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Early Successional Habitat Creation Project

Notice of Proposed Action and Opportunity to Comment

Green Mountain National Forest, Manchester Ranger District

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Introduction

The United States Department of Agriculture - Forest Service is proposing the Early Successional Habitat Creation (ESHC) Project located on National Forest System lands on the Green Mountain National Forest, Manchester Ranger District. The project area falls within multiple towns and counties in southern Vermont (see Figure 1 and Appendix C). The ESHC Project includes proposed management activities to achieve resource goals, objectives, and desired future conditions as outlined in the 2006 Green Mountain National Forest Land and Resource Management Plan, or Forest Plan.

The ESHC Project is designed to increase the regenerating age class (0 to 9 years old) of forested stands on about 17,411 acres over a 15-year period to provide habitat for neotropical migrant passerine birds (or perching birds) and other wildlife species requiring early successional habitats. Proposed project activities, chiefly commercial timber harvests, would create temporary openings in lowland and upland habitats across a large portion of the Manchester Ranger District.

The ESHC Project proposal must comply with the National Environmental Policy Act (NEPA) prior to proceeding with any activities. The application of NEPA requires public participation, the disclosure of environmental effects of proposed activities, and preparation of a decision document providing specific direction for project implementation. The environmental analysis for the proposed ESHC Project management activities will be documented in a site-specific environmental assessment.

The project environmental analysis will follow an adaptive management approach with less time focused on pre-NEPA field inventory. Environmental effects will be based on the assumption the project would be implemented with the application of design criteria developed for each resource. Although the project will be planned with the best available information, site-specific surveys would be delayed until after the analysis is complete just prior to implementation. It is during this post-decision survey period when proposed activities would be confirmed and verified for compliance with Forest Plan direction and project design criteria. Proposed treatment areas may be modified or dropped to ensure resource effects are within the range disclosed in the environmental assessment.

The Forest Service will develop an implementation guide, which will include monitoring, to ensure treatments are consistent with the final decision and treatments result in the intended effects. The implementation guide will aid in tracking adaptive management actions that occur due to new or more detailed information being received just prior to or at the time of project implementation.

Public Involvement

The ESHC Project was listed in the Green Mountain National Forest Schedule of Proposed Actions in April 2018 and will be updated quarterly until the project environmental analysis process is complete. A public open house providing proposed project content and intent was held in Manchester Center, VT on March 26, 2018 with over 30 individuals attending. Although largely supportive, some public feedback and comment was used to finalize the proposed action.

The United States Forest Service invites you to comment on the proposed ESHC Project during this 30-day opportunity for public comment. Your thoughtful input will help identify issues related to the proposal, determine whether any alternatives need to be considered, focus effects analysis on resource concerns, and document results in an environmental assessment as the basis for the responsible official to

decide how to implement the project. Your comments can best be considered if they have a direct relationship to the proposed activities and include supporting reasons for any resource concerns. Directions for how to comment are included in the public scoping and opportunity to comment cover letter.

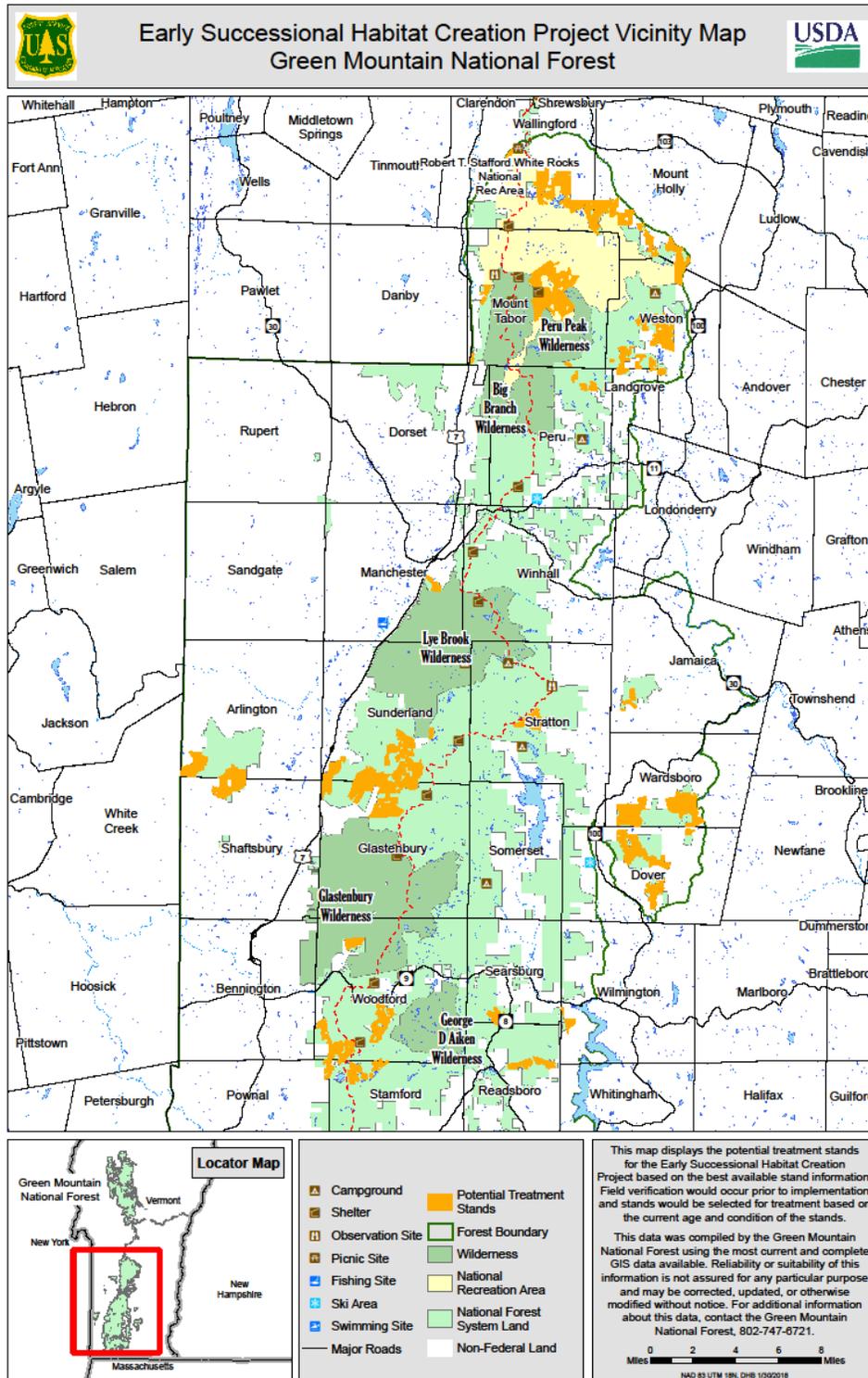


Figure 1: Project Area Vicinity Map

Pre-decisional Objection Process

The proposed ESHC Project would implement the Forest Plan and thus is subject to subparts A and B under the 36 Code of Federal Regulations part 218. These regulations provide for a project level pre-decisional administrative review (objection) process. In order to be eligible to object the draft decision notice for this project prior to implementation, timely submittal of specific written comments during the designated public comment period is required. This scoping period also serves as the formal 30-day notice and comment period and is the only opportunity for public comment for this project.

Decisions to be Made

The District Ranger for the Manchester Ranger District is the responsible official for the ESHC Project. The District Ranger will make the following decisions after reviewing the environmental assessment, supporting project record, and public comments received during the comment period:

- Determine whether the proposed action complies with Forest Plan direction including forest-wide and management area standards and guidelines
- Determine whether a finding of no significant impact or an environmental impact statement is warranted based on the disclosure of effects in the environmental assessment

If no environmental impact statement is needed, the following decisions will be made:

- Determine whether the ESHC Project will proceed as proposed or needs to be modified by an alternative to address issues
- Determine which specific design criteria or mitigation measures should be implemented as part of the project to ensure resource protection
- Determine what monitoring requirements, if any, should be applied during or after project implementation

Project Timeline

The Forest Service anticipates completing an environmental assessment and draft decision for this project by late summer 2018. The timing for the final project decision will depend on whether any objections are received but is anticipated to be no later than fall 2018. Implementation of activities may begin after the final decision notice is signed by the responsible official.

Project Area

The project area for the ESHC Project includes all stands proposed for potential treatment as well as the roads and trails needed for access. Stands are located on National Forest System lands across the Manchester Ranger District which extends from the Vermont-Massachusetts border north to Route 140 in Wallingford, VT and from the Vermont-New York border east to South Wardsboro Road in Wardsboro, VT (see Figure 1 and Appendix C).

Forest Plan Direction

The ESHC Project is guided by management direction in the 2006 Green Mountain National Forest Land and Resource Management Plan (Forest Plan). The project proposal has been designed to move the existing condition of National Forest System lands within the project area toward specific Forest Plan goals and objectives and Management Area desired future conditions. The project area falls within the following Management Areas:

- Diverse Forest Use
- Diverse Backcountry
- Remote Wildlife Habitat
- Robert T. Stafford White Rocks National Recreation Area
- Green Mountain Escarpment

Purpose of Action

The Forest Plan goals, objectives, and management direction for the desired future condition of resources are the primary drivers for defining the purpose of the ESHC Project proposed action. Direction specific to the regenerating age class (forested stands 0-9 years old), also referred to as early successional habitat, has been especially considered for this project.

Forest-wide Management Direction

The purpose of this action is to meet Forest Plan Goal 2. Goal 2 promotes management activities that maintain and restore the quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals (Forest Plan, page 10). In order to contribute to this goal, the Forest Plan identifies forest habitat type composition and age class objectives to ensure diversity of composition, structure, and function is maintained or increased on the Green Mountain National Forest (Forest Plan, pages 10 to 12).

The purpose of the ESHC Project is to achieve the following specific Forest Plan objectives:

- Increase the acreage of the regenerating age class (0 to 9 years) to provide a variety of habitat conditions for wildlife and balanced age-class distribution which include (Forest Plan, Table 2.2.2, page 11):
 - 10 to 20 percent aspen
 - 5 to 15 percent each of birch, mixedwoods/softwoods, and oaks
 - 5 to 10 percent northern hardwoods
- Increase aspen/birch forest and regenerating forest to support species preferring these habitats (Forest Plan, page 10)
- Manage aspen-birch habitat so 1 to 5 percent of National Forest System lands are of this type (Forest Plan, Table 2.2-1, page 11)
- Provide for a sustainable supply of forest products (Forest Plan, page 14) which includes maintaining or improving forest health
- Restore and improve wetland resources (Forest Plan, page 13)

The Forest Plan describes the major emphasis and desired future conditions for each Management Area.

Partner Collaboration

The management goals of our partners are also important considerations for the project purpose. The Mennen Environmental Foundation and the Ruffed Grouse Society have a mutual interest to increase the acreage of early successional habitat for bird species in southern Vermont. The Mennen Environmental Foundation is interested in maximizing neotropical migrant passerine diversity, while the mission of the

Ruffed Grouse Society is to improve land for the ruffed grouse and American woodcock, two gamebird species that require early successional habitat. Both organizations desire to work with the Forest Service to achieve Forest Plan goals and objectives that promote early successional habitat on National Forest System lands. They have helped during the planning stage of the project.

Need for Action

The need for action is determined by the difference between the existing condition and desired future condition within the project area. There is a need to:

- Create desired early successional habitat conditions (see Table 1)
- Promote aspen-birch habitat type
- Maintain forest health
- Improve wetland habitat

Timber harvesting is the primary tool to achieve these Forest Plan objectives and moving management toward desired future conditions for creating and maintaining healthy, productive forests and quality habitats (Forest Plan, page 15). It is also used to enhance habitats and features of particular value to certain plant and animal species where that habitat is uncommon in the forest, such as aspen, upland openings, hemlock, and oak. A wide range of even-aged and uneven-aged silvicultural harvest methods are available to achieve these objectives (Forest Plan, pages 23 to 25).

Explanation for the Need for Action

Create Early Successional Habitat Conditions

The key need this project would address is the discrepancy between the existing and desired amount of early successional habitat on the Manchester Ranger District. Inventory data demonstrates a lack of forested stands within the 0 to 9 year age class (see Table 1).

Table 1: Comparison of existing amounts of 0 to 9 year old forested stands and Forest Plan objectives on the Manchester Ranger District

Habitat Type	Existing Condition (percent)	Forest Plan Objectives (percent) ¹
Northern Hardwood	<1	5-10
Mixedwood	<1	5-15
Softwood	<1	5-15
Aspen	13	10-20
Birch	<1	5-15
Oak	<1	5-15
All Habitat Types	<1	N/A

¹ Age class objectives only apply to suitable lands using even-aged silvicultural systems within the Diverse Forest Use, Diverse Backcountry, Remote Wildlife Habitat, and Green Mountain Escarpment Management Areas (Forest Plan, page 11).

Regenerating forest stands 0 to 9 years old provide important early successional habitat for a number of wildlife species. These include species such as ruffed grouse, woodcock, wild turkey, deer, bear, bobcat, and snowshoe hare, as well as many passerines such as the eastern bluebird, chestnut-sided warbler, common yellowthroat, song sparrow, and American goldfinch (Forest Plan Final Environmental Impact Statement, page 3-102).

The focus of this project is to provide early successional habitat for neotropical migrant passerine birds. Neotropical migrant passerines include all species of perching birds that breed in the United States and/or Canada and winter in Mexico, Latin America, the Caribbean, and/or South America. The Neotropical Migratory Bird Conservation Act lists 386 species that fall into this category, including the five passerines listed above. A number of species on the list, such as the golden-winged warbler and willow flycatcher, occur in Vermont, breed in early successional habitats, and are declining in population in part because of habitat loss within their breeding season ranges. In addition, many other neotropical migrants that nest in mature forest, such as the blue-headed vireo, black-throated blue warbler, and Swainson's thrush, forage extensively in early successional habitats after the young have fledged.

Promote Aspen-Birch Habitat Type

Inventory data also shows that the existing aspen-birch habitat type only makes up 2.1 percent of National Forest System lands on the Manchester Ranger District, which is within the lower range of the Forest Plan composition objective of 1 to 5 percent. This habitat type is early successional in nature, so efforts to increase early successional habitat in general would likely increase aspen-birch habitat.

Maintain Forest Health

The vast majority of stands that are to be considered for treatment are infected by beech bark disease, which causes fungal infections that lead to severe defects and mortality in beech trees. There is a need to salvage or remove these diseased trees while creating conditions favorable for other tree species, such as aspen and birch, to regenerate to fully utilize the site, providing an indirect benefit of this project. Beech is one of the most shade-tolerant tree species in the project area and also sprouts vigorously. In many stands with shaded conditions, beech is the only regeneration in the understory and would eventually replace the overstory trees. However, these beech trees would be short-lived due to disease and unable to maintain full forest canopy. As they die, they would in turn be replaced by more beech regeneration. This cycle would continue into the foreseeable future without treatment.

Improve Wetland Habitat

Part of Forest Plan Goal 4 is to maintain or restore wetland habitats (Forest Plan, page 13), and management can help improve the condition of this resource (Forest Plan, page 22). Wetland areas associated with beaver activities along perennial streams exist throughout the project area. Some species not typically found in upland habitat favor early successional wetland habitat, such as the yellow warbler and willow flycatcher. The creation of early successional habitat conditions adjacent to and within wetlands would benefit these species.

Proposed Action

The Forest Service proposes management activities to increase early successional habitat conditions, promote aspen-birch habitat, and maintain forest health across the Manchester Ranger District. These activities are summarized in Table 2.

Table 2: Summary of proposed management activities

Management Activity	Amount Proposed
Vegetation treatments ¹	Up to 17,411 acres
Developing road infrastructure	Up to 3 to 5 miles of new roads per year, up to 2 miles of which may be constructed to permanent road standards ²
Site preparation for natural regeneration (mechanized equipment, hand tools, and/or prescribed fire)	Up to 17,411 acres
Wetland habitat enhancement	Up to 9 acres of vegetation treatments Installation of up to 18 bird nesting boxes
Placement of interpretive signs	Up to 5 in high-visibility areas

¹ Up to 1,000 acres annually for a 15-year period.

² A total of 3 to 5 miles of new roads may be constructed each year. Of this, up to 2 miles may be permanent roads while the rest would be temporary.

Vegetation Treatments

Potential harvest treatments are proposed for stands totaling up to 17,411 acres with between 500 to 1,000 acres harvested annually over a 15-year period (see Table 2, Appendix A, and Appendix C). Each stand proposed for harvest, the associated Management Area, and size in acres are provided in Appendix A. All activities are designed to be consistent with all Forest-wide and Management Area standards and guidelines in the Forest Plan. The key Forest Plan standards for this project that vary by Management Area pertain to restrictions on the size of created temporary openings (see Table 3).

Table 3: Proposed harvest acres for each Management Area

Management Area	Total Proposed Harvest Acres	Maximum Temporary Opening Size (acres) ¹
Diverse Forest Use	7,631	30
Diverse Backcountry	3,637	20
Remote Wildlife Habitat	2,409	20
Green Mountain Escarpment	1,176	30
Robert T. Stafford White Rocks National Recreation Area	2,559	5 ²
Total	17,411	

¹ Forest Plan Forest-wide and Management Area standards (Forest Plan, pages 26, 59, 61 and 80).

² The Forest Plan states that temporary openings in Robert T. Stafford White Rocks National Recreation Area shall be *less than* 5 acres in size (Forest Plan, page 80).

Stands proposed for treatment were selected based on proximity to existing roads, presence of aspen/paper birch, presence of beech infected with beech bark disease, presence of declining overstory with limited suitable tree regeneration (meaning no or minimal tree regeneration, or existing regeneration is more than 50 percent beech) in the understory to grow into the overstory, and the economic viability of potential harvests.

Harvest methods proposed include even-aged regeneration (clearcut with reserves, patch cuts, and shelterwood) and uneven-aged treatments (group selection) to create temporary openings (see Table 4).

Table 4: Description of proposed timber harvest methods

Harvest Treatment Method	Description	Example Photograph
Clearcut with reserves	Creates a temporary opening of greater than five acres. At least five percent of each stand would be reserved from harvest to provide wildlife trees and greater structural diversity.	
Patch cuts	Creates a temporary opening of three to five acres. Trees with high wildlife value, such as those with cavities or exfoliating bark, can be reserved from harvest.	
Shelterwood	A portion of the existing overstory is retained to provide shelter to regeneration, to allow vigorous young trees to continue growing, and/or to provide greater forest structure. Trees with high wildlife value are also retained individually or in clumps.	
Group selection	Group openings are created throughout a stand ranging in size from one to two acres in order to provide early successional benefits. Group openings are scattered throughout the stand to equal 10 to 20 percent of the total stand acres.	

Harvest treatment acres would be sited adjacent to each other over multiple time intervals within a 15-year time frame starting from project initiation. This would create a mosaic of varied habitats (in terms of age-class and species composition) within close proximity (see Figure 2 for a visual example of an area with three treatments over 15 years).

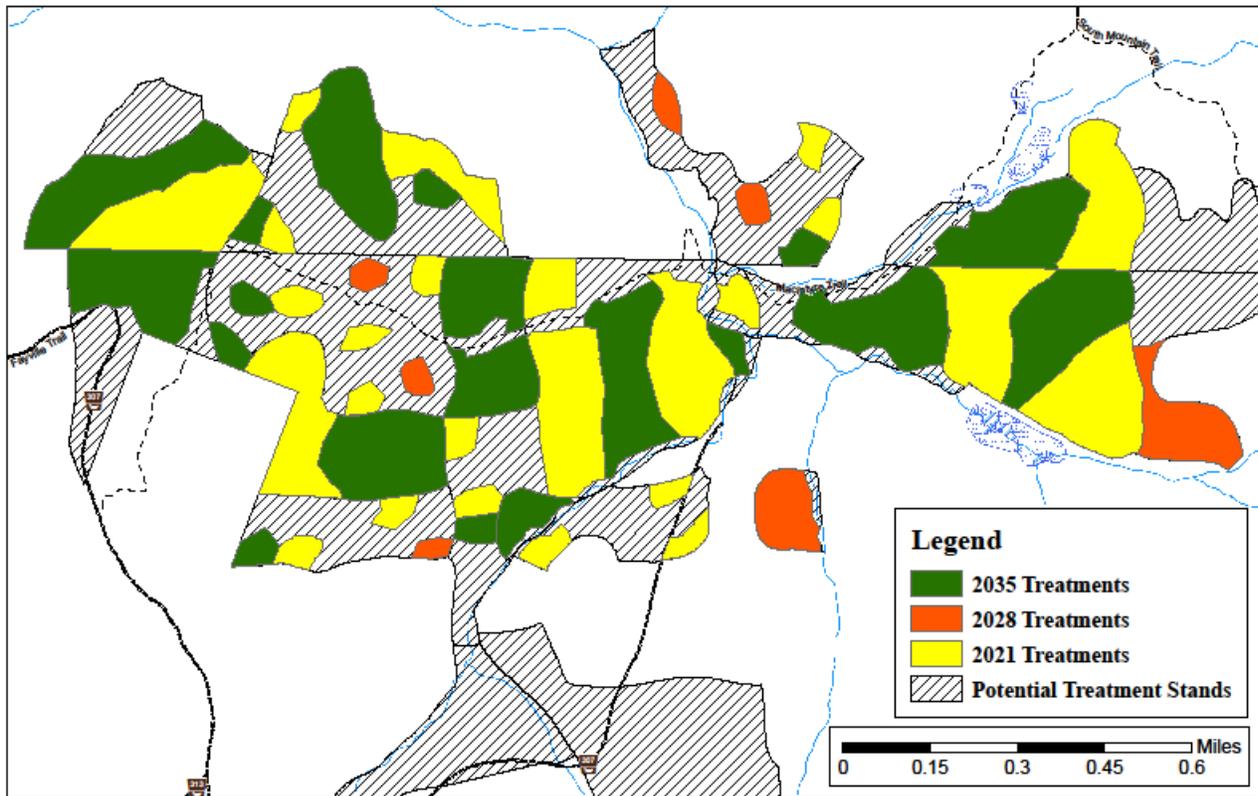


Figure 2: Example of treatment layout over time and space¹.

¹ Note that temporary openings should not be created directly adjacent to previously regenerated areas until the average height of the adjacent area reaches a minimum of 15 feet (Forest Plan, page 26).

Selection of the harvest method for each stand would be based on site-specific conditions and factors determined prior to timber sale planning and implementation (see Table 5).

In general, when aspen and/or birch are present, harvest treatments would be designed to regenerate these species. In stands with mature overstory trees and little or no acceptable regeneration in the understory, harvest treatments would also be designed to establish mid-tolerant species (such as red maple, yellow birch, northern red oak, and eastern white pine) and shade-intolerant species (such as aspen, paper birch, and black cherry).

In stands dominated by beech regeneration, harvest treatments would be designed to reduce the amount of beech for the purpose of establishing other desired species, including aspen and birch. Silvicultural treatments such as single tree selection or group selection with small group size are ineffective in these stands, as they create light conditions that favor the understory beech. Further, removal of the diseased beech under these systems would cause beech sprouting, and these sprouts would also be favored by post-harvest light conditions. For these reasons, silvicultural treatments that create openings with full sunlight reaching the ground to favor species mid-tolerant to intolerant of shade would be preferred to reduce the amount of beech regeneration and increase species diversity.

Feral apple trees found within stands proposed for treatment would be retained, and if necessary, released from competing vegetation with hand tools.

Table 5: Stand conditions, factors and considerations for harvest method selection

Harvest Treatment Method	Conditions, Factors, and Considerations ¹
Clearcut with reserves	<ul style="list-style-type: none"> • In stands where the desire is to establish shade-intolerant species such as aspen and birch. • In stands where beech dominates the advance regeneration (greater than 50 percent of stocking) or where there is little advance regeneration.
Patch cuts	<ul style="list-style-type: none"> • In younger stands with aspen clumps where treatment of the entire stand is not economically feasible due to tree size, but where it is desirable to harvest the aspen since they are at an age when they would sprout vigorously after harvest. • In the Robert T. Stafford White Rocks National Recreation Area, where management direction limits opening size to five acres or less.
Shelterwood	<ul style="list-style-type: none"> • Where there are visual concerns, in stands that have partial stocking of vigorous trees that would be desirable to retain, or where greater structural diversity is desirable.
Group selection	<ul style="list-style-type: none"> • Where there are visual concerns, in stands with variable stocking and quality, or in stands that have previously been managed with group selection treatment. Lower quality areas would be treated first while higher quality areas would be retained for later groups.
Whole tree harvesting	<ul style="list-style-type: none"> • In stands where aspen clearcuts would be implemented so that optimum conditions for aspen regeneration are created (e.g. light and growing space).
Summer/dry ground harvesting	<ul style="list-style-type: none"> • In stands without existing vigorous aspen and paper birch, to create bare soil seedbed suitable for aspen and paper birch to establish by seed.

¹ This list of conditions, factors, and considerations is not exhaustive but provides a general guide for treatment selection when planning for implementation.

Developing road infrastructure

The existing National Forest, town, and state road systems would be used for log truck and equipment access to forested stands for harvest activities. Access to potential treatment areas was an important consideration during the development of the project proposal. Some existing roads may need maintenance and reconstruction to meet the appropriate standards. Based on past timber sale experience on the Green Mountain National Forest, it is estimated approximately 20% of existing roads used to facilitate timber harvest require reconstruction and the majority would require some maintenance. In general, Operational Maintenance Level (OML) 1 roads, which are closed to vehicle traffic, require more work than OML 2 through 5 roads, which are open to the public. In addition, a total of 3 to 5 miles of new roads would be proposed annually to access harvest treatment areas (see Table 6). Of this, up to 2 miles may be constructed to permanent OML 1 road standards while the rest would be constructed to temporary road standards.

Table 6: Road infrastructure proposed to access harvest treatment areas

Road Infrastructure Activity	Conditions, Factors, and Considerations
Maintenance or reconstruction of existing roads	<ul style="list-style-type: none"> • Approximately 56 percent of the stands are estimated to be entirely within one-quarter of a mile from Forest System, town, or state roads. Current logging equipment is capable of skidding harvested timber this distance to existing roads (based on equipment limitations, risk to soil, and economic feasibility). • Some existing roads may need maintenance or reconstruction to meet the appropriate standard for their intended use by logging trucks and equipment. • Improvements may include clearing brush, limited road widening, gravel placement, installing and/or repairing culverts, and ditching and shaping of roads.
Construction of up to three to five miles of temporary road annually	<ul style="list-style-type: none"> • Where stands, or portions of stands, are located further than one-quarter of a mile from an existing road, temporary road construction may be required. • Approximately 17 percent of stands proposed for treatment are within one-quarter of a mile of an existing unclassified road (which includes snowmobile trails). These may need to be improved upon to meet temporary road standards. • Approximately 14 percent of the stands are partially within one-quarter of a mile of an existing or unclassified road. These may require a small amount of temporary road construction to access the portions of the stands that are beyond one-quarter of a mile from a road. • Approximately 13 percent of the stands are more than one-quarter of a mile from an existing or unclassified road and would require temporary road construction to access any part of the stands. • Approximately half of the temporary roads would be constructed over known existing unclassified roads, such as snowmobile trails. In other areas, temporary roads may be located on existing roadbeds, old temporary roads, skid trails, or other types of trails.
Construction of up to two miles of OML 1 permanent road annually where site conditions warrant	<ul style="list-style-type: none"> • The construction of new permanent Operational Maintenance Level 1 roads or reconstruction or relocation of existing system or non-system roads may be necessary based on future resource management needs including but not limited to timber, vegetation and wildlife habitat management. • When permanent roads are relocated, the existing system road shall be decommissioned and closed. • Final road level and location needed for each proposed treatment area would be determined by conditions such as soil type, soil moisture content, slope, stream crossings, and proximity to wetlands or other sensitive resources. • Forest Service timber and engineering staff will determine the appropriate locations which will be reviewed by relevant resource specialists prior to implementation.

Temporary roads would be the preferred option for accessing stands. The difference between temporary and permanent OML 1 roads are as follows:

- Temporary roads: These are minimum-standard roads designed for short-term use during a specific project and are built at a minimum width to allow for the passage of equipment. After their use, any culverts and crossing structures would be removed and the road template would be returned to pre-existing conditions. The roads would be blocked with organic material, berms, or barriers to prohibit motorized vehicle access and allow the roadbed to naturally re-vegetate.
- Permanent OML 1 roads: These are intermittent service roads that are closed to vehicle traffic when not needed for management activities. They would be constructed using native material as well as imported gravel. Drainage structures would be placed as needed. The width of the roads would be fourteen feet with ditches or fill slope extending out to four feet wider than the road surface. Drainage structures would be removed following use. Basic custodial maintenance is performed during times of non-use to minimize damage to adjacent resources.

New log landings and skid roads/trails would also be constructed in locations needed to access all areas being considered for harvest. Landings are typically between one-quarter and one-half acre in size.

Estimates on the anticipated miles of temporary and permanent roads and maintenance and reconstruction of existing roads are part of the proposed action so impacts from these activities can be fully analyzed. The specific level, amount, and location of road infrastructure needed would be based upon site-specific conditions identified during project planning at the time of implementation. Design criteria and best management practices are used to minimize the impacts and costs of road use and construction. For example, existing roads would be used to the extent possible. If access cannot economically be achieved in accordance with the design criteria and best management practices, then stands would be excluded from treatment.

There will be no change in public motorized use as a result of this decision. Until a separate decision is made, all roads currently open to public motorized use will remain open, and all roads closed to public motorized use will remain closed.

Site Preparation and Planting

Site preparation would occur in all stands following harvest activities to create conditions favorable for establishing tree regeneration and to remove undesirable stems of existing saplings. This would be accomplished primarily with hand tools such as chainsaws or brushsaws. Mechanized equipment, such as tractors, may be used as well. Prescribed burning (which may include the construction of fire lines) may be used in cases where desirable oak regeneration is present, or if there is a large amount of retained organic material left after harvest that would impede seedling establishment.

Planting of oak and hickory species, or other species predicted to do well in future weather conditions, would be considered on south/west facing slopes and other appropriate sites as determined by a silviculturist.

Wetland Habitat Enhancement

In nine discrete wetlands or wetland complexes within the project area (see Table 7), trees would be felled, but not harvested, within 100 feet of the wetland boundary, right up to the water's edge. Leaving the trees on the ground to simulate natural wind throw events would provide valuable habitat for reptiles, amphibians, mammals, and invertebrates adjacent to or within wetlands. Up to nine total acres would be

treated in this fashion, or approximately one acre per wetland. The compartments and stands listed in Table 6 can be found on the maps in Appendix C.

In addition, up to two bird nesting boxes may be installed around the perimeter of each wetland to provide cavity nesting habitat.

Table 7: Wetlands proposed for habitat enhancement

Associated Stream	Compartment	Stand(s)	Management Area
North Alder Brook	89	2, 12, 46	Diverse Backcountry
Ball Mountain Brook UT	179	9	Remote Wildlife Habitat
Stamford Stream	128	56	Diverse Backcountry
	129	60, 63, 70, 71	
Big Branch	19	7, 10, 19	White Rocks NRA
Utley Brook UT	44	23, 25	Diverse Forest Use
City Stream UT	134	5, 8	Diverse Forest Use
Jenny Coolidge Brook UT	30	6	Diverse Forest Use
West Branch Deerfield River UT	122	2, 16	Diverse Forest Use
Ellis Brook	53	3, 8, 9	Diverse Forest Use

UT = Unnamed Tributary; NRA = National Recreation Area

Design Criteria

An interdisciplinary team of Forest Service specialists have developed design criteria to achieve management objectives for other resources and to minimize or eliminate any potential effects to natural and cultural resources in the project area (Appendix B). Design criteria ensure projects are implemented in a manner that is consistent with Forest Plan Standards and Guidelines. These include habitat enhancement features for wildlife, measures to reduce the spread of invasive species, and protective measures for rare plant and animal habitats, riparian areas, fisheries, soil and water resources, visual quality objectives, recreation opportunities, and cultural resources.

The Forest Service is anticipating site-specific conditions would vary and require the application of different types of design criteria depending on the type of vegetation treatment method, level of road access selected, and/or other site-specific factors. The ESHC Project would be planned with the best available information; however, all site-specific information would not be available before a decision is made to implement. Therefore, closer to the time of implementation (such as when planning specific timber sales), the stands selected for treatment and potential road/access locations would be evaluated through field inventory and survey. The appropriate design criteria would then be identified and required during implementation. This would ensure that resources would be protected under the variety of expected management activities proposed and any effects would be minimized to acceptable levels.

For example, some design criteria would require field surveys prior to implementation to ensure that impacts to any rare or sensitive resources are minimized or avoided. Many of these resources may change during the 15-year period that implementation would occur. Completion of surveys and inventories closer to the actual time of implementation can better ensure the most accurate information is used to implement the project and protect these resources. An added benefit of this approach is the ability to adapt the design criteria (within the defined parameters of the criteria in Appendix B) if monitoring results demonstrate changes are needed to protect a given resource or better achieve objectives.

Appendix A: List of stands included in the ESHC Project.

Compartment	Stand	Area (acres)	Management Area ¹	Compartment	Stand	Area (acres)	Management Area ¹
1	1	10	GME	52	8	44	DFU
1	2	17	NRA	52	9	44	DFU
2	4	15	NRA	52	10	76	DFU
3	1	23	NRA	53	1	19	DFU
3	4	69	NRA	53	3	52	DFU
3	6	23	NRA	53	6	35	DFU
3	7	17	NRA	53	8	36	DFU
3	8	19	NRA	53	9	140	DFU
3	9	20	NRA	53	11	44	DFU
3	10	27	NRA	53	12	72	DFU
3	13	18	NRA	53	13	108	DFU
3	15	17	NRA	53	14	103	DFU
3	18	11	NRA	53	16	23	DFU
3	22	14	NRA	53	22	5	DFU
3	24	18	NRA	53	29	22	DFU
3	26	18	NRA	89	2	4	DBC
3	31	55	NRA	89	12	35	DBC
3	32	12	NRA	89	46	1	DBC
3	33	17	NRA	89	46	6	DBC
3	35	14	NRA	91	1	38	DBC
3	36	60	NRA	91	4	7	DBC
3	39	34	NRA	91	6	57	DBC
3	40	46	NRA	91	14	18	DBC
4	1	10	DFU	91	17	61	DBC
4	3	9	DFU	91	18	39	DBC
4	4	95	DFU	91	20	45	DBC
4	6	21	NRA	91	21	20	DBC
4	10	26	DFU	91	22	26	DBC
4	11	14	DFU	91	24	3	DBC
4	12	23	DFU	91	25	16	DBC
4	13	21	DFU	91	26	12	DBC
4	14	60	DFU	91	26	6	DBC
4	15	90	DFU	91	32	58	DBC
4	17	89	DFU	91	33	33	DBC
4	18	57	DFU	91	34	22	DBC
4	19	14	DFU	91	36	28	DBC
4	20	55	DFU	91	38	49	DBC
4	22	17	DFU	91	39	31	DBC
5	1	13	DFU	91	40	13	DBC
5	2	44	DFU	91	41	54	DBC
5	3	22	DFU	91	42	27	DBC
5	4	16	DFU	91	44	26	DBC
5	5	12	DFU	91	48	36	DBC

Compartment	Stand	Area (acres)	Management Area ¹	Compartment	Stand	Area (acres)	Management Area ¹
5	6	14	DFU	92	8	16	DBC
5	7	30	DFU	92	26	17	DBC
5	8	16	DFU	92	27	47	DBC
5	9	27	DFU	92	28	31	DBC
5	11	7	DFU	92	29	10	DBC
5	12	39	DFU	92	30	49	DBC
5	13	10	DFU	92	31	146	DBC
5	14	16	DFU	92	42	56	DBC
5	15	17	DFU	92	44	6	DBC
5	16	30	DFU	92	46	5	DBC
5	18	10	DFU	92	47	70	DBC
5	19	17	DFU	92	48	31	DBC
5	21	9	DFU	92	49	10	DBC
6	27	37	GME	92	51	32	DBC
6	29	11	DFU	94	6	9	DBC
9	1	9	GME	94	7	16	DBC
9	4	11	DFU	94	8	3	DBC
9	4	6	DFU	94	10	20	DBC
9	5	8	DFU	94	12	8	DBC
9	6	30	DFU	94	15	203	DBC
9	7	23	DFU	117	6	3	DFU
9	8	32	DFU	122	2	59	DFU
9	9	15	DFU	122	16	30	DFU
9	10	39	DFU	122	41	68	DFU
9	11	16	DFU	122	43	77	DFU
9	12	15	DFU	128	56	134	DBC
9	13	16	DFU	129	1	96	DBC
9	19	15	DFU	129	15	56	DFU
9	20	6	DFU	129	16	89	DFU
9	21	8	DFU	129	24	23	DFU
9	22	22	DFU	129	26	31	DFU
9	23	27	DFU	129	27	46	DFU
9	24	13	DFU	129	32	34	DFU
9	25	32	DFU	129	44	69	DFU
10	1	43	NRA	129	49	42	DBC
10	6	18	NRA	129	54	36	DBC
10	7	25	NRA	129	56	47	DBC
10	42	32	NRA	129	57	73	DBC
10	45	82	NRA	129	60	37	DBC
10	46	78	NRA	129	60	13	DBC
12	54	5	NRA	129	63	85	DBC
13	1	3	DFU	129	70	19	DBC
14	1	9	DFU	129	71	56	DBC
14	2	22	DFU	129	75	14	DFU
14	3	22	DFU	133	2	11	DBC
14	5	33	DFU	133	6	28	DBC

Compartment	Stand	Area (acres)	Management Area ¹	Compartment	Stand	Area (acres)	Management Area ¹
14	15	26	DFU	134	5	51	DFU
14	21	29	DFU	134	8	54	DFU
14	22	56	DFU	134	9	11	DFU
14	23	126	DFU	134	15	38	DFU
14	24	40	DFU	134	26	31	DFU
15	2	23	DFU	141	2	51	DBC
15	3	57	DFU	141	3	32	DBC
15	4	13	DFU	141	6	55	DBC
15	5	7	DFU	141	9	20	DBC
15	6	11	DFU	141	10	18	DBC
15	18	27	DFU	141	12	30	DBC
15	19	33	DFU	141	14	81	DBC
15	20	4	DFU	141	25	64	DBC
15	21	23	DFU	141	102	1	DBC
15	22	7	DFU	142	4	28	DFU
15	23	18	DFU	142	9	7	DFU
15	25	6	DFU	142	13	41	DFU
15	26	8	DFU	144	2	47	GME
15	27	10	DFU	144	3	56	GME
15	32	96	DFU	144	7	76	GME
19	1	74	NRA	144	8	37	GME
19	2	125	NRA	144	9	56	GME
19	5	18	NRA	144	11	25	DBC
19	6	44	NRA	144	12	51	DBC
19	7	414	NRA	144	14	63	GME
19	8	41	NRA	144	15	26	GME
19	10	12	NRA	144	16	16	GME
19	11	42	NRA	144	17	21	GME
19	12	26	NRA	144	18	28	GME
19	13	7	NRA	144	19	62	DBC
19	14	14	NRA	144	20	41	DBC
19	15	23	NRA	144	21	8	GME
19	16	12	NRA	144	22	19	GME
19	17	8	NRA	144	23	37	DBC
19	19	50	NRA	144	27	11	GME
19	20	38	NRA	144	27	16	GME
19	28	92	NRA	144	28	9	GME
19	29	147	NRA	144	29	4	GME
19	31	126	NRA	144	30	30	GME
19	32	9	NRA	144	31	54	GME
19	36	120	NRA	145	11	24	GME
19	39	12	NRA	145	14	25	GME
19	40	12	NRA	145	15	84	GME
19	42	30	NRA	145	16	17	GME
23	8	48	NRA	145	17	15	GME
23	11	12	NRA	145	18	51	GME

Compartment	Stand	Area (acres)	Management Area ¹	Compartment	Stand	Area (acres)	Management Area ¹
23	20	67	NRA	145	19	8	GME
23	21	15	NRA	145	22	9	GME
23	37	23	NRA	145	24	25	GME
23	38	10	NRA	145	26	45	GME
23	39	4	NRA	145	27	10	GME
23	40	16	NRA	145	28	8	GME
25	16	72	RWH	145	29	44	GME
28	3	70	DFU	145	30	55	GME
28	4	41	DFU	145	32	44	GME
28	5	15	DFU	145	33	9	GME
28	6	17	DFU	145	103	5	GME
28	7	7	DFU	149	6	34	RWH
28	8	14	DFU	149	7	9	RWH
28	9	17	DFU	149	8	17	RWH
28	10	13	DFU	149	11	11	RWH
28	11	41	DFU	149	14	15	RWH
28	12	29	DFU	156	16	17	DFU
28	13	14	DFU	156	17	62	DFU
28	14	22	DFU	156	18	40	DFU
28	15	31	DFU	172	2	36	GME
28	20	5	DFU	172	3	28	DBC
30	6	86	DFU	172	4	33	DBC
30	8	21	DFU	172	10	57	DBC
30	12	10	DFU	172	11	25	DBC
30	13	7	DFU	172	12	99	DBC
30	14	174	DFU	172	13	6	DBC
30	16	23	DFU	172	14	35	DBC
30	17	7	DFU	172	15	25	DBC
30	18	6	DFU	172	18	36	DBC
30	20	29	DFU	172	20	221	DBC
31	1	6	DFU	172	22	39	DBC
31	2	17	DFU	172	23	5	DBC
31	4	28	DFU	172	24	20	DBC
31	5	19	DFU	172	25	82	DBC
31	8	49	DFU	174	3	19	DFU
31	10	77	DFU	174	4	10	DFU
31	12	29	DFU	174	6	15	DFU
31	13	52	DFU	174	7	4	DFU
31	14	9	DFU	174	8	51	DFU
31	15	25	DFU	174	9	44	DFU
31	16	46	DFU	174	19	62	DFU
31	17	23	DFU	174	20	15	DFU
31	18	4	DFU	174	21	27	DFU
31	19	5	DFU	174	22	10	DFU
31	20	8	DFU	174	23	21	DFU
31	23	7	DFU	174	24	58	RWH

Compartment	Stand	Area (acres)	Management Area ¹	Compartment	Stand	Area (acres)	Management Area ¹
31	25	15	DFU	174	25	46	RWH
38	7	8	GME	179	9	53	RWH
38	15	19	DFU	179	11	9	RWH
38	16	4	DFU	181	2	22	RWH
38	21	19	GME	181	3	62	RWH
38	22	3	GME	181	4	41	RWH
39	4	26	DFU	181	14	17	RWH
43	7	50	RWH	181	15	16	RWH
43	15	21	RWH	181	16	31	RWH
43	22	14	RWH	181	17	7	RWH
43	23	7	RWH	181	18	5	RWH
43	26	35	RWH	181	19	29	RWH
43	31	30	RWH	181	31	16	RWH
43	64	16	RWH	184	7	17	DBC
44	2	37	DFU	184	14	20	DBC
44	4	3	DFU	184	15	38	DBC
44	5	14	DFU	184	16	33	DBC
44	8	6	DFU	184	17	15	DBC
44	10	12	DFU	184	19	2	DBC
44	13	55	DFU	186	2	45	DFU
44	14	6	DFU	186	999	895	RWH
44	15	5	DFU	192	1	33	DFU
44	16	1	DFU	192	5	22	DFU
44	19	26	DFU	192	6	49	DFU
44	20	11	DFU	192	7	18	DFU
44	21	15	DFU	192	8	33	DFU
44	22	22	DFU	192	9	57	DFU
44	23	28	DFU	192	11	48	DFU
44	24	6	DFU	192	17	33	DFU
44	25	20	DFU	192	18	34	DFU
44	41	8	DFU	192	20	35	DFU
44	113	3	DFU	192	21	47	DFU
45	3	14	DFU	192	22	5	DFU
45	6	6	DFU	192	23	4	DFU
45	8	32	DFU	242	3	182	DFU
45	10	13	DFU	242	4	93	DFU
45	12	49	DFU	242	5	170	DFU
45	13	16	DFU	242	6	85	DFU
45	18	4	DFU	251	36	8	DFU
45	30	5	DFU	251	47	9	DFU
45	31	17	DFU	251	48	8	DFU
45	32	5	DFU	251	49	13	DFU
45	33	24	DFU	251	50	39	DFU
45	37	5	DFU	251	51	19	DFU
47	12	14	RWH	251	53	27	DFU
48	1	29	DFU	251	56	8	DFU

Compartment	Stand	Area (acres)	Management Area ¹	Compartment	Stand	Area (acres)	Management Area ¹
48	2	1	DFU	251	60	44	DFU
48	6	44	DFU	251	61	18	DFU
48	8	17	DFU	251	64	53	DFU
48	9	37	DFU	251	65	201	DFU
51	999	759	RWH	251	66	201	DFU
52	7	31	DFU	251	67	135	DFU

¹ GME = Green Mountain Escarpment; DBC = Diverse Backcountry; DFU = Diverse Forest Use; NRA = Robert T. Stafford White Rocks National Recreation Area; RWH = Remote Wildlife Habitat.

Appendix B: Design Criteria

Wildlife

1. Before each timber harvest and associated road construction may commence, consultation with the U.S. Fish and Wildlife Service must be completed if activities may affect a federally-listed species.
2. In order to protect both nesting birds (in particular neo-tropical migrant passerines) and bats, tree felling and clearing activities shall not be conducted from May 1 through July 31.
3. Potential Indiana bat roost trees (defined as any tree greater than or equal to eight inches diameter at breast height with exfoliating bark, cavities, or crevices) located under 1100 feet in elevation west of the spine of the Green Mountains and/or within five miles of a known Indiana bat hibernacula shall not be removed unless one of the following measures are taken:
 - a. Trees are surveyed for emerging bats
 - b. Trees are cut outside of the Indiana bat active season, including the fall swarming season (April 1 to November 15)
 - c. Trees are deemed as hazards that are likely to fall in the immediate future and could cause injury or death to people
4. When working in stands that are important black bear habitat as evidenced by high densities of black bears and/or the presence of bear-clawed beech trees, including all stands considered for treatment within Compartments 122, 149, 181, and 184, consult with the Vermont Fish and Wildlife Department to minimize impacts to bears and, when practicable, enhance bear habitat.
5. If threatened, endangered, or Regional Forester Sensitive Species (RFSS) are previously documented, located in surveys, or newly discovered, staff would recommend buffer zones and/or time-of-year restrictions as needed to protect the populations. Populations and protection measures would be reviewed on a case-by-case basis to determine the appropriate action. Guidelines in approved recovery plans, existing conservation approaches, other scientific literature, the 2006 Forest Plan, and professional judgment would be followed to protect these populations. The Responsible Official would make a final decision on protection measures.

Fisheries and Aquatic Habitat

1. As necessary to attain stabilization of roadbed and fill slopes of temporary roads, measures will be employed such as out-sloping, drainage dips, and water-spreading ditches.
2. Once temporary roads have served their purpose, restore roadbeds to the original landscape contour and remove all bridges and culverts. Eliminate ditches, out-slope roadbed, remove ruts and berms, effectively block the road to normal vehicular traffic where feasible under existing terrain conditions, and build necessary cross ditches and water bars.
3. When bridges and culverts are removed, associated fills shall also be removed to the extent necessary to permit normal maximum flow of water as well as normal floodplain and wetland functions.

4. Where permanent roads will be created, or where existing and/or unclassified roads will be improved, permanent stream crossing structures proposed for installation (new or replacement) on fish bearing streams shall allow for the passage of aquatic organisms, sediment, and wood.
5. Reshape streambank to preconstruction/natural shape to restore stream hydrology.

Sensitive Natural Communities

1. When planning work around rare and sensitive natural communities (as mapped by the Vermont Natural Heritage Inventory program) with a State Rank of S1 (critically imperiled) through S3 (vulnerable), do not conduct timber harvests or create roads or skid trails within 100 feet of the mapped communities.

Rare Plants

1. Site-specific botanical field surveys will be conducted prior to project implementation for habitats within the project area based on the Likelihood of Occurrence Table (see project file). If any plant listed as a Regional Forester Sensitive Species (RFSS) is found, specific measures to protect these plants would be developed by the Forest botanist so that the population does not lose viability, and the species does not trend toward federal listing. "Protect" means do not trample, fell trees on top of, or change the habitats of RFSS plants. Examples include winter logging to avoid trampling, marking rare plants with GPS and flagging to avoid trampling or felling trees on top of them, and excluding areas to avoid altering habitats.
2. An individual RFSS only needs to be searched for in the sites that, based on pre-field review, are likely to provide the species-specific habitat requirements (such as liminess, certain elevation, topography, etc.).
3. Where trees will be felled near wetlands, protect *Sphagnum pulchrum*, which occurs in wetlands.
4. If eastern dwarf mistletoe (*Arceuthobium pusillum*) is found in a wetland, do not cut the tree upon which it grows.
5. Search for and protect all plant RFSS listed as possible to occur in rich woodlands (including sugar maple/beech/yellow birch, sugar maple, and old field northern hardwoods forest types with a site index greater than 60).
6. Search for and protect leathery grapefern (*Botrychium multifidum*) and hay sedge (*Carex argyrantha*) in the one likely dry opening in the project area (Compartment 141, Stand 102).
7. Search for and protect all plant RFSS listed as possible to occur in dry woods (dry red maple/beech, beech, and red oak forest types) in western Vermont.
8. Protect rough cotton grass (*Eriophorum tenellum*) which is known to occur in Compartment 44, Stand 105.
9. Where work will occur along streams, protect plant RFSS listed as possible in seeps or along streams: boreale bedstraw (*Galium kamtschaticum*) and bog chickweed (*Stellaria alsine*). Given the extensive potential habitat, develop a sampling scheme and implement it, rather than searching all seeps or stream sides.

10. Where coniferous woods or mixed woods occur (red spruce/balsam fir and maple/beech/birch/spruce forest types), search for and protect round-leaved orchis (*Platanthera orbiculata*) and lesser wintergreen (*Pyrola minor*). Given the abundance of this type of habitat, and the very limited likelihood of locating either species (one tends to occur in very small populations that are easily overlooked and the other is very small in size), develop a sampling scheme and implement it, rather than searching all such stands.
11. Do not cut healthy butternut (*Juglans cinerea*) trees where they occur.

Non-native Invasive Plants

1. For stands that occur along roadsides, inventory for non-native invasive plants at least 500 feet in both directions on both sides of the road, and if landowner permission can be obtained (or it is National Forest System land next to a Forest Service road), treat any non-native invasive plants found prior to project implementation, using methods in keeping with 2010 Forest-wide Non-native Invasive Species Control Environmental Assessment and associated Decision Notice. Treat any non-native invasive plant infestations found from monitoring newly created early successional habitat stands after implementation activities are complete.
2. Based on results of any pre-field review, plus any botanical inventory that occurs, implement relevant best management practices as determined by the Forest Botanist, using the “Non-native Invasive Species Best Management Practices Guidelines for the U.S. Forest Service Eastern Region” (USDA FS 2012).
3. Perform risk assessments for stands that contain or are adjacent to infestations by using the “Non-native Invasive Species Framework for Plants and Animals in the U.S. Forest Service Eastern Region” (USDA FS R9 RLT 2003), and incorporate the results of the risk assessments into project implementation.
4. When seeding bare, disturbed soil resulting from project activities, use a Forest Service approved local, native plant mix. If unavailable, use a non-invasive seed mix approved by the Forest botanist.

Soils and Wetlands

1. Planning and implementation of all proposed activities would comply with the National Best Management Practices Program for Water Quality Management on National Forest System Lands
2. The following design criteria are applicable to ground disturbing vegetation management activities, such as commercial timber harvests and non-commercial vegetation treatments:
 - a. Bole-only harvesting would be done in all stands except those with aspen present where clearcuts are planned for aspen regeneration. This measure limits nutrient removal associated with harvesting.
 - b. Do not remove existing or created fine woody debris (i.e. no whole tree harvest) on sandy, nutrient-poor soils (see map of such areas in project file).
 - c. Do not remove stumps, roots, or other below-ground biomass. Do not remove litter.
 - d. Where whole-tree harvest is utilized (on unrestricted soils), retain fine woody material present before harvest except on roads, skid trails, and landings; retain fine woody

material resulting from incidental breakage of tops and limbs in the general harvest area. Disperse residues throughout the site.

- e. Retain existing coarse woody material. It can be moved to allow for safe operations in the harvest area (i.e. off roads, skid trails and landings).
 - f. Leave tops and limbs used to stabilize soil on roads or skid trails in place following harvest operations. Tops and limbs may be used to cross small wet drainages, but must be removed from drainages prior to sale close-out.
 - g. Scatter tops and limbs throughout harvested stands.
 - h. Do not operate heavy machinery or harvest within 100 feet of wetlands, except when wetlands must be crossed for timber management because there are no reasonable alternatives. Maintain cross drainage during and after the project is completed, and place easily removable materials such as mats, small pipe bundles, corduroy (log stringers), or similar structures to minimize damage due to fill removal; and only log when soils are frozen or sufficiently covered with snow to protect soil resources (generally at least a foot). Flag wetlands with a 100 foot buffer within units as equipment exclusion areas.
 - i. Sale area layout would exclude all mapped slopes greater than 45 percent. Equipment operations would be prohibited on all slopes greater than 35 percent except in special situations where equipment operations on a very short slope would greatly facilitate timber sale operations and/or reduce impacts to soils in other areas, and where erosion and sedimentation will be minor, with soil/land stability maintaining intact. All proposed equipment operations would be approved by sale administration personnel in consultation with a soil scientist on a case by case basis. Equipment operations on slopes between 25 and 35 percent will be evaluated on a case by case basis by Forest Service personnel in consultation with a forest soil scientist. Sale area layout may exclude these slopes within cutting units or areas would not be marked to avoid soil resource damage.
 - j. Sale area layout would exclude all wetlands, poorly drained soils, or very poorly drained soils, and all shallow soils greater than one-quarter of an acre in area (less than 20 inches deep over bedrock).
 - k. On elevations greater than 2,500 feet, do not harvest, except in some stands on a case-by-case basis with soil scientist review. This review will consider site-specific soil-affecting parameters like acid deposition, aspect, plant communities, and wildlife habitat needs.
 - l. Stands would generally be harvested with sufficient snow cover (at least one foot) or frozen soil, to minimize soil disturbance. Some stands may be suitable for summer harvest when soils tend to dry sufficiently between early August and late September. They would be below 2,500 foot elevation, with moderately well-drained soils or drier, with moderately deep or deeper soils, and no wetlands that would be crossed during logging operations. Specific stands for summer harvest would be identified during annual soil scientist input in response to proposed vegetation management. A small number of additional stands may be identified afterward by the soil scientist as suited to summer harvest, if for example special harvest equipment is used, or there is an unusually dry summer, and if the skid roads and landings are located outside of stream protective strips prescribed in the Forest Plan.
3. The following design criteria are applicable to the siting and use of log landings:
 - a. Do not locate landings on somewhat poorly or poorly drained soils. Locate landings where slope directs sediment away from water bodies, including seasonal ponds.

- b. Locate landings at least 100 feet from all wetlands, including seasonal ponds, and design and manage them to not contribute sediment to any water body.
 - c. Reduce logging debris (such as chips and bark) at landings to less than 12 inches so as to not severely restrict vegetative growth in the area.
 - d. Scatter tops and limbs on landings and skid trails during logging operations where needed to reduce compaction and erosion, and return all other tops and limbs and scatter throughout harvested stands to retain soil nutrients.
4. The following design criteria are required to maintain soil stability and control erosion. They apply to all newly constructed Operational Maintenance Level (OML) 1 permanent and temporary road segments in addition to any other disturbed areas that result from project activities:
 - a. Seed and mulch bare soils to a depth of at least one inch in the road corridor off the driving surface (such as fillslopes and cutbanks). However, if construction occurs when seeding is not recommended (such as the dormant season), mulch to a depth of at least three inches to prevent adverse soil erosion.
 - b. Place geotextile fabric, jute netting, or other erosion control matting to hold the soil and seed in place until vegetation is established on cutbanks and exposed steep slopes in excess of 35 percent.
5. Design skid trails to direct water flow outside of riparian corridors as quickly as possible, to avoid steep terrain (slopes above 35 percent), maximize the distance between the road and water-bodies, minimize the number of water body crossings, and minimize the total miles of skid road.
6. The following design criteria apply to prescribed burning and associated activities:
 - a. Prescribed burning will be done only when overall mineral soil heating is low, and no more than an average loss of one inch or one-half of the sum of organic horizons will be consumed during burns. Burns will have mixed-severity burn patterns at each unit, and uneven, mosaic forest floor consumption, with no more than 10 percent of the area having mineral soil exposed immediately after the burn. This minimizes soil erosion and nutrient losses. In addition, burning will not be done in areas dominated by outcrops and soils less than 12 inches deep over bedrock.
 - b. While burning piles, the number of piles at each pile burning site shall be minimized, with a maximum of 10% of the area of each unit occupied by piles. Previous pile burning sites shall be reused as much as possible. This would minimize soil nutrient losses.
 - c. No heavy equipment will be used to create fire line within the protective strips of streams, wetlands, or ponds, or on slopes in excess of 35 percent.
 - d. Mulch all exposed mineral soil within fire lines with nearby duff material after burning to minimize erosion and sedimentation.
 - e. On slopes in excess of 35 percent, install waterbars during fire line construction (i.e. before burning).
 - f. On slopes in excess of 20 percent, install waterbars along the fire line after burning to minimize erosion.
 - g. Heavy equipment shall only be used once in each stand over the life of the project for the creation of fire lines.

- h. When equipment is used for fire line creation, only remove the upper layers of organic matter, leaving the most decomposed organic matter layer intact, to minimize erosion and sedimentation. To correct unintended soil disturbance and removal, mulch with nearby duff material or straw and install water bars.

Cultural Resources

1. All project areas shall have a cultural resources survey before implementation.
2. All archaeological and historic sites that are eligible for the National Register of Historic Places (NRHP), or whose NRHP status remains unevaluated, shall not be impacted by any ground disturbing activities. These sites shall be avoided by all project activities, and shall be protected by a buffer zone of up to 30 meters (100 feet) beyond the site boundary. No vegetation removal or other activities shall be allowed within this zone.
3. Forest Service staff and contractors must immediately stop work if any unexpected artifacts, archaeological sites, or human remains are encountered; and the location shall be reported to the Forest Archaeologist.

Recreation Opportunities

Roads

1. Temporary traffic controls shall be used to provide road users with adequate warning of hazardous or potentially hazardous conditions associated with timber harvesting operations. The timber sale purchasers and the Forest Service shall agree to a specific traffic control plan for each individual project prior to commencing operations to address safety concerns associated with recreation traffic.
2. Upon completion of harvest activities, road closure devices shall be installed to prevent unauthorized motorized use in accordance with the following:
 - a. The selection of a road closure device and closure procedures shall follow the road access management guidelines for roads on the Green Mountain National Forest. Road closures can be conducted using berms, boulders, gates, or transplanting trees and shrubs from nearby or adjacent sites into the road surface area. This is to discourage unauthorized use and subsequent aquatic and soil resource impacts. Closure devices on roads used for recreation and other access shall allow for openings to meet those uses.
 - b. Wherever practical, a closure device should be placed at the entrance of a network of roads rather than closing each individual segment.

Trails

1. The following design criteria shall be implemented to protect the trails, including continued safe use of the existing trail system.
 - a. No trail shall require permanent re-routing as a result of this vegetation management prior to or after project implementation. Temporary rerouting or trail closures may be an option selected when necessary for safety and when other options are not viable.

- b. A recreation specialist shall be included in the planning of individual sale layout activities to ensure there is minimal disruption to existing and future designated trails within the Project Area.
- c. Existing trails shall be protected during harvest operations. Any damage to trails incidental to logging activities will be repaired in a timely manner. This includes repairing damage to waterbars, removal of slash and debris, smoothing of ruts in trails and removal of overhead hazards.
- d. Skid road crossings on trails shall be perpendicular to the trail tread and have a sight distance safe enough to allow visibility for recreation users.
- e. Skid roads that cross system trails shall be disguised with retained organic material produced by logging activities. Prior to the completion of harvest activities, tree branches with diameters of six inches or less shall be placed in a random, natural appearing pattern along the width of the road where it intersects the trail to a height of two to three feet and a depth of six to eight feet.
- f. Where feasible, trees shall be felled away from the trail prism to reduce retained organic material accumulation immediately adjacent to the trail.
- g. When practicable, plan timber harvests and road construction activities outside of the typical season of use of any trails or other recreation sites that may be impacted.
- h. If harvest activities occur along or within trails, logging activity signs shall be posted and the trails shall be evaluated for temporary closure to ensure safety of forest visitors.
- i. Hauling activities impacting high-use snowmobile trails shall not take place on weekends or federal holidays unless snow conditions do not allow snowmobiling to occur. Recreation and timber staff shall consult with local snowmobile clubs during sale layout planning to determine use levels on trails and appropriate weekend haul restrictions.
- j. If harvest activities using snowmobile trails for skidding or hauling are required by prescription to operate during the snowmobile season (December 16 to April 15), attempts to accommodate both activities shall be made. If conditions allow, adequate snow pack at a width that would allow snowmobile passage shall be left on one side of the trail and safety signs shall be posted. If simultaneous use of the trails is not possible, temporary reroutes of the snowmobile trails shall be attempted. Coordination between timber and recreation shall occur before the snowmobile season to allow time for the responsible clubs to designate alternative routes with Vermont Association of Snow Travelers, or complete closure of the route to mitigate safety concerns.

Developed Recreation

- 1. No harvest activities would occur within developed recreation sites, such as Wallingford Pond Trailhead or any other developed recreation sites identified in pre-implementation surveys.
- 2. If harvest activities occur adjacent to developed recreation areas, logging activity signs shall be posted and sites shall be evaluated for temporary closure to ensure safety of forest visitors.

Inventoried Roadless Areas (IRAs)

1. No more than 20 percent of each IRA shall be harvested with even-aged regeneration harvests in any ten-year period.

Congressionally Designated Areas

1. Treatment units adjacent to Wilderness shall have boundaries marked and delineated to a degree of accuracy agreed upon by recreation and survey staff. No trees shall be felled that can fall into Wilderness.
2. Questions regarding the location of any Wilderness Area boundaries shall be directed to the Forest Land Surveyor. No determinations shall be made based on assumptions or previous answers to similar questions.

Visual Quality

1. A Forest Service landscape architect or recreation specialist trained in scenery management shall be consulted prior to layout of each timber sale.
2. Treatment units visible from state highways, well-traveled Forest Roads, and key observation points at recreation sites or along trails shall be limited in size and shape. Mitigation techniques such as paralleling harvest edges with existing contours, feathering harvest areas and avoiding creation of unnatural hard straight lines and shapes on the landscape shall be used to reduce visual contrast from the valued scenic character. Specific mitigations shall be selected prior to layout in order to best meet scenic integrity objectives of the site.
3. Screen log landings from view of Forest recreation users on trails, roads, and at developed recreation sites by using an angled road or leaving a vegetative screen. When possible, landings shall be located out of sight from roads or public viewing locations.
4. Retained organic material that results from timber harvests shall be managed according to the following restrictions:
 - a. Where retained organic material is created adjacent to developed recreation sites, it shall be lopped and scattered no higher than two feet from the ground within 50 feet from the recreation site.
 - b. Where timber harvest takes place adjacent to recreation trails and/or maintained residential areas, lop and scatter any remaining retained organic material that falls within 25 feet of the residential boundary or each side of recreation trails to no higher than two feet from the ground.
 - a. Where timber harvest takes place adjacent to major travel corridors, such as highway 155, FR10, and other significant travel ways and recreation access routes, pull back retained organic material from the road edge a minimum of 15 feet, then lop and scatter to within two feet of the ground so as not to create an unnatural edge.

Property Boundaries and Easements

1. The Forest Land Surveyor shall be consulted prior to any ground disturbing activity within one-quarter of a mile of any exterior National Forest property boundary, or Special Designated Area boundary, or within any easements of unknown location or extent.

2. All National Forest System property boundaries and Special Designated Area boundary lines within 500 feet of a treatment area must be surveyed and marked or maintained prior to commencing activity, unless an exemption is provided by the Forest Land Surveyor for a specified area.
3. Boundary buffers or setbacks shall not be used for purposes of avoiding the boundary marking requirement. Whenever possible, treatment areas that are not coincident with the exterior National Forest System or Special Designated Area boundaries, but are within one-quarter of a mile of the same, shall be defined by non-linear boundaries in order to reduce the likelihood of misinterpretation as evidence of the legal boundary.
4. The Forest Land Surveyor shall be consulted prior to the removal of any bearing trees, trees marked for boundary, line posts, or other boundary markings. Sufficient time shall be allotted for the Forest Land Surveyor to coordinate the perpetuation of boundary corners and lines in the field so that marked boundaries are not lost during the management activity.
5. Geographic Information System (GIS)-based coordinates for survey lines, parcel boundaries, controlling corners, and parcel corners shall not be used as authoritative indicators of legal boundary lines and property corners. In addition, fence lines, fence corners, and other alleged physical evidence of the lines and corners are not to be used as indicators of boundary lines unless their locations have been validated by the Forest Land Surveyor.
6. All suspected trespasses or encroachments, whether appearing to have been committed against or by the Forest Service, shall be reported to the Forest Land Surveyor. In severe cases, or where planned Forest activities may contaminate evidence or interfere with investigation of such cases, Forest Service staff and contractors must immediately stop work and report the location and issue to the Forest Land Surveyor and Law Enforcement.
7. All claims of title or disagreements regarding boundary location or land use rights, received verbally or in writing, shall be reported to the Forest Land Surveyor.
8. Interpretation of deeds, legal descriptions, and other written documents that define the ownership and location of land title and land boundaries is the responsibility of the Forest Land Surveyor.
9. Legal access to National Forest land, across other lands, shall not be assumed. Proposed access routes and known easements or rights-of-way shall be discussed with the Forest Land Surveyor prior to project implementation.
10. Rights to timber removed from easements or rights-of-way across non-National Forest System lands should be discussed with the Forest Land Surveyor prior to project implementation.

References

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Appendix C: Project Maps

See enclosure