PROGRAMMATIC BIOLOGICAL ASSESSMENT

AND

PROGRAMMATIC BIOLOGICAL OPINION

FOR THE

NATURAL RESOURCES CONSERVATION SERVICE'S

MAINE HEALTHY FORESTS RESERVE PROGRAM

Written by

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and

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PREFACE

In 2003 Congress passed the Healthy Forest Restoration Act. Title V of the Act designates a Healthy Forest Reserve Program with objectives to 1) promote the recovery of threatened and endangered species, 2) improve biodiversity, and 3) to enhance carbon sequestration. In 2006, Congress provided the first funding for the Healthy Forest Reserve Program, and three states, Maine, Arkansas, and Mississippi, were chosen as pilot states to receive funding through their respective Natural Resources Conservation Service (NRCS) state offices. NRCS and the U. S. Fish and Wildlife Service (Service) determined that the most efficient way to complete Section 7 consultation and to deliver the Safe Harbor-like assurances required by Healthy Forest was by developing programmatic biological opinions for each of the participating states. A programmatic biological opinion provides a framework for determining incidental take, baseline conditions, and terms and conditions when reviewing projects selected for future funding.

In Maine NRCS and the Service offered the 2006 Healthy Forest Reserve Program to landowners in the proposed Canada lynx critical habitat to promote development of lynx forest management plans. Plans would help to achieve an important objective for lynx recovery. Three landowners were enrolled in the Healthy Forest Reserve Program – the Passamaquoddy Tribe, The Nature Conservancy, and the Forest Society of Maine as a conservation easement holder for the West Branch Project. Lynx forest management plans will be developed for about 500,000 acres within the 6.8 million acre proposed critical habitat. Tiered "mini-biological opinions" will be developed under this programmatic opinion for each of the three projects. The tiered opinions will document environmental baseline and incidental take for each project. If additional Healthy Forest Reserve Program funding is made available to Maine in the future, this programmatic biological opinion will guide the consultation between NRCS and the Service. New projects will be tiered under this programmatic opinion. This programmatic opinion will be revised as new information is obtained or if new rare, threatened, or endangered species are considered for Healthy Forest Reserve funding.

CONSULTATION

This document is the United States Fish and Wildlife Service's (Service) programmatic biological opinion (PBO) based on our review of the Healthy Forest Reserve Program (HFRP) located in northwestern Maine. This programmatic biological opinion serves as the NRCS' biological assessment and the Service's biological opinion of the projected HFRP and its effect on the threatened Canada lynx (*Lynx canadensis),* bald eagle (*Haliaeetus leucocephalus),* and endangered Furbish's lousewort (*Pedicularis furbishiae*) and gray wolf (*Canis lupis*) in Maine. This also serves as a formal conference on proposed Critical Habitat for the Canada lynx. The NRCS and the U.S. Fish and Wildlife Service (Service) agreed to a streamlined consultation process whereby a biological assessment and biological opinion are jointly developed (referred to here as PBA/BO). This biological opinion is based on information provided by the NRCS and Service in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.) A complete administrative record of this consultation is on file in the Service's Maine Field Office (Old Town, Maine). The purpose of this PBA/PBO is to expedite consultations on proposed HFRP activities.

Section 7(a)(2) of the ESA requires federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of any federally listed species nor destroy or adversely modify critical habitat. The Service and the

federal agency or its designated representative implement section 7 of the ESA by consulting or conferring on any federal action that may affect federally listed or proposed threatened and endangered species and/or designated or proposed critical habitat.

This PBA/PBO is based on the best available scientific and commercial data including electronic mail and telephone correspondence with NRCS officials, Service files, pertinent scientific literature, discussions with recognized species authorities, and other scientific sources. A complete administrative record of this consultation is on file in the Maine Ecological Services Field Office in Old Town, Maine.

This PBA/PBO applies to all HFRP management activities (easements, agreements, Habitat Restoration Plans [HRP], landowner protections, and conservation practices/measures that implement HRPs) as detailed in the Healthy Forest Reserve Act of 2003 that will occur on an ongoing basis for 10, 30, or 99 years. The pilot program in 2006 will occur in portions of Franklin, Somerset, Piscataquis, Penobscot, and Aroostook Counties in northwestern Maine. Habitat Restoration Plans that are consistent with the PBO conditions and area may be appended to this PBO only as the Service deems appropriate. In addition, the NRCS is responsible for making sure that individual HRPs comply with this PBO and that take is not exceeded.

The goal of this PBA/PBO is to develop an effective and efficient approach to the implementation of the HFRP; to evaluate, assess, and ascertain its effects on targeted endangered, threatened, candidate and other imperiled species of fish, wildlife and/or plants; and to develop a consistent conceptual national framework on the delivery of ESA regulatory assurances through the HFRP using the section 7 process.

CONSULTATION HISTORY

2003 – 108th Congress passes H.R. 1904, the Healthy Forests Restoration Act of 2003. Title V of the Act designates a Healthy Forest Reserve Program with objectives to 1) promote the recovery of threatened and endangered species, 2) improve biodiversity, and 3) to enhance carbon sequestration.

October 1, 2005 – Congress allocates $2.5 million to the Natural Resources Conservation Service to initiate a pilot Healthy Forest Reserve Program.

March 3, 2006 – Three states, Maine, Arkansas, and Mississippi, are selected and notified to receive funding. NRCS and USFWS discuss consultation requirements, Safe Harbor-like assurances, and implementation of the program at a national level. NRCS drafts implementation rules.

April 3, 2006 – NRCS initiates discussion with the Maine Field Office on implementing a pilot Healthy Forest Reserve Program in Maine.

April 5, 2006 – First meeting between NRCS and MEFO to discuss implementing HFRP.

April 19, 2006 – Multi-state teleconference to discuss implementation of HFRP.

May 1, 2006 – NRCS and USFWS staff meet with NRCS State Technical Committee to discuss implementing a HFRP program.

May 23-25, 2006 – On May 23 to 25, 2006 NRCS and Service personnel from the designated pilot states (Arkansas, Maine and Mississippi) meets in Pearl, Mississippi for a HFRP and Section 7 and 10 training session. The purpose of the training session is to formulate the

consultation and coordination procedures for implementing the pilot HFRP in fiscal year 2006 The program calls for unprecedented collaboration on behalf of the two agencies in the development of Biological Assessments (BA) and BO in order to meet ESA § 7(a)2 consultation requirements and HRPOs. The following outcomes result from this training session:

1. NRCS will prepare a combined programmatic BA/BO in each of the 3 pilot states with the assistance of NRCS National Technology Support Centers (NTSC);
2. The Service will provide species life history, habitat, and technical expertise/information needed by NRCS to complete the PBA/PBO and develop HRPs, including Service participation in all phases of HFRP formulation;
3. The pilot states set program enrollment dates for mid June through mid July, 2006;
4. Pilot states identified targeted species and geographic areas for implementation of the HFRP; and
5. Signed contracts (for restoration agreements) or intent to continue certifications (for easements) will be submitted to NRCS' Headquarters by September 1, 2006 to obligate funds.

The Maine NRCS state office initiates formal consultation with the Service's Maine Field Office immediately after this workshop. The Maine Field Office does not request a letter initiating consultation between state offices, since our national offices had already initiated the process of consultation.

June 29, 2006 – NRCS and USFWS hosts workshop for prospective landowners.

July 21, 2006 – Deadline for applications from landowners. NRCS and USFWS begin writing a programmatic biological assessment and biological opinion.

September 25, 2006 – NRCS announces that it enrolled three landowners to the HFRP program; the Passamaquoddy Tribe, Maine Chapter of the Nature Conservancy, and the Forest Society of Maine. The landowners will develop lynx forest management lands for their lands in northern Maine and monitor habitat response to management in the framework of a 10-year cost-share program. Approximately 500,000 total acres will be affected by these plans.

DESCRIPTION OF THE PROPOSED ACTION

The NRCS and Service propose to implement the HFRP and integrate specific operational and structural elements and concepts which already exist under the Service's program authorities of the ESA. This is expected to be accomplished without the need to create additional bureaucratic or administrative encumbrances on interested landowners or the agencies.

Action area

For the purposes of this programmatic consultation, the scope of the effects of the action (action area) is limited to the area proposed as critical habitat for the Canada lynx in northwestern Maine on November 9, 2005 (Federal Register 70(216):68294-68328, see Maine map on page 68317)(Fig. 1). Federally-listed species within this geographic area include the Canada lynx (threatened), bald eagle (threatened), Furbish's lousewort (endangered), and gray wolf (endangered).

General Overview of the Healthy Forests Reserve Program

Title V of the Healthy Forests Restoration Act of 2003 under section 501 authorizes the establishment of the HFRP. The purpose of the Program is to assist private landowners in restoring and enhancing forest ecosystems primarily for the recovery of threatened and endangered species listed under section 4 of the Endangered Species Act (ESA). The NRCS shall carry out the HFRP in coordination with the Secretary of the Interior and the Secretary of Commerce. The interim final rule (71 FR 28547) sets forth how the NRCS will implement the HFRP to meet the statutory objectives of the program. A general overview of the HFRP and how the program will be implemented using protections available under the ESA is discussed below.

The HFRP is a voluntary program which the Secretary of Agriculture carries out in coordination with the Secretaries of Interior and Commerce, to restore and enhance privately-owned forest ecosystems for the recovery of threatened and endangered species. The NRCS will give additional consideration toward enrolling land that measurably improves the well-being of species not listed under section 4 of the ESA, but are candidates for listing, State-listed, special concern species, or will improve biodiversity or increase carbon sequestration. The Secretary of Agriculture is also required to consider the cost-effectiveness of each agreement or easement, and associated restoration plans, so as to maximize the environmental benefits per dollar expended.

A Habitat Restoration Plan (HRP) is required for all land enrolled in the HFRP. The plan is developed jointly by the landowner and the Secretary of Agriculture or its designee, in coordination with the Secretaries of Interior and Commerce. The plan must include any restoration practices or measures necessary to protect, restore and enhance habitat for species listed as endangered or threatened under section 4 of the ESA and animal or plant species that are candidates, State-listed or special concern species.

Program enrollment options are:

> (a) 10-year cost-share agreements, for which the landowner will receive 50% of the average cost of approved conservation practices, measures and activities;
>
> (b) a 30-year easement, for which the landowner may receive 75% of the easement value of the enrolled land plus 75% of the average cost of approved conservation practices, measures and activities;
>
> (c) an easement of not more than 99 years, for which the landowner may receive 100% of the easement value of the enrolled land plus 100% of the average cost of approved conservation practices, measures and activities. A maximum of 2 million acres may be enrolled in the program nationwide, regardless of the length of enrollment.

Landowners enrolled in the HFRP are also entitled to receive technical assistance to assist them in complying with the terms of the plans that are incorporated in their HFRP agreements or easements. In addition, the Secretary of Agriculture may use the services of certified technical service providers to develop and implement the HFRP.

When conservation activities on land enrolled in the HFRP result in a net conservation benefit for listed, candidate, or proposed species, the legislation provides that the landowner will receive Safe Harbor or similar assurances and protection under the ESA. These are called “Landowner Protections” by the NRCS. Program participants will be authorized to “take”, as defined by the

ESA, individuals of this species that have increased in number or range, or "take" habitat that has increased in quantity or quality, in relation to established baselines, as part of beneficial management that will provide an overall net conservation benefit. Takings will be incidental consequences of an otherwise approved and lawful land use or practice. A further discussion of available regulatory assurances is provided below.

For the 2006 federal fiscal year, the NRCS chose to pilot the HFRP in three states: Maine, Mississippi, and Arkansas. Eligible private forest landowners in selected counties in each state who seek to voluntarily conserve identified threatened, endangered, candidate, proposed or species of concern and who may desire additional biodiversity and/or carbon sequestration objectives shall complete and submit an application package to the NRCS during a sign-up period starting June 19 and ending at a time in July, 2006 as determined by each State. A sign-up notice shall be published by the NRCS stating program requirements, including program eligibility, focus, and geographic scope. A completed AD-1153 form is the minimum documentation needed to meet HFRP application requirements.

Applications will be prioritized according to ranking criteria as described in the interim final rule (71 FR 28547) and approved by the NRCS State Conservationist in consultation with the Service. Ranking criteria may consider, but are not limited to, the following factors:

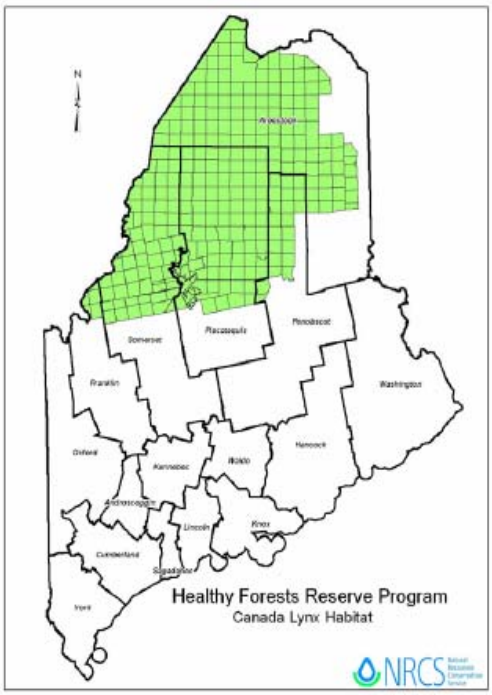
- estimated conservation benefit,
- estimated improvement of biological diversity,
- estimated increased capacity of carbon sequestration,
- availability of contribution of non-federal funds,
- significance of forest ecosystem values and functions,
- estimated cost-effectiveness,
- likelihood of success, and
- other factors, as appropriate.

The HFRP is competitive; the highest ranked applications receive funds first. If available funds are insufficient to accept the highest ranked application, and the applicant will not reduce the offered acres, the next ranked application may be funded. For easement offers, an applicant has 15 calendar days to submit a notice of intent to continue (AD-1159). This offer of tentative acceptance does not bind either party to acquire or convey an easement or to a HFRP restoration plan. The NRCS will proceed with easement acquisition activities. An option agreement to purchase (AD-1157) and subordination agreement and limited lien waiver (AD-1158) will be presented by NRCS to the applicant describing the terms and conditions of the easement and any other terms and conditions that may be needed for participation. Ten-year cost-share agreements and option agreements to purchase need to be signed prior to September 30 of the federal fiscal year to obligate funds. All HFRP participants will have a long-term agreement (AD-1154), conservation plan schedule of operations (AD-1155), and special provisions for long-term agreements.

The HFRP in Maine

In Maine, NRCS has decided to use the 10-year cost share option only. The 30- and 90-year easement options will not be implemented at this time. If these options are to implemented in the future, this programmatic opinion will be revised to specifically address the legal documentation and other requirements of implementing an easement program including a template easement consistent with Maine law that specifies the rights of the agencies as well as stipulates prohibitions that are protective to lynx.

Figure 1. Proposed Canada Lynx critical habitat



NRCS will use HFRP to provide funds to individual private forest landowners on a voluntary basis to develop Habitat Restoration Plans (HRP) to provide a net conservation benefit for recovery of Canada lynx. The Service has identified the lack of forest management planning as a threat to Canada lynx and the need for forest management plans as an important recovery task in the Recovery Plan Outline (USFWS 2005).

The HFRP funds will be made available to landowners in an area of approximately 6.8 million acres in northern Maine (Fig. 1) in which the Service (70 FR 68304) is proposing to designate critical habitat for the lynx. The proposed critical habitat encompasses the known suitable lynx habitat in Maine. The majority of HFRP projects are expected to be within the proposed critical habitat unit; however, individual projects may cross over or abut unit boundaries.

Due to their biology and social structure, lynx require large areas for their existence. The ability to enroll large areas under the 10-year cost-share agreements described above is expected to make this option the most cost-effective and widely-used means by which the HFRP will be implemented in Maine to benefit lynx.

The lynx habitat unit is primarily comprised of spruce-fir and spruce-northern hardwood forest (Gawler and Cutko 2004). These forest communities are constituents of a transitional boreal forest ecosystem typical of the Acadian Forest in northeast United States and eastern Canada and are the primary habitats used by lynx. Forest management to benefit lynx, as identified in a HRP, will affect habitat elements within these two forest communities.

The NRCS will provide incentives, financial and regulatory, under the enrollment options above to assist private landowners in the development of long-term, landscape-level HRPs with the objective being achievement of a net conservation benefit for lynx. The NRCS conservation practice standard *Prescribed Forestry*, code 409, provides criteria and specifications for forest planning. Criteria under this standard specify the use of species-specific management guidelines, when wildlife habitat enhancement is the forest management objective.

Canada Lynx Habitat Management Guidelines for Maine (*CLHMG*) (McCollough 2006) developed by the Service's Maine Field Office in consultation with the University of Maine Cooperative Fish and Wildlife Research Unit (CFWRU) and the Maine Department of Inland Fisheries and Wildlife (MDIFW) will be used as the basis for forestry management prescriptions and will satisfy criteria of the *Prescribed Forestry* standard. The *CLHMG* are based on the best scientific data available for lynx populations in the northeastern United States.

In addition to lynx conservation, other biodiversity options being offered under the HFRP during 2006 are:

- sustainable landscape level forest management for American marten,
- sustainable landscape level forest management for late successional forest, and
- riparian zone establishment and management.

The lynx and American marten are both considered "umbrella" species for spruce-fir and spruce-northern hardwood forests. Umbrella species are those species for which management will benefit a wide range of co-existing species in the same habitat, which may be lesser known and difficult to manage for otherwise. Lynx use regenerating or sapling or pole stage of succession while marten use intermediate to mature stands. Based on comparisons with data from the Maine Gap Analysis, the majority of vertebrate species in northern Maine forest systems (86%) will benefit by managing for both lynx and pine marten (W. Krohn, Maine Cooperative Fish and Wildlife Research Unit, unpub. data). Late successional forest is least represented in Maine forests and is the most vulnerable biodiversity element in most forested systems. Wider riparian protection zones than required by law to alleviate water quality concerns can be established and managed. Riparian habitat integrity and function will improve, as will habitat connectivity with adjacent forestland. Riparian areas, if managed appropriately, can be used to establish and maintain late successional forest.

Enrollment Procedures

Each landowner interested in enrolling in the HFRP and performing voluntary conservation activities that result in a net conservation benefit for federal candidate, proposed, threatened or endangered species must agree to the elements presented in the following sections. In some situations, landowners may not be willing to engage in all conservation activities necessary to produce a net conservation benefit, yet still achieve other stated goals of the HFRP or choose not to accept offered ESA regulatory assurances. In those cases, Landowner Protections will not be provided by the HFRP agreement and HRP

NRCS staff will meet with property owners that are interested in the targeted species conservation. The HRP will then be developed from the guidelines and requirements presented herein.

Specific Requirements of Maine Canada Lynx Habitat Restoration Plans

The NRCS will provide 10-year cost-shares for implementation of HRPs under the NRCS conservation practice standard *Prescribed Forestry,* code 409. Cost-shares will also be available for necessary permits associated with implementing the HFRP Habitat Restoration Plan. The NRCS and Service will require that all plans:

- meet minimum NRCS Habitat Restoration Plan requirements;

- meet standards necessary to ensure a net conservation benefit;
- meet requirements of the NRCS conservation practice standard *Prescribed Forestry*, code 409 (Appendix 1); and
- clearly articulate environmental baseline conditions.

NRCS expects all of these standards to be met in each landowner's HRP. The specifics of each of these standards are discussed below.

Minimum NRCS Habitat Restoration Plan Requirements

The HRP plan is developed jointly by the landowner and the Secretary of Agriculture or a designee in coordination with the Secretaries of Interior and Commerce or their designee. The HRP must include any restoration practices or measures necessary to protect, restore and enhance habitat for threatened or endangered species. The HRP will describe the conservation measures and practices that are to be implemented and the goals and objectives during each 10 year period.

Habitat Restoration Plans shall be developed for all land enrolled in the HFRP according to criteria, specifications, and deliverables described in the scope of work for the Maine NRCS conservation practice standard *Prescribed Forestry*, code 409 (see Appendix 1). Required information includes, but is not limited to the following:

1. The land and acreage enrolled (A legal boundary description will be used, and maps will be used to identify and characterize the enrolled property and locations of planned conservation activities to achieve a net conservation benefit for lynx and contracted biodiversity options;
2. Forest stand conditions (existing habitats, stand boundaries, appropriate maps depicting forest stand locations, boundaries, forest type and tabular data describing stand conditions, i.e., forest cover type or composition, age, stem density, and % canopy cover;
3. Maps of sensitive and protected habitats (e.g., wetlands, streams and riparian areas, State of Maine Essential and Significant Wildlife Habitats, known occurrences of State and Federally protected species and cultural resources protected by section 106 of the National Preservation Act [16 U.S.C 470]);
4. Written guidelines to minimize adverse impacts to resources listed under 3 above from planned conservation activities;
5. Agreed-upon baseline conditions and identify how the baseline was determined, when and how baseline surveys or analyses were conducted;
6. Previous forest management strategies and describe planned conservation activities (their nature, extent, timing, etc.) that will be undertaken to achieve a net conservation benefit for lynx and other contracted biodiversity options, where and when the benefits will be achieved, and the time frame these conservation activities will remain in effect to result in a net conservation benefit;
7. The anticipated habitat conditions (location, quantity, and quality) that will occur at the conclusion of the 10-year cost share agreement;

8. The implementation schedule identifying the forest stand and the planned month and year of implementation of all conservation activities that contribute to a net conservation benefit for lynx and other contracted biodiversity options, and,
9. Plans to update HRPs every 10 years for 30 and 99 year easements.

Development of Conservation Practices and Activities Necessary to Provide a Net Conservation Benefit

The Service and NRCS have worked cooperatively to identify conservation activities necessary to provide a net conservation benefit for the targeted species. The *Canada Lynx Habitat Management Guidelines for Maine(CLHMG)* will serve as the basis for HFRP for Canada lynx. These include both intensive and passive management. Specific guidelines from the *CLHMG* include:

1. Avoid upgrading or paving dirt or gravel roads traversing lynx habitat. Avoid construction of new high speed/high traffic volume roads in lynx habitat.
2. Maintain through time at least one lynx habitat unit of 35,000 acres (≈1.5 townships) or more for every 200,000 acres (≈9 townships) of ownership. At any time, about 20-25% of the area in a lynx habitat unit should be in the optimal mid-regeneration conditions (see Guideline 3). Small landowners with less than 35,000 acres can manage at the stand level to create optimal mid-regeneration conditions.
3. Employ silvicultural methods that will create regenerating conifer-dominated stands 12-35 feet in height with high stem density and horizontal cover above the average snow depth that will support >1.0 hares/ha.
4. Maintain land in active forest management. Development and associated activities should be consolidated to minimize direct and indirect impacts. Avoid development projects that occur across large areas, increase lynx mortality, fragment habitat, or result in barriers that affect lynx movements and dispersal.
5. Encourage coarse woody debris for den sites by maintaining standing dead trees after harvest and leaving patches of wind throw or insect damage.

To demonstrate a net conservation benefit, landowners must document in their HRP how they will accomplish these five guidelines and provide specific examples of the management activities that will be used to implement these guidelines. Management activities will vary on a case-by-case basis due to site-specific factors, which include, but are not limited to, whether or not lynx are present on the enrolled property, age and condition of suitable habitat, requirements from other HFRP goals, and the landowners' management goals and objectives. However, all HRPs will include a description of the nature, extent, timing, and other pertinent details of the conservation activities that he/she will voluntarily undertake to provide a net conservation benefit, including a schedule for implementation of the conservation activities.

In some cases, implementation of only one conservation activity may be necessary in a HRP to achieve the required net conservation benefit, whereas, in other situations, more than one conservation activity may be necessary to achieve the net conservation benefit. It up to the NRCS to determine if more than one conservation activity would be necessary to meet the conservation benefit standard. However, the NRCS, as part of the enrollment process, will ensure that the conservation activities covered will result in the required net conservation benefit.

The NRCS and Service seek an adaptive approach for the HFRP that allows modification of the five guidelines in the *CLHMG* and, as appropriate, adjustments to any reasonable and prudent measures, terms and conditions, and the extent of permitted take. Post-agreement adjustment of established HRPs will require prior consent of program participants. NRCS and the Service will re-initiate consultation, as appropriate.

The requirement of a HRP in HFRP provides an opportunity to include a description of the agreed-upon conservation activities that will produce a net conservation benefit. Net conservation benefits must contribute, directly or indirectly, to the recovery of the covered species. This contribution toward recovery may vary and may not be permanent. The benefit to the species depends on the nature of conservation measures, the activities to be undertaken, where they are undertaken, and their duration. Although species specific standards may be tailored for the species targeted in implementation of HFRP, the following conditions are generally the minimum requirement for achieving a net conservation benefit.

- occupied breeding, feeding, and/or foraging habitats are maintained or enhanced;
- suitable habitats are enhanced, restored, and/or created;
- habitat connectivity increases as a result of habitat enhancement, restoration, and creation efforts;
- significant reduction of the adverse effects from catastrophic events is likely;
- compatible buffers are established around/near existing important populations/habitats on protected lands (e.g., publicly-owned lands managed for wildlife, etc);
- reduction in (one or more) existing threats to the species and/or its necessary habitat components is expected;
- contributing offspring that may either reoccupy previously abandoned lands/habitats or that may be used for relocation (if feasible) to land protected by longer-term conservation arrangements;
- new populations and associated habitat components are created and maintained; and/or,
- new management techniques are tested and/or developed.

In situations where the affected landowner desires landowner protections, the NRCS will develop an appropriate level of documentation to demonstrate that one or more of the elements listed above will provide a net conservation benefit to the targeted species. The level of specificity for the species and landowner will tailored to the individual circumstance, but the finding must clearly describe the expected net conservation benefits and how the NRCS reached that conclusion.

Each landowners plan will address how a net conservation benefit will be achieved. In addition to the information provided above, each plan will be expected to provide the following details:

- The anticipated duration of the plan. Ahtough the HFRP cost-share period is 10-years, NRCS and the Service expect plans to be developed for at least one rotation or 70 to 80 years;
- Lynx habitat areas (as described in the CLHMG) will be clearly identified on maps. If a shifting mosaic of habitat is planned, the intended location of lynx habitat areas will be

clearly identified on maps that depict lynx habitat on at least a decade-by-decade basis. Landowners will strive to achieve the landscape and stand conditions in the *CLHMG*;

- Within lynx habitat areas, the stands to be harvested will be clearly identified in 10-year increments. NRCS will hold landowners responsible only for harvests in the initial 10-year cost share period. Stands expected to support lynx will be clearly identified for each 10-year time frame;
- Each plan will clearly quantify and map baseline habitat conditions and project anticipated lynx habitat in 10-year increments. Methodology for projecting habitat conditions will be specified;
- Landowners will submit lynx HRP to the NRCS and Service within 2 years (fall, 2008);
- Landowners will provide an annual progress report; and
- Plans will describe a plan to monitor and assess lynx habitat (GIS maps, quantification of habitat). The initial habitat assessment will occur by year 7 (fall, 2013) and occur every 5 years thereafter.

Meet NRCS Practice Standard Prescribed Forestry, code 409

HFRP Conservation Practices will initially be limited to the Maine NRCS conservation practice standard *Prescribed Forestry*, code 409 (see Appendix 1). This practice is used to manage areas for forest health, wildlife habitat, wood and/or fiber, enhancement of water resources, plant biodiversity, recreation and aesthetics, and wildlife habitat enhancement. This practice will be used to identify the location and describe the forest management activities that will result in habitat conditions described in the *CLHMG* and guide implementation of the *CLHMG* to achieve a net conservation benefit for lynx. In addition, these practice will identify the location and describe forest management activities that will enhance conditions for any other contracted biodiversity options offered under the HFRP. In the future additional conservation practices may be included for consideration in HFRP.

An executed HRP must provide all information and documentation required by the NRCS conservation practice standard *Prescribed Forestry*, this PBO, and other agreed upon site-specific requirements. The landowner, NRCS, and Service must sign the HRP for it to be valid. Upon completion and signing of the HRP, the Service will formally append the client's name, HFRP enrollment year, project area map, the HRP conservation activity/measure implementation schedule, and the enrollee's decision to accept or decline Landowner Protections to this PBO (Appendix 2). A complete copy of the HRP and original copies of HFRP documents will be kept on file in the NRCS State Office.

Clearly Articulate Baseline Conditions

The purpose of determining baseline conditions is to ensure that the targeted species status on enrolled lands is no worse after HFRP participation than before enrollment. The most important feature of the baseline concept is that it will be determined by the existing ESA responsibilities present within the eligible enrolled lands. Baseline conditions can be zero (no current ESA responsibilities as illustrated by no occupied habitat or species presence throughout the identified property). Baseline conditions may be described in terms related to population size, such as

number of nest sites, number of den sites, or a specific number of individuals. However, in many cases, baseline conditions are best described using measurements of available suitable habitat and habitat conditions rather than numbers of individuals present. No matter whether population or habitat-based methods are used to determine baseline, there should be a description of the existing habitat, representative species, water and wetland resources, condition of the habitat, and any other information necessary to describe baseline conditions.

Determining Baseline Conditions for Lynx

Techniques to assess lynx populations have not been developed, thus measures of suitable habitat conditions rather than the number of individual animals present will serve as the baseline. The NRCS, in cooperation and coordination with the Service and other partners, recommends the following metrics for determining baseline conditions for the lynx:

1. Estimated extent of foraging and denning habitat;

- regenerating conifer trees between 12 to 35 feet in height or 10 to 35 years old; or
- stands with understory structure expected to support $\geq$1 hare/ha; or
- stands that have conifer stem densities greater than 12,000 stems/ha;

2. Mortality threat from roads;

- miles of two lane paved roads and major haul roads designed for safe conveyance of vehicles at speeds exceeding 45 miles per hour; and
- miles of one-lane unpaved roads.

Landowners may also adapt lynx habitat models (Hoving et al. 2004, Robinson 2006) to quantify baseline habitat conditions for lynx on their ownership.

The NRCS will work cooperatively with landowners and seek assistance from the Service, University of Maine (CFRU, MCWRU, Wildlife Department), and Maine Inland Fisheries and Wildlife as appropriate to help landowners determine baseline conditions for each enrolled parcel. If the NRCS, Service, and/or their designated agents do not directly take part in surveys or assessments to determine the baseline, concurrence with the baseline determination is mandatory.

Maintaining Baseline Conditions

Landowners that have an existing baseline responsibility above zero, (i.e., the presence of the species/occupied habitat), will employ management activities with a goal of maintaining baseline habitat conditions for lynx. The NRCS and the landowner in consultation with the Service will agree to a set of conservation activities that will ensure that the baseline is maintained on each enrolled property, and these conservation activities and a description of how the management activities will be implemented on the enrolled property will be described in the HRP.

Baseline Adjustments

Both the NRCS and Service acknowledge that procedures must be in place to describe how circumstances acting on the targeted species/habitat outside of a particular landowner's management control can affect stated baseline conditions (and therefore affect landowner

protections) within implementation of the HFRP. Lynx habitat in northern Maine (young regenerating softwood clearcuts) is currently at a historically high prevalence as a result of the extensive clearcutting that occurred in the late 1970s and 1980s to salvage timber from a spruce budworm epidemic. In general, landowners are expected to employ sustainable forest management and allow this young forest to mature to attain merchantable age and size. Thus, lynx habitat quality for lynx is expected to decline statewide within the next 10 to 15 years.

Given this statewide trend, it will be difficult for landowners not to have a long-term diminishment of habitat conditions from 2006 baseline conditions. For species requiring early successional or ephemeral habitats, the Service accommodates special circumstances to adjust for declining or fluctuating baselines. Lynx occupy large geographic areas. New clearcuts or heavy partial harvests can take a decade to support hare populations. Habitat is transient (approximately 12-30 years after cutting) and furthermore, hare and lynx populations may fluctuate or cycle. There is still research needed to fully understand the relationships between forestry, hares, and lynx. Thus, the Service will offer exceptions for downward or shifting baseline situations if an overall net conservation benefit can be achieved (see below). In any scenario, the HRP will identify and justify the anticipated habitat conditions (location, quantity, and quality) that will occur at the conclusion of the 10-year cost share agreement and in 10-year increments thereafter for one complete stand rotation (70-80 years). This will help to enable the Service to assess and document the long-term net conservation benefit for each landowner's HRP.

Shifting Mosaic Baseline Adjustment - The concept of a shifting mosaic of habitat is appropriate for lynx. This approach presumes that an enrolled landowner may wish to allow currently suitable or occupied forest habitat to mature to where it is of lesser value to lynx in exchange for creating an equivalent amount of enhanced/restored occupied habitat elsewhere within the enrolled lands in previously unsuitable habitat (where in that area the initial baseline is zero). In any situation where a shifting mosaic baseline is considered, the following will apply:

1. no net loss of occupied habitat occurs as a result of the landowner's voluntary conservation activities;
2. the shifting mosaic baseline is clearly identified in the HFRP HRP or in subsequent modifications of the plan. If not in the original HFRP plan, Landowners must request to relocate baseline responsibility to an equivalent habitat area, and the NRCS/Service must evaluate and approved that request;
3. the enrolled landowner has implemented the management activities specified in the HFRP agreement and HRP*;*
4. the enrolled landowner has maintained baseline responsibilities as specified in the HFRP agreement and HRP

For a landowner to shift baseline responsibilities, the request must be evaluated by the NRCS and the Service to ensure that the conditions outlined above are met. If the conditions are met, the NRCS will document the shift in the records associated with the applicable HFRP agreement and HRP, noting that the baseline responsibilities did not change and that the baseline was maintained prior to any incidental take associated with the baseline shift.

Downward Baseline Adjustments - In spite of management and protection efforts, there may be circumstances, through no fault of the landowner (e.g. fire, windthrow, insect infestation, lynx or hare population cycle, or natural forest succession) where existing members/populations and/or occupied habitats of the targeted species cease to exist. Should this situation occur, the participating landowner will not be held accountable for the loss of this element of his/her baseline provided that the loss of the baseline occurred through no fault of the landowner and in spite of total compliance with the HFRP agreement and HRP.

If as part of a sustainable forestry plan, the landowner anticipates that the amount of lynx habitat will decline during the 10-year cost-share agreement period, then the landowner can propose a downward adjustment of the baseline. In these situations, the benefit of having a long term (70-80 year) lynx forest management plan that provides for a continuous supply of quality habitat located on the landscape in a configuration meaningful to lynx outweighs the temporary adverse effects of a decline in baseline habitat conditions. In these situations, a landowner should present a habitat goal for the end of the 10-year HFRP cost-share period, which will serve as an "adjusted" baseline, with a long-term perspective of where and when lynx habitat will be created in the future.

A landowner's responsibility can be reduced by the appropriate increment of the targeted species baseline metric provided the above criteria have been met. However, the landowner must make a request in writing for a baseline reduction. Further, the HFRP agreement and HRP will specifically allow the NRCS, Service, or their designated agents, to conduct an investigation, at the agencies' option(s), to verify that conditions leading to the natural loss of the baseline occurred. If approved, the downward adjustment in baseline will be reflected in a revised HFRP agreement and HRP.

Available ESA Regulatory Assurances

Much of the nation's current and potential habitat for listed, proposed, and candidate species exists on property owned by private citizens, States, municipalities, Tribal governments, and other non-Federal entities. Conservation efforts on non-Federal lands are critical to the long-term conservation of many declining species. More importantly, a collaborative stewardship approach is critical for the success of such an initiative. Many property owners would be willing to manage their lands voluntarily to benefit fish, wildlife, and plants, especially those that are declining, provided that they are not subjected to additional regulatory restrictions as a result of their conservation efforts. Beneficial management could include actions to maintain habitat or improve habitat (e.g., restoring fire by prescribed burning, restoring properly functioning hydrological conditions). Property owners are particularly concerned about land-use restrictions that might result if listed species colonize their lands or increase in numbers or distribution because of the property owners' conservation efforts, or if species subsequently become listed as a threatened or endangered species. The potential for future restrictions has led many property owners to avoid or limit land or water management practices that could enhance or maintain habitat and benefit or attract fish and wildlife that are listed or may be listed in the future.

The Service has a variety of programs, policies, and tools available to private landowners wanting to conduct voluntary species conservation efforts without incurring additional ESA regulatory constraints such as described above. These include both Safe Harbor Agreements, Habitat Conservation Plans, and Candidate Conservation Agreement with Assurances.

Under a Safe Harbor Agreement, participating property owners voluntarily undertake management activities on their property to enhance, restore, or maintain habitat benefiting federally listed species. Safe Harbor Agreements encourage private and other non-Federal property owners to implement conservation efforts for listed species by assuring property owners they will not be subjected to increased property-use restrictions if their efforts attract listed species to their properties or increase the numbers or distribution of listed species already present on their properties. These ESA assurances are provided to landowner as long as baseline conditions (number of animals or habitat units) are maintained.

Habitat Conservation Plans allow landowners to undertake management activities that will take listed species incidental to otherwise lawful activities. Landowners develop conservation plans demonstrating that take will be minimized and mitigated to the maximum extent practicable, funding will be sufficient to implement the plan, and the level of take will not jeopardize the likelihood of survival and recovery of the species.

The ultimate goal of Candidate Conservation Agreements with Assurances Program is to remove enough threats to the covered species to preclude any need to list them as threatened or endangered under the Act. Proposed and candidate species may be the subject of a Candidate Conservation Agreement. Certain other unlisted species that are likely to become a candidate or proposed species in the near future may also be the subject of a Candidate Conservation Agreement. These Agreements are different from Safe Harbor Agreements and Habitat Conservation Plans (which involve the presence of at least one listed species) in that they provide conservation benefits exclusively to candidate and proposed species of fish, wildlife, and plants. The substantive requirements of activities carried out under Candidate Conservation Agreements with Assurances, if undertaken on a broad enough scale by other property owners similarly situated, should be expected to preclude any need to list species covered by the Agreement as threatened or endangered under the ESA.

Implementation of the HFRP and Integration of ESA Regulatory Assurances

At the time the Landowner submits an approved HRP, the NRCS and Service, will provide a written statement summarizing the Landowner Protections, anticipated incidental take, and requirements to maintain Landowner Protections. Enrollees may choose to receive Landowner Protections under the HFRP and this PBO or they may decline; either way, their decision shall be documented with their signature.

The Service and the NRCS both acknowledge the significant overlap between the legislative intent of the HFRP and existing ESA incentive programs. Moreover, the Service and NRCS agree to adopt specific operational aspects of the Service's existing Safe Harbor Policy[1] and Candidate Conservation Agreement with Assurances Policy[2] within the implementation of HFRP. Further, the NRCS and Service agree that various aspects of the implementation of HFRP will need a consistent framework to work effectively and efficiently at a national scale. This framework includes the following elements:

- the effective mechanism to deliver the landowner protection/regulatory assurances;

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[1] The Service's Safe Harbor Policy is found and described in the June 17, 1999 *Federal Register* Notice, 64FR 32717.

2 The Service's Candidate Conservation Agreement with Assurances Policy is found and described in the June 17, 1999 *Federal Register* Notice, 64FR 32726

- enrollment process;
- minimum HRP requirements;
- establishing the net conservation benefit;
- identifying the conservation activities necessary to produce the net conservation benefit;
- mechanisms for accounting for incidental take events; and
- use of general procedures for coordination and consultation. Each of the main elements is described and explained below.

Delivery of Landowner Protections and ESA Regulatory Assurances

The Service and NRCS agree that the HRP offers the appropriate mechanism within the scope of this federal action to deliver the landowner protection provisions and to describe the conservation benefits to the target species. Landowners will be offered landowner protection provisions at the time of HFRP enrollment; however, the provisions are not automatic. Following program eligibility requirements, landowner protections are provided only when it has been determined that a net conservation benefit to the targeted species is likely to be achieved and the other purposes and objectives of the HFRP are met. Further, the protections are contingent upon the landowner managing the enrolled property in compliance with the agreed upon HRP.

The Service will use the concept of net conservation benefit to evaluate whether HRPs are eligible for Safe Harbor-like assurances as provided in the HFRP draft rule. Net conservation benefits are described in the final rule creating Safe Harbor Agreements (FR 64(116):32717-32726):

Net conservation benefits may result from reducing fragmentation and increasing the connectivity of habitats, maintaining or increasing populations, insuring against catastrophic events, enhancing and restoring habitats, buffering protected areas, and creating areas for testing and implementing new conservation strategies.

The Service will evaluate how HRPs increase snowshoe hare and lynx habitat, enhance prey populations, increase denning habitat, increase the distribution and abundance of lynx, and increase the probability of sustaining lynx populations. Some management activities (e.g. forest harvesting) may create a temporary cessation or diminishment of conservation benefits, but may result in a long-term net conservation benefit. The Service will be looking for documentation that practices that may cause diminished habitat quality (e.g. road improvement, pre-commercial thinning, some forms of partial harvesting) will be balanced by practices that improve habitat quality. The NRCS and Service will also be looking for a commitment by landowner to continue the plans beyond the 10-year cost-share agreement, which we believe will increase the likelihood of achieving a net conservation benefit.

The incidental take assurances allow the landowner to alter or modify the enrolled property upon termination of the *agreement or easement;* even if such alternation or modification results in the incidental take of the targeted species. Such take is limited, however, only to the extent that the alteration and take returns to and does not exceed the originally agreed upon baseline conditions. These protections may apply to the entire enrolled property or to portions of the enrolled property as designated or otherwise specified in the HFRP agreement and HRP.

Unforeseen events and/or changed circumstances affecting the targeted species' status have the potential to change or alter the extent of Landowner Protections. If, as a result of these unforeseen events and/or changed circumstances, additional management, restoration, or other measures are necessary to achieve the HFRP conservation objectives for the affected species, the NRCS will only require such measures by the Property Owner when they maintain the original terms of the HFRP agreement, and are limited to modifications of the plan. Further, additional conservation measures will not involve the commitment of additional land, water, or financial compensation, or additional restrictions on the use of land, water, or other natural resources available for development or use under the original terms of the HFRP agreement and HRP without the consent of the Landowner.

The NRCS will work cooperatively with the Service in establishing and demonstrating that unforeseen events and or changed circumstances exist, using the best scientific and commercial data available. These findings must be clearly documented and based upon reliable technical information regarding the status and habitat requirements of the affected species. Considerations include, but are not limited to, the following factors:

- size of the current range of the affected species;
- percentage of the species' range enrolled in the HFRP;
- ecological significance of that portion of the range affected by the HFRP;
- level of knowledge about the affected species and the degree of specificity of the species' conservation program utilized by the HFRP; and
- whether failure to adopt additional conservation measures for Landowners enrolled in the HFRP would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

Conveyance of Incidental Take Authorizations

As landowners are enrolled under the HFRP, including the provisions of the HFRP agreement and HRP as outlined herein, the NRCS will provide copies of these documents to the Service at appropriate and agreed-upon intervals. The Service acceptance of the signed HFRP agreement and HRP, signifies that the Biological Assessment/Biological Opinion has been appended and conveyance of the incidental take authorizations is provided.

The NRCS and Service acknowledge that any "take," as defined by the ESA, of the targeted species be in accordance with the implementation of the net conservation benefit standards identified herein and/or at the time upon which the landowner may exercise her/his rights to return to the original baseline conditions after the HFRP agreement or time required to achieve a net conservation benefit has expired. In either case, take of the targeted species will be incidental to and not the purpose of carrying out an otherwise lawful activity. It is important to note that such taking may or may not ever occur. It is also imperative to emphasize that it is unlikely that the targeted species would utilize the habitat involved if not for the voluntary management activities of the participating landowners. These voluntary management activities undertaken through the HFRP will likely increase the number, extent and duration of the species and increase the amount and/or quality of habitat managed for the species.

Specific Requirements for Incidental Take Authorizations

An enrolled landowner will be allowed make any other lawful use of his/her property, even if such use results in the incidental take of the targeted species provided all of the following qualifications are met:

1. The enrollee must be in total compliance with the HFRP agreement and HRP, including maintaining his baseline responsibilities as specified in the HRP;
2. The targeted species may not be shot, captured, or otherwise directly or intentionally taken (as defined by the ESA) by the landowner or those under the supervision or charge of the landowner or their employees;
3. The take is incidental to otherwise lawful activities;
4. When incidental take occurs, the take is immediately reported to the NRCS and the Service; and,
5. The enrollee will *not* undertake any activity that could result in incidental take of the targeted species, *not* associated with implementation with the measures necessary to produce a net conservation benefit, until the Landowner has provided the Service with at least 30 days written notice, in order to allow the Service, or their designated agents, the opportunity to translocate the affected targeted species to a suitable recipient site.

NRCS and the Service may suspend or revoke a landowner's protections if a landowner has breached his/her obligations under a HRP and has failed to cure the breach in a timely manner, and the effect of the breach is to diminish the likelihood that the HRP will achieve its goals.

Monitoring and Reporting Responsibilities

During the 10-year cost-share period (until 2016), the NRCS will monitor the implementation of the effects of the HFRP and use of Landowner Protections. To do this, the NRCS, or its authorized agents, will require each enrollee to annually provide a brief report on progress made toward fulfillment of the HFRP agreement and lynx habitat goals identified in the HRP (e.g., for forest stands identified in the HRP that are to be managed to provide a net conservation benefit for target species and habitats, the nature and extent of conservation practice/activity completed), report any unexpected or unforeseen circumstances, need to discuss new research or management recommendations, or other anticipated changes to the original plan. A meeting with NRCS and the Service may substitute for an annual report. Annual reports must be submitted to the NRCS by the 1st business day in February for the preceding calendar year ending December 31.

The NRCS will submit an annual report to the Service, no later than April 1 for the preceding calendar year ending December 31, detailing the extent of the use of ESA regulatory assurances under the HFRP. This report shall include accurate records of the following:

1. any anticipated future increase in target species habitat on enrolled lands
2. the number of acres enrolled;
3. the number of landowner enrolled;
4. a summary of any incidental take that has or is expected to occur on enrolled lands;
5. a list of all HFRP agreement and HRP that have been terminated; and

6. a list of all conservation practices/measures implemented on each landowner's enrolled property and their location.

At least by year 7 (fall, 2013) of the contract, each enrollee will evaluate and assess implementation and maintenance of management activities to fulfill HFRP obligations and to achieve a net conservation benefit for target species and habitats, identify any modifications that may be necessary, and discuss other issues. The findings will be submitted to the NRCS and Service.

To do this, the NRCS, or its authorized agents, will require each enrollee to report the following for lands enrolled in the HFRP:

1. an assessment (preferably maps) of lynx habitat summarizing forest management that has occurred in the previous 5 years, quantification of lynx habitat in relation to habitat baseline goals in the HFRP plan, and projections for lynx forest management in the coming 5 years.
2. any other supporting information that the landowner is achieving lynx, pine marten, or biodiversity goals identified in the HFRP plan (e.g. hare density estimates, lynx or marten occurrence surveys, new lynx, marten, or hare habitat models applied to the land base).
3. any adaptive management measures that need to be taken to revise the HFRP forest management plan based unexpected or unforeseen circumstances, new research or management recommendations, or other anticipated changes to the original plan.

The agencies will use site inspections, with proper landowner notification as described below, or remote sensing to verify forest harvest and management reports. The NRCS, Service, or their designated agents, will annually conduct randomly chosen spot checks of at least five percent of HFRP-related timber harvests done during the previous calendar.

Providing Future ESA Regulatory Assurances for Additional Species

There is the possibility that other listed, proposed, candidate species, or species of concern may occur in the future on properties enrolled under this HFRP agreement as a direct result of the conservation activities undertaken. At this time, we know of no species in northern Maine that would be adversely affected by lynx habitat management to the point that it would become so rare that it would be considered for state or federal listing. There are currently no candidates for federal listing that occur in the action area. However, should that occur, and if NRCS and the enrolled landowner so request, the affected HFRP agreement and HRP and this Biological Assessment/Biological Opinion will be amended by establishing similar implementation provisions as described for the originally targeted species.

Surveys for other Federally-listed species will not be required of HFRP participants. However, the proposed action does not authorize incidental take of any other Federally-listed species. Therefore, within the scope of this Biological Assessment/Biological Opinion consultation, only the Canada lynx will be considered.

Conclusion of the 10-year cost-share period (2016)

When the HFRP agreement expires in 2016, enrolled landowners will be eligible for Safe Harbor Agreements and Habitat Conservation Plans (or other provisions for assurances) under section 10 of the Act. The Service will encourage continuation of Landowner Protections under section 10

of the Act for forest landowners who agree to continue to manage their forest to provide a net conservation benefit for lynx.

Access to Enrolled Lands

The NRCS shall ensure that the HFRP agreement and HRP provides the opportunity for the NRCS, Service, or their designated agents, access to enrolled land with Landowner Protections, at least annually, to verify that agreed-upon conditions and expectations are being upheld and to provide other technical assistance, as appropriate. The NRCS or Service shall give the Landowners reasonable notice (generally 30 days) of these visits and will be accompanied by the Landowner or an agent of the Landowner. The scope of the visit will be agreed to in advance. The Landowner shall not unreasonably withhold access to enter upon his/her property and agrees to grant the NRCS and/or the Service access with reasonable notification. Annual site visits may be done in lieu of an annual report and could be a good way to encourage communication and exchange of information between the landowner and the federal agencies. In some instances, the Service may work with landowners and other partners to help facilitate research and wildlife surveys that would help the landowner achieve the goals of the HFRP plan or the monitoring needed to achieve the desired outcomes.

STATUS OF THE SPECIES

Lynx are medium-sized cats, generally measuring 75 to 90 centimeters (cm) long (30 to 35 inches (in)) and weighing 8 to10.5 kilograms (18 to 23 pounds) (Quinn and Parker 1987). They have large, well-furred feet and long legs for traversing snow; tufts on the ears; and short, black-tipped tails. Lynx are a territorial and wide-ranging species requiring relatively large, undisturbed boreal forest with a sufficient prey-base to maintain healthy, viable populations. Lynx are associated with early successional boreal forest where their primary prey, the snowshoe hare, is abundant. Their specialized adaptations to deep, fluffy snow, gives them an advantage over potential competitors and enables them to be efficient predators of their primary prey.

In 2000, the lynx was listed as threatened (65 FR 16052); a clarification to the findings in support of the final listing rule was published in the Federal Register on July 3, 2003 (68 FR 40076). The lynx is currently listed as threatened in the contiguous Unites States as a Distinct Population Segment (DPS) that includes the States of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, Wisconsin, and Wyoming. In the contiguous United States, the majority of lynx habitat and lynx exist on Federal lands in central and western states and on private lands in the Northeast. Critical habitat designation has been proposed by the Service for the lynx (70 FR 68294), and will be discussed below.

Reasons for listing in the final rule and rule clarification (65 FR. 16052 and 68 FR 40076, respectively) are: the inadequacy of existing regulatory mechanisms, specifically the lack of conservation planning on Federal lands to ensure viable lynx populations; effects of forest harvest, management and fire suppression; lack of a cohesive international strategy to ensure habitat connectivity with core lynx populations in Canada; high traffic volume roads and suburban development; and “take”, as defined by the ESA, from incidental catch by trapping, snaring and hunting.

Critical Habitat

Critical habitat has been proposed for the DPS of the lynx (70 FR 68294). Critical habitat is defined in section 3 of the ESA as – (1) the specific areas within the geographic area occupied by a species, at the time it was listed in accordance with the ESA, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" means species recovery to de-listing status.

Section 7(a) of the ESA requires Federal agencies to evaluate their actions with respect any species that is proposed or listed as endangered or threatened and with respect to its critical habitat. Section 7(a)(4) of the ESA requires federal agencies to confer with the Service on any action that may result in destruction or adverse modification of proposed or designated critical habitat.

Four units (i.e., Maine, Minnesota, Northern Rocky Mountains, North Cascades) have been proposed in the rule for designation as critical habitat for the contiguous United States distinct population segment of the lynx. These units represent 69,760 km^2 (26,935 mi^2 or 17,238,400 acres). Proposed critical habitat for Maine encompasses 27,539 km^2 (10,633 mi^2 or 6,805,120 acres; Figure 1).

The Service's proposed critical habitat rule (70 FR 68294) lists and describes the biological and physical features essential to the conservation of the lynx as: (1) boreal forest landscapes, the primary constituent element of the proposed critical habitat, supporting a mosaic of differing successional forest stages and containing: (a) presence of snowshoe hares and their preferred habitat conditions; (b) winter conditions exhibiting extended periods of deep and fluffy snow; and (c) abundant course woody debris to provide denning habitat. Therefore, the proposed critical habitat would provide adequate space, prey, snow conditions, denning habitat, habitat connectivity, and act as a source of lynx for dispersal to suitable, partially- or un-occupied habitat.

As described in the rule, the proposed critical habitat for Maine encompasses the area occupied by the lynx at the time of listing, comprises the primary constituent element (boreal forest) and provides for its components and the essential habitat features needed to conserve the lynx, as described above. Threats to lynx within the unit include forest management strategies not conducive to providing the essential habitat components and features needed by snowshoe hare and, therefore, lynx, lack of an international conservation strategy (between Canada and the United States), vehicular traffic, and development of forest to other uses.

Natural History of the Canada lynx

Lynx are highly specialized predators of snowshoe hare (*Lepus americanus*) (McCord and Cardoza 1982; Quinn and Parker 1987; Aubry et al. 2000). Lynx and snowshoe hares are strongly associated with what is broadly described as boreal forest (Bittner and Rongstad 1982; McCord and Cardoza 1982; Quinn and Parker 1987; Agee 2000; Aubry et al. 2000; Hodges 2000a, 2000b; McKelvey et al. 2000b). The predominant vegetation of boreal forest is conifer trees, primarily species of spruce (*Picea* spp.) and fir (*Abies* spp.) (Elliot-Fisk 1988). In the contiguous U.S., the boreal forest types transition to deciduous temperate forest in the Northeast

and Great Lakes and subalpine forest in the West (Agee 2000). Lynx habitat can generally be described as moist boreal forests that have cold, snowy winters and a snowshoe hare prey base (Quinn and Parker 1987; Agee 2000; Aubry et al. 2000; Buskirk et al. 2000b; Ruggiero et al. 2000).

Snow conditions also determine the distribution of lynx (Ruggiero et al. 2000). Lynx are morphologically and physiologically adapted for hunting snowshoe hares and surviving in areas that have cold winters with deep, fluffy snow for extended periods. These adaptations provide lynx a competitive advantage over potential lynx competitors, such as bobcats (*Lynx rufus*) or coyotes (*Canis latrans*) (McCord and Cardoza 1982; Parker et al. 1983; Buskirk et al 2000a; Ruediger et al. 2000; Ruggiero et al. 2000). Bobcats and coyotes have a higher foot load (more weight per surface area of foot), which causes them to sink into the snow more than lynx. Therefore, bobcats and coyotes cannot efficiently hunt in fluffy or deep snow and are at a competitive disadvantage to lynx (Krohn et al. 2004). Long-term snow conditions presumably limit the winter distribution of potential lynx competitors such as bobcats (McCord and Cardoza 1982; Hoving et al. 2003, 2005) or coyotes. Snowfall was the strongest predictor of lynx occurrence in the Northeast region (Hoving et al. 2005). In the northeastern United States, lynx are most likely to occur in areas with a 10-year mean annual snowfall greater than 268 cm (105 in) of annual snowfall (Hoving et al. 2005). In addition to snow depth, other snow properties, including surface hardness or sinking depth, and duration of crust conditions are important factors in the spatial, ecological, and genetic structuring of the species (Stenseth et al. 2004).

Because of the patchiness and temporal nature of high quality snowshoe hare habitat, lynx populations require large boreal forest landscapes to ensure that there is a sufficient amount of high quality snowshoe hare habitat at any point in time and to ensure that lynx may move freely among patches of suitable habitat and among subpopulations of lynx. Individual lynx maintain large home ranges (reported as generally ranging between 31 to 216 km^2 [12 to 83 mi^2]) (Koehler 1990; Aubry et al. 2000; Squires and Laurion 2000; Squires et al. 2004b; Vashon et al. 2005a). The size of lynx home ranges varies depending on abundance of prey, the animal's gender and age, season, and the density of lynx populations (Hatler 1988; Koehler 1990; Poole 1994; Slough and Mowat 1996; Aubry et al. 2000; Mowat et al. 2000; Vashon et al. 2005a). For example, when densities of snowshoe hares decline, lynx enlarge their home ranges to obtain sufficient amounts of food to survive and reproduce. Generally, females with kittens have the smallest home ranges while males have the largest home ranges (Moen et al. 2004). Reported home range size varies from 31 km^2 (12 mi^2) for females and 68 km^2 (26 mi^2) for males in Maine (Vashon et al. 2005a) to much larger ranges of and 88 km^2 (34 mi^2) for females and 216 km^2 (83 mi^2) for males in northwest Montana (Squires et al. 2004b).

The overall quality of the boreal forest landscape matrix and juxtaposition of stands in suitable condition within the landscape is important for both lynx and snowshoe hares in that it can influence connectivity or movements between suitable stands, availability of food and cover and spatial structuring of populations or subpopulations (Hodges 2000b; McKelvey et al. 2000a; Ricketts 2001; Walker 2005). For example, lynx foraging habitat must be near denning habitat to allow females to adequately provision dependent kittens, especially when the kittens are relatively immobile. In north-central Washington, hare densities were greater in landscapes with an abundance of dense boreal forest containing small patches of open habitat interspersed, than in landscapes of open forest interspersed with few dense vegetation patches (Walker 2005). Similarly, in northwest Montana, Ausband and Baty (2005) concluded connectivity of dense

patches within the forest matrix benefited snowshoe hares. In the mountainous areas, lynx appear to prefer flatter slopes (Apps 2000; McKelvey et al. 2000d; von Kienast 2003; Maletzke 2004).

Lynx are highly mobile; long-distance movements (greater than 100 kilometers (km) (60 miles (mi))) are characteristic (Aubry et al. 2000; Mowat et al. 2000). Lynx disperse primarily when snowshoe hare populations decline (Ward and Krebs 1985; O'Donoghue et al. 1997; Poole 1997). Subadult lynx also disperse even when prey is abundant (Poole 1997), presumably to establish new home ranges. Lynx also make exploratory movements outside their home ranges (Aubry et al. 2000; Squires et al. 2001).

Snowshoe hares comprise a majority of the lynx diet (Nellis et al. 1972; Brand et al. 1976; Koehler 1990; Apps 2000; Aubry et al. 2000; Mowat et al. 2000; von Kienast 2003; Squires et al. 2004b). When snowshoe hare populations are low, female lynx produce few or no kittens that survive to independence (Nellis et al. 1972; Brand et al. 1976; Brand and Keith 1979; Poole 1994; Slough and Mowat 1996; O'Donoghue et al. 1997, Aubry et al. 2000; Mowat et al. 2000). Lynx prey opportunistically on other small mammals and birds, particularly during lows in the snowshoe hare population, but alternate prey species may not sufficiently compensate for low availability of snowshoe hares, resulting in reduced lynx populations (Brand et al. 1976; Brand and Keith 1979; Koehler 1990; Mowat et al. 2000).

Because lynx population dynamics, survival, and recruitment are closely tied to snowshoe hare availability, snowshoe hare habitat is a component of lynx habitat. Lynx generally concentrate their foraging and hunting activities in areas where snowshoe hare populations are high (Koehler et al. 1979; Parker 1981; Ward and Krebs 1985; Major 1989; Murray et al. 1994; O'Donoghue et al. 1997, 1998). Snowshoe hares are most abundant in forests with dense understories that provide forage, cover to escape from predators, and protection during extreme weather (Wolfe et al. 1982; Litvaitis et al. 1985; Hodges 2000a, b). Generally, hare densities are higher in regenerating, earlier successional forest stages because they have greater understory structure than mature forests (Buehler and Keith 1982; Wolfe et al. 1982; Koehler 1990; Hodges 2000b; Homyack 2003; Griffin 2004). However, snowshoe hares can be abundant in mature forests with dense understories (Griffin 2004).

Within the boreal forest, lynx den sites are located where coarse woody debris, such as downed logs and windfalls, provides security and thermal cover for lynx kittens (McCord and Cardoza 1982; Koehler 1990; Slough 1999; Squires and Laurion 2000; J. Organ, U.S. Fish and Wildlife Service, in litt. 2001). The amount of structure (e.g., downed, large woody debris) appears to be more important than the age of the forest stand for lynx denning habitat (Mowat et al. 2000).

Population Dynamics

Lynx populations are widely distributed and are most abundant in Alaska and Canada. In the contiguous United States, the extent and quality of boreal forest is limited as it is at the southern edge of its range. Lynx use large areas of boreal forest and subsist primarily on a single prey species, snowshoe hares. Therefore, lynx habitat in the contiguous United States is limited and patchily distributed, compared to extensive, contiguous areas of habitat in the northern portions of its range.

The boreal forest landscape is naturally dynamic. Forest stands within the landscape change as they undergo succession after natural or human-caused disturbances such as fire, insect

epidemics, wind, ice, disease, and forest management (Elliot-Fisk 1988, Agee 2000). As a result, lynx habitat within the boreal forest landscape is typically patchy because the boreal forest contains stands of differing ages and conditions, only some of which are suitable as lynx foraging or denning habitat at any point in time (McKelvey et al. 2000a; Hoving et al. 2004).

In northern Canada, lynx populations fluctuate widely in response to the 10-year cycle of snowshoe hare (Hodges 2000a; Mowat et al. 2000). Although snowshoe hare populations in the northern portion of their range show strong, regular population cycles, these fluctuations are generally much less pronounced in the southern portion of the range in the contiguous United States (Hodges 2000b). In the contiguous United States, the degree to which regional local lynx population fluctuations are influenced by local snowshoe hare population dynamics is unclear. However, it is anticipated that because of natural fluctuations in snowshoe hare populations or changing patterns of forest succession, there will be periods when lynx densities are extremely low and populations are more at-risk during these times.

Dispersal of lynx from core populations in central Canada during populations highs are a source of lynx for western states (Schwartz et al. 2002). Hoving (2001) felt dispersal among lynx metapopulations in the Northeast is likely and, likewise, can influence lynx distribution. The Service (65 FR. 16052, 68 FR 40076, 70 FR 68294) argues that habitat connectivity between lynx core populations in Canada and areas south is essential to sustain the viability of metapopulations in the United States.

Threats

The reasons for listing the lynx as threatened are described in the final listing rule published in the Federal Register on March 24, 2000 (65 FR 16052) and the clarification of findings published in the Federal Register on July 3, 2003 (68 FR 40076).

Presently within the contiguous United States, human alteration of forest distribution, abundance, species composition, successional stages, structure and connectivity plays a dominant role in affecting the boreal forest landscape's capacity to sustain lynx populations. Timber harvest and its related activities are the predominant land uses affecting lynx habitat in the contiguous United States. Timber harvest and associated forest management can be benign, beneficial, or detrimental to lynx depending on harvest methods, spatial and temporal specifications, and the forest ecology of the site.

Forestry practices can be beneficial for lynx when the resulting understory stem densities and structure meet the forage and cover needs of snowshoe hare (Wolff 1980; Litvaitis et al. 1985; Monthey 1986; Koehler 1990; Hoving et al. 2004; Vashon et al. 2005a). Although areas that are cut initially may not be used by snowshoe hare and lynx, regeneration from some forms of silviculture (e.g., clear-cuts or other even-aged management) in appropriate habitat types can grow (in 10 years or more depending on local conditions) to become stands with dense understories preferred by snowshoe hares and, therefore, lynx (Monthey 1986; Koehler 1990; Koehler and Brittell 1990; Ruediger et al. 2000; Homyack 2003; Hoving et al. 2004; Vashon et al. 2005a). For example, in Maine, forest regeneration after extensive clearcutting that occurred 10 to 25 years ago is providing high quality hare habitat over extensive landscapes and, thus, is sustaining the lynx population (Vashon et al. 2005a, Homyack 2003).

Some timber harvest regimes can result in forest openings and large monotypic stands with sparse understories that are unfavorable for lynx and snowshoe hare (Koehler 1990; Homyack

2003; Hoving et al. 2004). In Maine, pre-commercial thinning (mechanized or herbicide treatments) to promote vigorous growth of fewer trees diminishes the understory and horizontal cover preferred by snowshoe hares (Homyack et al. 2004). In these instances, pre-commercially thinned stands support lower snowshoe hares densities than un-thinned stands (Ruediger et al. 2000; Homyack 2003; Griffin 2004).

Fire is important in creating the mosaic of differing forest stand ages and structures in some boreal forest types used by lynx. Fire suppression policies likely have had little overall impact to lynx habitat because most forests where lynx habitat occurs have natural fire return intervals that are longer than the period of time that has elapsed since the inception of these policies. In addition, fires that occur in lynx habitat are often large, high-intensity fires that are difficult to suppress, regardless of management objectives. Reducing fuel loads to reduce the risk of fire (U.S. Department of Agriculture and U.S. Department of the Interior 2001) can diminish the value of lynx habitat by clearing understory vegetation that is an important component of snowshoe hare habitat.

An unresolved theory is whether packed snow trails, such as from snowmobiles or skis, facilitate the access of potential lynx competitors (e.g., coyote) into winter lynx habitats that are otherwise inaccessible, enabling them to effectively compete with lynx (Buskirk 2000a). Within lynx home ranges in northwest Montana, coyotes made limited use of compacted snowmobile trails for travel and primarily scavenged for food; snowshoe hare kills made up 3 percent of coyote kill sites (Kolbe 2005). In potential lynx habitats, Bunnell (2005) found that coyotes require packed snow trails to access deep snow habitats in mountain ranges in Utah, eastern Idaho, and northern Wyoming. Thus, the threat of increased competition for food or interference between species due to increases in packed snow trails remains hypothetical.

A substantial amount of lynx habitat in the contiguous United States is found on Federal lands, primarily National Forest lands. At the time of the final listing rule, the U. S. Fish and Wildlife Service found that federal land management plans did not adequately address risks to lynx and allowed actions that cumulatively could result in significant detrimental effects to lynx in the contiguous United States. As a result, the Service concluded in the final rule that the lack of Federal land management plan guidance for conservation of lynx, and the potential for plans to allow or direct actions that adversely affect lynx, were a significant threat to the contiguous United States lynx population. Currently, numerous U.S. Forest Service (USFS) and Bureau of Land Management (BLM) Plans are in the process of revision or amendment (e.g., USFS and BLM 2004) by incorporating the Lynx Conservation Assessment and Strategy (LCAS)(Ruediger et al. 2000). The LCAS is a multi-agency strategy that uses the best scientific information available to provide a consistent and effective approach to conserve lynx on federal lands (Ruediger et al. 2000).

Scientific evidence has demonstrated that globally the climate has been warming as evidenced by changes in the amount of snow cover, among other indicators (Intergovernmental Panel on Climate Change 2001). Continued warming temperatures are likely to negatively affect the cold climatic conditions that create and maintain the boreal forest ecosystem for which lynx are highly adapted. As a result, models predict that continued warming trends may eventually cause some of the boreal forest vegetation types to recede north and/or recede to higher elevations (Hansen et al. 2001) or to affect snow depths, which could affect lynx distribution (Hoving 2001).

Snowshoe hare density, more than any other factor is the most important factor explaining the persistence of lynx populations (Steury and Murray 2004). A minimum average landscape density of snowshoe hares necessary to maintain a persistent, reproducing lynx population within the contiguous United States has not been determined, although Ruggiero et al. (2000) suggested that at least 0.5 hares per ha (1.2 hares per ac) may be necessary. Steury and Murray (2004) modeled lynx and snowshoe hare populations and predicted that a minimum of 1.1 to 1.8 hares per ha (2.7 to 4.4 hares per ac) was required for persistence of a reintroduced lynx population in the southern portion of the lynx range.

Habitats supporting abundant snowshoe hares must be present in a large proportion of the landscape to support a viable lynx population. The boreal forest landscape must contain a mosaic of forest successional stages to sustain lynx populations over the long term as the condition of individual stands changes over time. If the vegetation potential of a particular forest stand is conducive to supporting abundant snowshoe hares, it likely will also go through successional phases that are unsuitable as lynx foraging (snowshoe hare habitat) or lynx denning habitat (Agee 2000; Buskirk et al. 2000b). For example, a boreal forest stand where there has been recent disturbance, such as fire or timber harvest, resulting in little or no understory structure is unsuitable as snowhoe hare habitat for lynx foraging. That temporarily unsuitable stand may regenerate into suitable snowshoe hare (lynx foraging) habitat within 10 to 25 years, depending on local conditions (Ruediger et al. 2000). Stands may continue to provide suitable snowshoe hare habitat for many years until woody stems in the understory become too sparse, as a result of undisturbed forest succession or management (e.g., clearcutting or thinning). Ruediger et al. (2000) and Hoving et al. (2004) hypothesize that forest management techniques that thin the understory may render the habitat unsuitable for hares and, thus, for lynx. However, research on the effects of pre-commercially thinned stands on lynx habitat use, fitness, or movements has not be done.

As described previously, snowshoe hares prefer boreal forest stands that have a dense horizontal understory to provide food, cover and security from predators. Snowshoe hares feed on conifers, deciduous trees and shrubs (Hodges 2000b). Snowshoe hare density is correlated to understory cover between approximately 1 to 3 m (3 to 10 ft) above the ground or snow level (Hodges 2000b). Habitats most heavily used by snowshoe hares are stands with shrubs, stands that are densely stocked, and stands at ages where branches provide more lateral cover (Hodges 2000b). Generally, earlier successional forest stages support a greater density of horizontal structure (stem density, stem cover units) in the understory and more abundant snowshoe hares (Buehler and Keith 1982; Wolfe et al. 1982; Koehler 1990; Hodges 2000b; Homyack 2003; Griffin 2004); however, sometimes mature stands also can have adequate dense understory to support abundant snowshoe hares (Griffin 2004).

In Maine, the highest snowshoe hare densities were found in regenerating softwood (spruce and fir) and mixedwood (softwood predominant) stands (Homyack 2003, Fuller and Harrison 2005). In the north Cascades, the highest snowshoe hare densities were found in 20-year-old lodgepole pine stands with a dense understory (Koehler 1990). In montane and subalpine forests in northwest Montana, the highest snowshoe hare densities in summer were generally in younger stands with dense forest structure, whereas in winter snowshoe hare densities were as high or higher in mature, multi-story stands with dense understory forest structure (Griffin 2004).

Lynx den sites do not seem to be limiting. Den sites are found in mature and younger boreal forest stands that have a large amount of cover and downed, large woody debris (Mowat et al.

2000). The structural components of lynx den sites are common features in managed (logged) and unmanaged (e.g., insect damage, ice damage, and wind-throw) stands. Downed trees provide excellent cover for den sites and kittens and often are associated with dense woody stem growth.

Lynx are described as being tolerant of humans (Staples 1995) and anecdotes suggest that lynx are not displaced by human presence, including moderate levels of snowmobile traffic (Mowat et al. 2000) and ski area activity (Roe et al. 1999). However, lynx (in contrast to bobcats, coyotes, and fishers) are not known to regularly occupy moderately-developed landscapes in North America even when appropriate habitat exists (Ruggiero et al. 2000). In Minnesota, lynx have been observed, captured, and radio-tagged in lightly developed areas on private land within the Superior National Forest (Burdette, Univ. of Minnesota, unpub. data). Recent studies in Maine also indicate lynx avoid moderately or heavily disturbed habitats (MDIFW, unpub. data). Indications are that lynx do not tolerate moderately settled areas.

Other reasons for listing as discussed by the Service includes: lack of an international conservation strategy to maintain habitat connectivity between lynx metapopulations of Canada and the United States; incidental take of lynx associated with trapping, snaring, or hunting; and potential deleterious effects of high traffic volume roads.

Lynx Status in Maine

Maine's lynx population is contiguous with populations south of the St. Lawrence River (southern Quebec, Gaspe Peninsula, and northern New Brunswick). A population of lynx has persisted in Maine during historic times. An historic review by Hoving et al. (2003) documented 188 records between 1833-1999 including records of 39 kittens from a minimum of 21 litters, indicating a long-term breeding presence in the state. Historically, lynx ranged statewide, but their range contracted in the 1900s primarily to the western and northern parts of the state. Range contraction is believed to be caused by changing habitat, climate, and carnivore community (particularly the northward expansion of bobcat populations) (Hoving et al. 2003).

Historic data suggested lynx populations fluctuated widely. For example, during the Civil War (1864-65) a Maine fur dealer (Hardy 1907a,b), purchased "several hundred" pelts annually, followed by a few years with no skins, then several years of 200 lynx hides. At least 30 lynx were bountied from 1833-1967, when a bounty was in effect. The lynx was proposed for state-threatened status in 1987. The Maine Department of Inland Fisheries and Wildlife (MDIFW) classified lynx as a furbearer with no open season during 1963 and a species of Special Concern during 1997. In northern Canada and Alaska, lynx populations cycle in response to the 10-year snowshoe hare cycle. Hare populations in Maine do not seem to be cycling and seem to be remaining at high population levels (D. Harrison and W. Krohn, UMaine, unpub. data). Although no reliable population estimates exist, current habitat assessments (Hoving 2001), population densities from a lynx telemetry study (J. Vashon, MDIFW, unpub. data), and results of snow track surveys suggests that 500 or more animals could occur statewide. These data suggest that lynx are currently more abundant than at any other time in recent decades.

Today, lynx are most frequently encountered in areas north of Greenville, Millinocket, and Houlton, but individuals may be occasionally observed throughout much of northern, western, and eastern Maine. From 2003-06, MDIFW and USFWS have surveyed approximately 60 townships (or 1.2 million acres) throughout the lynx range in northern Maine to better document

the distribution and collect data for new habitat models. The population seems to be well distributed throughout this area. In optimal habitat on the Gaspe Peninsula, fall lynx densities (adults and kittens) are estimated to be 10 lynx/100 km^2 (or about 20,000 acres or one township). Lynx densities in Maine are estimated to be over 20 lynx/100km^2 (J. Vashon, MDIFW, unpub. data).

Research in northwestern Maine documented high productivity of lynx; 91% percent (30 of 33 potential litters) of available adult females (greater than 2 years-old) produced litters, and litters averaged 2.83 kittens (Vashon et al. 2005b). Snowshoe hare are at high densities in many areas in northern Maine, lynx home range sizes are small, and productivity is high, and mortality is low. This pattern indicates that Maine's lynx population is healthy and likely increasing. Current and future habitat conditions for lynx are being modeled by the University of Maine and Maine Cooperative Fish and Wildlife Research Unit through several graduate student projects.

Maine-based studies indicate lynx chose dens in regenerating hardwoods and softwoods, with a dense understory and abundant coarse woody debris. Sub-stand characteristics were evaluated for 26 lynx dens from 1999 to 2004 in northwest Maine (J. Organ, USFWS, unpubl. data). Dens were found in several stand types. Modeling of den site variables determined that tip-up mounds (exposed roots from fallen trees) alone best explained den site selection (J. Organ, unpubl. data). Tip-up mounds may purely be an index of downed tress, which were abundant on the landscape. Horizontal cover at 5 m (16 ft) alone was the next best performing model (J. Organ, unpubl. data). Dead downed trees were sampled, but did not explain den site selection as well as tip-up mounds and cover at 5 meters. Lynx essentially select den sites in dense cover. Natural and anthropomorphic influences within the lynx's range in Maine provide an abundance of lynx denning habitat.

There is little information about the effects of logging roads on lynx. Home ranges of all lynx radio-tagged in the Clayton Lake area, Maine include a variety of sizes of forest roads from frequently-traveled haul roads to season skid trail (MDIFW, unpub. data). Road density in the lynx study area (containing some of Maine's best quality lynx habitat) is over 1 km of road/km^2. High road density is often indicative of an intensively logged area. Hoving (2001) did not find that logging road density was a significant determinant influencing lynx distribution in the Northeast region. Fuller (2006) found Maine lynx used areas within 30 m of roads less than their availability. On the other hand, tracking of radio-tagged lynx, winter snow tracking surveys, and anecdotal observation of lynx in Maine document that lynx routinely cross logging roads and use them for traveling and foraging. Radio-tagged lynx from Clayton Lake, Maine traveled hundreds of km away to the Gaspe Peninsula and southern Quebec, and had to cross many roads. Logging roads did not seem to affect lynx habitat use in lightly roaded areas in northcentral Washington (McKelvey et al. 2000d).

Lynx road mortality (12 animals) documented in Maine has occurred on logging roads (n=9) and paved public roads (n=3)(MDIFW unpub. data). Most logging road mortality occurred on two-lane haul roads where higher traffic volume and speed would occur. These roads are open to the public, and public traffic volume exceeds forestry-related traffic by several fold.

The density and distribution of logging roads greatly influence recreational use of the landscape by humans and may have secondary effects on lynx. Trapping, hunting, and other potential sources of human mortality are indirectly influenced by logging roads. However, at this time,

there is no compelling evidence to suggest that forest roads or their secondary impacts limit lynx populations (Ruediger et al. 2000).

In Maine, lynx have not been documented in moderately to heavily developed areas on the fringe of their range (i.e. Greenville, Millinocket). A radio-tagged lynx in Maine established a home range in undeveloped, corporate forest land adjacent to the town of Ashland, but did not use the developed portions of the town (MDIFW, unpub. data). Similarly, Maine lynx roaming out of their home ranges have approached moderately-settled areas, but returned to their home ranges (MDIFW, unpub. data).

Lynx Habitat Requirements in Maine

Lynx populations respond to biotic and abiotic factors at different scales. At the regional scale, snow conditions, boreal forest and competitors (especially bobcat) influence the species' range (Aubry et al. 2000; McKelvey et al. 2000b; Hoving et al. 2005). At the landscape scale, natural and human-caused disturbance processes (e.g., fire, wind, insect infestations and forest management) influence the spatial and temporal distribution of lynx populations by influencing the amount and distribution of high quality snowshoe hare habitat (Agee 2000; Ruediger et al. 2000). Within Maine, snowshoe hare density and the presence of bobcats most influenced lynx geographic distribution (Robinson 2006). At the stand-level scale, quality (hare density), quantity, and juxtaposition of habitats influence home range size, productivity, and survival (Aubry et al 2000, Vashon et al. 2005a, Robinson 2006). At the substand scale, spatial distribution and abundance of prey and microclimate influence movements, hunting behavior, den, and resting site locations (Fuller 2006).

At a regional scale (northeastern United States and eastern Canada) Hoving et al. (2005) documented that Canada lynx distribution was strongly associated with areas of deep snowfall and 100 km^2 landscapes comprised of little deciduous forest. Hoving et al (2005) concluded that the broad geographic distribution of lynx in eastern North America is most influenced by snowfall, but within areas of similarly deep snowfall, measures of forest succession are important.

At a smaller (northwestern Maine) scale, Hoving et al. (2004) and Robinson (2006) compared landscape attributes of areas where lynx had been detected on snow track surveys to where lynx had not been detected. Logistic regression models predicted lynx were more likely to occur in 100 km^2 landscapes with abundant late regenerating forest, and less likely to occur in landscapes with much recent clearcut, partial harvest, forested wetland, and deciduous forest. Hoving described "late regeneration" forest as clearcut >10 years prior and having >50% overhead closure at a height of 1 meter. Lynx were not associated positively or negatively with mature coniferous forest. Lynx were associated with young forests more than mature forests, however old growth forests were functionally absent from the landscape. The Hoving et al (2004) model predicted that potential habitat for lynx in northern Maine in the early-1990s was rare, patchily distributed, and comprised 6% of the landscape (546 km^2 or 134,916 acres with a >50% probability of supporting lynx). Lynx were positively associated with 100 km^2 landscapes altered by clearcutting 15-30 years previously. The proportion of mature conifer forest in the landscape was not a powerful determinant of lynx occurrence, and the influence of mature deciduous forest on lynx occurrence was ambiguous. Lynx snow track surveys completed from 2003 to 2006 documented that lynx were widely distributed throughout northern Maine with habitat occurring across north-central Maine.

In a more recent evaluation of lynx habitat, Robinson (2006) used lynx snow tracking surveys (2002-2005) to model lynx habitat at the geographic (within the state of Maine) and home range scales (within the range of lynx in Maine). A snowshoe hare habitat model was developed to derive landscape hare densities across the lynx range. The best model of lynx habitat at the geographic scale included landscape hare density (+) and presence of bobcats (-). At the home range scale, landscape hare density best described lynx presence vs. absence. Landscape hare density is correlated with regenerating clearcuts (average 2.0 hares/ha).

A preliminary analysis of the habitat use of 17 radio-tagged lynx in 2002 in the Clayton Lake region in northwestern Maine compared habitat use vs. availability within the surrounding landscape, within the home range, and core use areas within home ranges (Vashon et al. 2005a). Within their home range, lynx preferred mature softwood and mid-regenerating softwood dominated mixed stands. Lynx avoided early regenerating, pole, mature hardwood, hardwood dominated mixed stands and other non-forested habitat. Mid-regenerating stands comprised 85% of telemetry locations for females and 77% for males. Mid-regenerating stands in Clayton Lake were 3.4-6.1 meters in height and were created by clearcutting stands to salvage trees after the spruce budworm outbreak in the 1970s and 1980s. A more complete analysis is pending.

Fuller (2006) backtracked six radio-tagged lynx for 65 km (40 mi.) during two winters on the Clayton Lake study area to document winter habitat selection at the stand scale. She compared vegetation characteristics in areas used by lynx with random points located within lynx home ranges. She also analyzed habitat for sites where lynx killed hares. She documented that lynx selected older (11-26 year-old), tall (15-24 foot), mid-regenerating clearcut stands, and older (11-21 year-old) partially harvested stands. Lynx avoided young (<11 years) clearcut stands, short (11-14 foot) mid-regenerating clearcut stands, recent (1-10 years) partially harvested stands, and mature stands. Most of the stands were dominated by softwood (spruce and fir). Eighty-one percent of 16 hare kills were in short regenerating clearcut stands (n=5) and tall regenerating clearcut stands (n=8).

These studies indicate that lynx select softwood-dominated mid-regenerating clearcut stands with associated high hare densities at the landscape level, within their home ranges, within foraging and high use areas, and to locate their dens. Regenerating clearcut stands used by lynx generally develop 12-30 years after cutting and are characterized by dense horizontal structure and high stem density within a meter of the ground. These habitats support high snowshoe hare densities (average of 1.6 to 2.4 hares/ha)(Fuller 1999, Lachowski 1997, Homyack 2003, Vashon et al. 2005b, Robinson 2006). Lynx seem to use regenerating clearcut stands until about 30 years of age when the canopy closes, the stand begins to self-thin, and the understory is reduced, but it is unknown whether hare densities decline dramatically or gradually after a stand reaches this level of development. Maine lynx avoid recently clearcut and recent partially harvested areas, which lack the structure to support high hare densities. However, these stands may become used by lynx as they mature, especially if dense regenerating softwoods dominate the understory. Lynx selected older partially harvested stands (Fuller 2006) when they occurred in a matrix of regenerating clearcuts. Partial harvesting, the dominant form of silviculture in Maine today, supports moderate hare densities (0.2 to 1.6 hares/ha, Robinson 2006), which in some instances may be inadequate hare densities to support lynx.

Old growth forest does not currently exist as a functional component of Maine's boreal forest. Thus the current research provides little information about positive or negative associations of Canada lynx with old growth forest. Older, multi-story, multi-age stands may develop adequate

understory structure to support moderate snowshoe hare populations, especially if the canopy has been opened by wind-throw, insect damage, or selective or patch cuts. Mature stands may be also used as movement corridors or for hunting (esp. in summer)(Vashon et al. 2005a). Across northern Maine, older stands were not prevalent and were not a powerful determinant of lynx occurrence in landscape scale analyses (Hoving et al. 2005). At a regional scale, mature hardwood stands were negatively associated with lynx occurrence (Hoving et al. 2005).

Maine's hare population currently does not undergo 10-year population cycles. Hare density data collected at several locations in northern Maine since 1995 indicate a sustained high population of hares with little variation (Homyack 2003, D. Harrison and W. Krohn, UMaine, unpub. data). It is hypothesized that the lynx population is being sustained by unusually favorable habitat conditions for snowshoe hares in a forest regenerating from extensive clearcutting. In the early 2000s, lynx populations in the Gaspe region of Quebec were similarly high (Fortin and Tardif 2003). Recent satellite imagery analysis by The Nature Conservancy shows a preponderance of regenerating softwood forest in Maine, southern Quebec, New Brunswick, and Nova Scotia, which suggests that lynx could be increasing throughout the region (Ray et al. 2002, Carroll 2005). Up to 7% of the pre-settlement spruce-fir-northern hardwood forest in northern Maine was in the 1-15-year seedling-sapling age class created by wind-throw, fire, and insect epidemics (Lorimer and White 2003). Today, 20-30 years post-budworm, the amount of early successional habitat in northern Maine spruce-fir stands has increased from about 500,000 acres in 1982 to 1.75 million acres in 2003, or about 25% of the landscape (Trani et al. 2001). This large supply of young, regenerating softwood provides habitat benefits for lynx, moose, snowshoe hares, and other early successional species. By 2010-15, many of the budworm-era clearcuts will grow out of optimal habitat conditions for hares and lynx.

Following the last budworm outbreak (1972-1986) about 45% of the annual forest harvest (47,000 hectares) was by clearcut and 55% by partial harvest (Maine Forest Service 1995). In 1989, the Maine Forest Practices Act was enacted, which regulates the amount and size of clearcutting. By 1999, clearcuts accounted for only 3% of the annual harvest, whereas partial harvest methods (including shelterwood, seed tree, group selection, and others) accounted for 96% of the forest area harvested (Maine Forest Service 2000). Clearcutting remains a dominant forest practice in eastern Canada. Established partially harvested stands were selected by lynx in winter because they are less dense and provide easier access to hares (Fuller 2006). Hare densities in established partially harvested stands were 0.2-1.6 hares/ha (Robinson 2006), but in some instances may be positively influenced by adjacent regenerating clearcut stands. Until further information is obtained, it is not possible to determine how significant the shift from clearcutting to partial harvesting in Maine's will affect lynx.

Other ESA-Listed Species

The threatened American bald eagle (eagle) (*Haliaeetus leucocephalus*), endangered Furbish's lousewort (*Pedicularis furbishiae*), and endangered gray wolf (*Canis lupus*) are known to occur in the action area. Existing regulatory mechanisms, occurrence data, and NRCS and HFRP policy exist to ensure no impact to the eagle or their habitat from forestry-related actions will occur. The eagle and/or their habitat are protected by federal statute (i.e., the ESA, the Migratory Bird Treaty Act of 1929 (16 U.S.C. §703-712), Bald Eagle Protection Act (16 USC § 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978)) and by State statute and rule (Maine Endangered Species Act (MESA) of 1975 (12 MRSA c925, sub-c3); MDIFW Essential

Habitat Rule (Chapter 8.05); Maine Forest Practices Act (12 MRSA c805, Sub-c3A); and Maine Forest Service (MFS) Rule (Chapter 20).

The MDIFW annually conducts aerial eagle nest surveys and update their database of known eagle nest occurrences. Eagle nest occurrence data is available to the public and is routinely used by natural resource managers for planning purposes. Clearcuts larger than 75 acres require notification, to the MFS, of intent to harvest 60 days prior to the action. The MFS, in consultation with MDIFW, determine in writing whether planned harvests are compliant with state law. Industrial forest landowner have maps of know eagle nest locations, and all harvest notifications are screened by the Maine Natural Areas Program for known locations of eagles and other rare and endangered species.

The NRCS conservation practice standard *Prescribed Forestry* criteria for timber harvests and management proximal to eagle nests, prohibits deleterious actions. Timber harvest and management is prohibited within 330 ft of an eagle nest, unless approved by the MDIFW and the Service, and is prohibited within ¼ mile of nests during sensitive periods (February 1 – August 31). Riparian management zones proposed under the HFRP as a biodiversity option may enhance aquatic habitat used for feeding by eagles. For example, riparian protection zones under the HFRP range from 100 ft for 1st order streams to 660 ft for 4th order streams. Under current Maine law, riparian protection zones range from 75 to 250 ft. NRCS concludes the proposed action may affect, but is not likely to adversely affect the eagle.

Furbish's lousewort (lousewort) is known to exist along the banks of the St. John River in the north portion of the action area. This plant requires open habitat near the top of riverbanks, occurs in narrow strips, and benefits from shade provided by adjacent riparian forest. Maine's Mandatory Shoreline Zoning Act (38 MRSA §439-A(5)) and Land Use Regulation Commission regulates timber harvesting in riparian areas and prohibits clearing of forest riparian areas and requires retention of riparian vegetation. NRCS concludes the proposed action will have no effect on the lousewort.

The gray wolf is not known to regularly exist in northern Maine, although occasional individuals may disperse into Maine from Canada. Wolves and lynx coexist throughout much of their range. NRCS concludes the proposed action is not likely to adversely affect the gray wolf.

ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process. The action area is the area affected directly and indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR§ 402.02).

Action Area Description

The action area consists of the land being proposed under the ESA as lynx critical habitat (Figure 1), approximately 6.8 million acres, and the surrounding area extending approximately five miles from the proposed critical habitat boundary illustrated in Figure 1. The action area includes a five mile buffer area proximal to what is generally considered suitable lynx habitat, because lynx are known to make exploratory ventures outside their typical home range and to disperse long

distances in search of suitable habitat conditions. In Maine, typically a 5-by-5 mile area (or 16,000 acres) would be large enough to support a male lynx, several females, and their offspring. The primary focus of the HFRP is to enhance habitat within the proposed critical habitat.

Repeated glacial events have shaped Maine's landscape. Elevations range from slightly below 303 m to 1,596 m (1,000 ft to 5,268 ft). Most of the area, especially the northern and northwestern sections, are heavily forested, rugged, remote, undeveloped, and, in places, mountainous. Non-mountainous terrain is hilly with narrow to broad river valleys. The USDA-NRCS (2006) provides the following general description of the area's physiographic and soil conditions. The mountains and foothills are underlain by bedrock and thin deposits of glacial till. Rugged, steep mountains are separated by high-gradient streams traversing either steep areas of colluvium or talus-laden valleys. Glacially broadened valleys are filled with deposits of glacial outwash and exhibit numerous swamps, lakes and streams. The dominant soil orders are Inceptisols and Spodosols. Generally, soils are shallow to very deep, somewhat excessively to poorly drained, and loamy. Burnham and Monarda soils series form in dense till in depressions on till plains. Berkshire, Lyman, Thorndike, and Tunbridge series form in loamy till in hills, mountains and plateaus. Dense till on drumlins, hills and ridges are typified by soil series Becket, Colonel, Dixfield, Howland, Marlow, Peru and Plaisted.

The following descriptions are from Gawler and Cutko (2004). At elevations below 667 m (2,200 ft), the dominant vegetative matrix within the action area is Spruce-fir and Spruce-Northern Hardwood forest. These two communities dominate the southern transitional boreal forest typical of the region. Hardwoods often dominate at middle slopes with spruce-fir dominate along ridges, seeps and poorly drained lowlands. Other conifer-dominated vegetative associations used by lynx and snowshoe hare (e.g., hemlock, cedar swamps, bogs and fens, etc.) are interspersed with the two dominant communities. Characteristic or common species of Spruce-Fir Forest are: Overstory – red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), eastern hemlock (*Tsuga canadensis*); Sapling/Shrub – red spruce, balsam fir; Herb/Groundcover – red spruce, balsam fir/various bryoids. The Spruce-Northern Hardwood Forest has the following species associations: Overstory – Red spruce, yellow birch (*Butela alleghaniensis*), balsam fir and white pine (*Pinus strobus*); Sapling/Shrub – red spruce, balsam fir, striped maple (*Acer pensylvanicum*), American beech (*Fagus grandifolia*), mountain maple (*Acer spicatum*), red maple (*Acer rubrum*), hobblebush (*Viburnum lantanoides*); Herb/Groundcover – spinulose wood fern (*Dryopteris carthusiana*), northern wood sorrel (*Oxalis montana*), star flower (*Trientalis borealis*)/various byroids. Areas recently logged often initially regenerate with quaking aspen (*Populus tremuloides*), paper birch and red maple; however, this community is relatively short-lived and will be succeeded by other forest types.

Defining climate in the area are cold, snowy winters with plenty of snow. Based on Hoving et al.'s (2004), lynx distribution in Maine, which corresponds to the area proposed for critical habitat, is most influenced by the amount of mean annual snowfall > 268 cm (105 in.) For example, 14-years of temperature and precipitation data from the weather station ME1479 at Clayton Lake, the Clayton Lake area exhibits some of the highest known lynx densities, reveals an average January temperature of -13.22°C (8.2°F) and an average annual snowfall of 280 cm (110 in).

The action area is largely remote forest with little development pressure. The action area is largely comprised of unorganized townships with very low human habitation. The largest towns (population figures are from the 2000 US Census) include Millinocket (5,203) and East

Millinocket (1,828) in Penobscot County, Greenville (1,623 residents, 6,000 seasonal) in Piscataquis County, Ashland (1,474.pop.) in Aroostook County, and Jackman (718) in Somerset County. The sparse development that does occur outside towns (e.g., sporting camps, single camps and cottages, limited shorefront development, boat launches), typically occurs at a small scale. Existing road systems are relatively primitive except near the towns listed above where primary and secondary state or county maintained roads are common. The majority of roads in the action area are unpaved forest access roads maintained by private timber interests to manage, harvest and haul timber products.

The dominated land use is forestland managed for timber production (e.g., lumber, pulp and paper, etc.) by private industrial timber companies, various financial management companies, and non-industrial forest landowners (more detail is provided below). Maine has an open-land tradition where private land, including private forestland in the action area, is typically open to the public for recreational use. Hunting, fishing, trapping, hiking, boating, snowshoeing, cross country skiing, all terrain vehicle trails, wildlife observation and other outdoor-related uses are allowed in the majority of the action area.

Status of the Lynx in the Action Area

Recent evidence of reproducing lynx populations comes primarily from within the proposed critical habitat (Fig. 1), thus the species' range in Maine is primarily within the action area. Exploratory and dispersal movements by radio-tagged lynx have been documented outside the proposed critical habitat boundaries. Occasional observations of lynx occur outside the action area. Although habitat conditions outside the area proposed as action area/proposed critical habitat are considered suitable for establishment and maintenance of reproducing lynx populations, lynx do not occur because of competition with bobcats (Robinson 2006). Critical habitat and the lynx's status in Maine were thoroughly discussed under the "Status of the Species" section above.

Forestland Ownership Patterns

Much of the following comes from the Maine Tree Foundation. Maine is over 90% forested (17.7 million acres) and is the most extensively forested state in the United States. Over 94% of the state's forest lands (16.7 million acres) are privately-owned. The largest tracts of undeveloped forestland in the eastern United States are found in the western, northern, and eastern areas of the state.

Approximately 6% of Maine's forestland (1 million acres) is publicly owned. The state owns a total of about 800,000 acres of public land including Baxter State Park (235,000 acres), 55 State Wildlife Management Areas, 29 Public Reserve Lands (482,000 acres), and 32 State Parks (from 500 to 43,000 acres in size). The federal government owns 200,000 acres of forest, including the part of the White Mountain National Forest located in western Maine, Acadia National Park, and five National Wildlife Refuges scattered across the state.

More than 250,000 families and individuals own more than 35% (6.2 million acres) of Maine's forest. Small woodland owners are those who own between one acre and 1,000 acres. Counted together as a whole, they lay claim to the largest share of Maine's forest.

Companies that own paper mills, sawmills and other wood processing facilities own nearly 28% (5 million acres) of the forest, including large tracts in northern and eastern Maine. A handful of

large, corporate landowners (>100,000 acres) own 14% (approximately 2.5 million acres) of Maine's forest. Owners of large tracts of non-industrial forest include individuals, families and public and private companies. Investment institutions, such as banks, insurance companies, mutual and pension funds and university endowment funds, own about 15% (more than 2.6 million acres).

Between 1980 and 2005, approximately 23.8 million acres have changed ownership in northern Maine representing a shift from industrial ownership to a variety of financial investors, real estate development trusts, private individuals, and conservation organizations. In 1994, forest industry owned about 60% (4.6 million acres) of the large tracts (>5,000 acres) of timberland and investors owned about 3%. By May, 2005, financial investors owned about 33% of the large forest tracts and industry owned only 15.5% (1.8 million acres, mostly in a single ownership)(Hagan et al. 2005). Most forest blocks have remained intact, however, there is a trend toward subdivision and smaller parcel sizes. One implication is that interest in biodiversity practices has likely declined. Former corporate/industry landowners had stronger biodiversity ethic than many of the new landowners (Hagan et al. 2005).

Ninety-six land trusts and conservation organizations in the state own nearly 1.4% of the forested area of the state (251,000 acres). The Maine Chapter of The Nature Conservancy owns the largest parcel, approximately 180,000 acres along the St. John River in northwestern Maine. Native American tribes own roughly 1% (approximately 184,000 acres) of the Maine forest. The Penobscot Tribe owns 124,000 acres of land, most of which is forested. The Passamaquoddy Tribe owns 144,000 acres overall, including 60,000 acres of forest.

Permanent conservation lands owned by federal, state, local or non-government organizations or under conservation easements that transfer development rights or allow management control slightly more than 3 million acres in Maine. These lands account for approximately 30% of the action area or 2,038,000 acres.

Timber Harvesting and Management in the Action Area

Passage of the Maine Forest Practices Act in 1989 greatly changed silviculture in the action area. As discussed previously, clearcutting was the predominant form of silviculture used in spruce-fir-dominated stands in Maine prior to and immediately after the last spruce budworm outbreak. Currently, little clearcutting is done as defined by the Maine Forest Practices Act. An impediment to conducting larger clearcuts is the paperwork required by Maine law to justify class 2 or 3 clearcuts (class 2 – any clearcut larger than 20 ac., but less than or equal to 75 ac.; class 3 – any clearcut greater than 75 ac., but less than or equal to 250 ac.) Clearcuts larger than 250 acres requires petitioning the Commissioner of the Maine Department of Conservation for a variance from the Maine Forest Practices Act.

Section 7 Consultation History in the Action Area

The Canada lynx was listed as a threatened species in April, 2000. Section 7 of the ESA requires that 1) all federal agencies, in consultation with USFWS (Service), utilize their authority to implement ESA and 2) federal agencies must insure that any action authorized, funded, or carried out is not likely to jeopardize the continued existence of federally-listed species. Most of the area occupied by lynx and proposed for critical habitat is owned by corporate forestry owners. Since they do not use federal funding or require federal permits for logging or road-building, there is little federal nexus for Section 7 consultation in the range of the lynx in

northern Maine. Similarly, there has been no federal nexus for state lands within the proposed critical habitat (Bureau of Parks and Lands, Maine Inland Fisheries and Wildlife, Baxter State Park).

From 2000 to 2006, the Service has consulted on fewer than 50 projects within the action area that were authorized, funded, or carried out by federal agencies. To date, all consultations were concluded informally, with fewer than five requiring any recommendations, terms, or conditions. The majority (≈40) consultations have been with the Maine Forest Service to review forestry projects funded through the Woodswise program (U. S. Forest Service funding). The Service and Maine Forest Service reviewed the list of conservation practices funded by the USFS for the Maine Woodswise and Forest Land Enhancement Programs and limited consultations to projects that include pre-commercial thinning, road building, or forest clearing. Nearly all projects reviewed to date have been small (<15 acres), are located on small ownerships (<500 acres), are located on the periphery or out of known lynx range, and have been routinely approved without recommendations, terms, or conditions. In three or four consultations, Maine tribes sought USDA funding to help with larger timber sales, forest management plans, or pre-commercial thinning projects. In these instances, projects were approved with few or minor conditions.

The Service consulted with the National Park Service on a proposal for new campsites in the Appalachian Trail, which was approved with minor changes. A private hut-to-hut cross-country ski trail using federal small business funding was approved with minor changes. The Service is currently consulting with two applicants on wind power projects. Pre-construction lynx surveys were completed by one applicant (lynx were not present). The Service is also currently consulting with Maine Department of Highways and Federal Highway Administration on highway improvements in northern Maine in the eastern portion of action area. The Service has consulted on one or two dam re-licensing projects with the Federal Energy Regulatory Commission with no terms or conditions for lynx.

Foreseeable Future Impacts to the Action Area

Two large development projects have been proposed in the action area. In 2005 Plum Creek Timber Company, a Real Estate Investment Trust (REIT) corporation that owns approximately 900,000 acres in Maine, submitted a proposal to Maine's Land Use Regulation Commission (LURC) requesting rezoning of roughly 421,000 forested acres to allow development. Public hearings and public review and comment during the LURC's review process caused Plum Creek to down-size their original proposal. Plum Creek is currently seeking the right to sell 975 house lots, develop two resorts, an industrial park, and other related structures on roughly 10,000 acres around Moosehead Lake in Piscataquis County. In exchange, they propose to sell a conservation easements on over 400,000 acres in the Moosehead Lake Region to non-profit land conservation organizations. The Plum Creek petition rezoning remains under review by the LURC. If approved, other landowners may wish to develop portions of their forest land.

An east-west highway linking Maine to the Canadian Maritime Provinces in the east and to Quebec, Ontario and Midwestern States in the west has been repeatedly proposed to stimulate Maine's economy. The Maine Department of Transportation (MDOT) and State Planning Office (MSPO) conducted studies, as required by Maine legislation, on the costs and economic benefits of 5 alternative corridors. The agencies reported their findings in an executive summary (MDOT-MSPO 1999). Three alternatives (A, B, and C) would require upgrades of existing 2-lane roads to allow travel speeds of 55 mph or greater. Two alternatives (D and E) would result

in 4-land limited access roads that would combine upgrades to existing 2-lane road systems and construction of new sections of road. Only one of the five alternative routes, alternative A, would bisect known occupied lynx habitat. Preference surveys involving Maine firms conducted during 1999 indicated that alternative A was the least favored of the alternatives considered.

EFFECTS OF THE ACTION

Implementation of the HFRP involves conservation measures and management practices that ultimately work towards sustainable forests on private lands. Cost share agreements with individual landowners also will provide financial incentives for private lands conservation of federally threatened and endangered species. Moreover, any landowner desiring participation in the program will be required to implement a HRP. Initial evaluation of the property will identify immediate management needs, and conservation practices to be carried out in the 10-year cost share period. Evaluation, formulation, and implementation of a HRP designed to enhance and promote habitat in order to benefit species depends upon the nature of the activities to be undertaken, where they may occur, and the duration. The Service and NRCS will jointly develop, review, and amend each HRP to ensure consistency with the goals and objectives of the HFRP. The NRCS will be responsible for conducting annual site reviews to ensure program consistency and intent.

HRPs are expected to provide a net conservation benefit to the covered species via implementation of the conservation actions and practices described in the Description of Proposed Action section. Further, we expect a positive response at the landscape level for the Canada lynx, because of the cumulative and sequential impact accrued through successive years of HFRP enrollment (e.g., as more acreage is enrolled and more conservation actions are deployed throughout the action area).

For the duration of the 10-year cost share period, or as long as the habitat created during enrollment period persists, habitat will benefit the conservation of the lynx. There are additional tools and incentives that the Service and NRCS can apply to encourage continued implementation of these plans beyond the 10-year cost-share period:

- The Service will offer Safe Harbor Agreements to landowners. Landowners may receive ESA take assurances as long as the plan remains implemented;
- Landowners will receive positive public relations by having a lynx management plan;
- Landowners with green forestry certification (SFI, FSC) have obligations to manage for listed species and have an incentive to continue plans beyond the 10-year cost-share period;
- Landowners conducting plans will contribute toward recovery goals which may facilitate delisting the lynx.
- State agencies share an interest with the Service in developing forest management plans for rare, threatened, and endangered species and other biodiversity issues. HFRP lynx plans may meet other state requirements.
- HFRP lynx plans may facilitate future federal and state permit review.
- Once a long-term silvicultural plans is developed, it is difficult to revise or adjust.

There are some circumstances that may lead a landowner to renege on a HRP, however, we believe that even if these events occur, there is a high likelihood that a net conservation benefit will still be achieved:

- The landowner sells the land. If a landowner sells their land during the 10-year cost-share period, NRCS will offer the new landowner the opportunity to embrace the new plan. If this occurs, the ESA assurances will be transferred to the new landowner. If a landowner sells the land prior to the conclusion of the 10-year period, and it is apparent that the new landowner has no interest in adopting the plan, NRCS has a mechanism to implement violation penalties to have the HFRP funds returned. Nevertheless, the habitat created of maintained prior to selling will still develop into quality snowshoe and lynx habitat.
- New markets affect forest management. New markets, including biomass, wood chemicals, ethanol, small tree dimension lumber may shorten rotations resulting in a younger forest that would benefit lynx and snowshoe hare.
- Purchase of lands for conservation may preclude future management (i.e. land placed in wilderness or "forever wild" designation. Natural processes (e.g. fire, windthrow, insect infestations) may still periodically create young forests that may be used by lynx.
- Landowner decides to develop a portion of their land. Some development may be compatible with lynx conservation. If a landowner decides to maintain their lynx plan and actively manage in lynx habitat areas it could mitigate or compensate for some of the adverse effects associated with development.

For these reasons, the Service believes that overall the HFRP has a high likelihood of providing a net conservation benefit to the aforementioned species. The net conservation benefit for each individual HFRP project will be assessed in a biological opinion appended to this programmatic opinion (see next steps for consultation at the end of this document).

The actions proposed under the HFRP are of 10 years duration making the program's benefits appear temporary. However, the habitat maintained through commitments created by the HRPs will not necessarily cease upon expiration or termination of the HRPs. Enrolled landowners may choose not to bring enrolled properties back to baseline at the point of termination, or at any other time in the future. If the HFRP continues in future years and new landowners continue to enroll under the program over an extended period, the net effect will be an increasing matrix of lands being maintained for conservation of the targeted species, with a net conservation benefit.

<u>Effects of the action on the Canada lynx</u>

The Canada lynx requires large (>100km^2) landscapes of boreal spruce-fir forest with deep snow and few bobcats. Lynx currently occupy a large region (10,500 mi.^{2}) in northwestern Maine. Within this landscape, lynx select home ranges in areas of high hare density. In Maine hare densities are greatest in young (10-35 year post-harvest), softwood-dominated, regenerating clearcuts, which support hare densities >2.0 hares/ha. Lynx and hare habitat is prevalent in northern northern Maine today. Extensive clearcuts used to salvage harvest of spruce budworm-damaged stands in the 1970s and 1980s are currently of optimal age to support high hare densities. The Maine Forest Practices Act and subsequent referenda on clearcutting resulted in restrictions to the size and prevalence of clearcutting. Today, >90% of forest harvesting is done by partial harvesting (shelterwood, selection cuts, overstory removal), which creates lower

quality habitat for hares (0.2 to 1.6 hares/ha, median 0.8 hares/ha). Density of regenerating conifer stems >10-12,000 stems/ha is key to supporting hare densities > 2.0 hares/ha. Biologists believe that landscape hare densities less than about 1.0 hares/ha will result in lower survival of young lynx, increased home range size, and result in population declines. Given the changes in forest management, the future for lynx in Maine is less certain.

Implementation of the HRP, will involve development of forest management plans based on "*Canada lynx habitat management guidelines for Maine*." These guidelines provide outcome-based landscape and stand-level recommendations for large landowners and stand level recommendations for small landowners. The habitat goal for large landowners is to maintain a continuous supply of large patches of mid-regeneration softwood-dominated habitat in 35,000 acre or greater units to support adult resident lynx and family groups and to maintain the connectivity of forested habitat. Within these large areas, the goal is to manage stands that create large patches of young, regenerating softwood that supports densities of snowshoe hares > 1.0 hares/ha. Specific management guidelines are to:

- Avoid upgrading or paving dirt or gravel roads to create new high speed or high traffic volume roads in lynx habitat.
- Maintain through time at least one lynx habitat unit of 35,000 acres (≈1.5 townships) or more for every 200,000 acres (≈9 townships) of ownership. At any time, about 20% of the area in a lynx habitat unit should be in optimal mid-regenerating conditions.
- Employ silvicultural methods that will create regenerating conifer-dominated stands 12-35 feet in height with high conifer stem density and horizontal cover above the average snow depth that will support >1.0 hares/ha.
- Maintain land in active forest management. Development and associated activities should be consolidated to minimize direct and indirect impacts to lynx. Avoid development projects that occur across large areas, increase lynx mortality, fragment habitat, or result in barriers that affect lynx movements and dispersal.
- Encourage coarse woody debris for den sites by maintaining standing dead trees after harvest and leaving patches of wind throw or insect damage.

If these outcomes can be accomplished, then sufficient habitat quantity and quality should be present to support a viable, breeding lynx population in Maine into the future. If the majority of landowners in northern Maine developed plans based on these principles, it would contribute to the recovery, and possible delisting, of the species.

Silviculture that results in conversion of softwood to hardwood forest, reduces the density of softwood regeneration, or creates low habitat quality for snowshoe hares may have negative impact on Canada lynx, particularly if extensive across the landscape. Without forest planning, the regenerating clearcuts of the 1970s and 1980s, which currently provide the prime habitat conditions for hares and lynx, will soon grow out of optimal conditions. Lynx populations would be expected to decline as landscape hare densities decline below 1 hare/ha. Habitat maintained by landowner participation in HFRP will increase the extent and quality of snowshoe hare habitat that will support lynx populations. Although it is doubtful that lynx can be maintained at the artificially high populations they are today, implementation of landscape and stand guidelines should support ensure the continuation of a viable population of breeding lynx that could be considered for delisting. In the absence of forest planning and active management,

it is uncertain whether the new partial harvest paradigm can support a viable lynx population 20 to 30 years hence. Therefore, implementation of HFRP within the action area is expected to increase the amount and quality of habitat for snowshoe hares and Canada lynx on private lands. While minimal net conservation benefits may be achieved in the early stages (first several years) of HFRP implementation, the long-term implementation and subsequent addition of HFRP enrolled lands are expected to further Canada lynx recovery goals.

The HFRP is designed to provide a mosaic of young, mid- and older-growth softwood forest stands on the landscape. We encourage landowners to consider other biodiversity values when developing forest management plans. Canada lynx and the American marten are good umbrella species for young and mature forest wildlife species, respectively. Even-aged management systems that provide young forests that benefit snowshoe hares and lynx (10 to 35 years after cutting) will mature to older growth stands that support pine marten, forest interior birds, and other species (35 to 80 years), until the cutting cycle is repeated. Landowners may choose to establish lynx habitat areas in the same place over time or shift these areas over the landscape (shifting mosaic concept). Clearcutting (especially large cuts) and subsequent herbicide application have proven to produce good lynx habitat. A return to large clearcuts and herbicide use may be justified in some circumstances to create habitat in planned lynx habitat areas. Implementation of the HFRP will also provide an opportunity to develop and test new management practices that may be applied to other areas for the conservation and recovery of threatened and endangered species.

HFRP cost-share plans will last for 10 years. Within 2 years of signing an agreement, participating landowners will develop a forest management plan for lynx and other biodiversity values. During the remaining 8 years they will implement the plan using the prescribed forest management, monitor the status and extent of current habitat, and project future habitat. We anticipate that forest management plans will forecast habitat decade-by-decade over a forest rotation, which is about 70 to 80 years in Maine for softwood species.

Because it takes at least 10 years for hare and lynx habitat to develop after cutting, habitat improvements will not be experienced until after the 10-year HFRP cost-share period expires. Some 25-30 year-old stands may grow out of good lynx habitat during the 10-year cost-share period. Present and future habitat baselines will be documented as part of HFRP plans. As indicated above, habitat baselines may diminish during the 10-year cost-share period. At the time of writing this programmatic biological opinion, the Service does not have all details needed to fully analyze the net conservation benefit of the HFRP. Net conservation benefit will be analyzed for each individual HRP as tiered biological opinions under this programmatic opinion (see next steps in consultation at the conclusion of this document). Nevertheless, the Service is reasonably assured that an overall net conservation benefit will be realized because:

- Markets require that young softwood stands grow to maturity (70-80 years) to produce merchantable forest products, thus stands cut during the 10-year cost-share period will develop into habitat (10-35 years of age) that provide optimal habitat for lynx.
- Silvicultural practices used to thin young stands include use of herbicides (to remove hardwood competition and generally believed to benefit hares by promoting dense softwood regeneration) and pre-commercial mechanical thinning to thin and space regenerating softwoods. Pre-commercial thinning as typically used by forest industry in Maine reduces

hare densities by half, but is expensive and usually occurs on a small proportion of the landscape. The HRP will address use of pre-commercial thinning.

- If the HFRP program is continued nationally, 10-year agreements could be renewed. Even if the HFRP incentive is not available, landowners may be enticed to continue to implement the plan because of a) good public relations, b) plans meet endangered species requirements of forest certification programs, c) lynx management is cost-effective, profitable, and part of a sustainable forestry plan, and d) it is possible that incidental take assurances will be extended beyond the 10-year cost-share period.

Implementation of the HRP and their prescribed management activities may have short-term negative effects on Canada lynx in the form of harm and/or harassment. Specifically logging activities may harm or harass individuals if cutting occurs near dens. It is extremely unlikely that mortality would occur because lynx readily move kittens to new den sites if disturbed. Over 30 lynx dens have been visited in the last 7 years by researchers in Maine, kittens have been handled, ear-tagged, and no mortality or abandonment has been documented (J.Vashon, MDIFW, pers. comm.). Since the lynx was listed in 2000, 9 lynx have been killed on logging roads in Maine. Mortality of approximately two lynx/year over an area exceeding 6 million acres and believed to support over 500 adult lynx, will not jeopardize the population.

For many species, take could occur if a landowner decides to return to baseline conditions at the conclusion of a HFRP program. This is highly unlikely for lynx. First, the supply of young, regenerating softwood forest habitat for lynx is currently unnaturally high because of the spruce budworm salvage from 20 to 30 years ago. Habitat baseline conditions are expected to decline in the action area 10 to 30 years from now unless management is focused on maintaining habitat. Second, HFRP will ensure that a constant supply of new habitat is created to provide future habitat for lynx. It is unlikely that a landowner can reverse forest succession once the cutting to create new habitat has been completed. Finally, landowners could fail to retain baseline habitat conditions if they chose not to cut and allowed the forest to age past the conditions favorable to lynx. Annual reporting and periodic monitoring of habitat conditions will help the Service determine if the landowners are meeting the goals identified in the HRP. As mentioned earlier, we anticipate baseline habitat conditions to generally decrease over the next 10 years. However, the benefits from the creation, restoration and maintenance of habitat will outweigh any temporary impacts associated with the limited level of take anticipated. In summary, implementation of HRPs for Canada lynx are reasonably expected to result in protection, enhancement, and restoration of denning and foraging habitat and will result in improved land use practices on enrolled properties during the period that the HRP is valid and operating.

Effects of the action on bald eagles

Bald eagles nest in northern Maine within the range of the Canada lynx. HFRP HRPs will be focused on Canada lynx habitat. However, we will encourage landowners to consider other biodiversity values – a goal of the HFRP program. Canada lynx management will occur in matrix forest and will not conflict with the locations of rare and endangered species or rare natural communities. We anticipate little overlap between bald eagle nesting habitat and Canada lynx management areas. We expect implementation of the HFRP will not likely adversely affect bald eagles because:

- Forest landowners in northern Maine know the locations of bald eagle nests, which are kept in their GIS databases. HFRP plans will be reviewed to ensure that cutting to create lynx habitat does not occur within ¼ mile of bald eagle nests without consulting with the Service. Bald eagle nests are also designated Essential Habitat under the Maine Endangered Species Act. The Maine Forest Practices Act requires landowners notify the Maine Department of Conservation of the nature and location of proposed harvests. All notifications are screened to ensure that cutting does not occur near eagle nests without consultation with Maine Department of Inland Fisheries and Wildlife.

- Nearly all bald eagle nests occur in riparian zones regulated by the Land Use Regulation Commission (unorganized townships) or Shoreland Zones in organized towns. Proposals to harvest trees is shoreland zones is reviewed by LURC or municipalities to ensure that important resources, including rare and endangered species, will not be affected.

Effects of the action on Furbish's lousewort

The Furbish's lousewort occurs along the banks of the St. John River in northern Maine within the range of the Canada lynx. We anticipate no overlap between Furbish's lousewort habitat and Canada lynx management areas. We expect implementation of HFRP to have no effects to Furbish's lousewort because:

- Forest landowners in northern Maine know the locations of all Furbish's lousewort locations, which are kept in their GIS databases. HFRP plans will be reviewed to ensure that cutting to create lynx habitat does not occur near lousewort locations.
- All Furbish's lousewort habitat occurs in riparian zones regulated by the Land Use Regulation Commission (unorganized townships) or Shoreland Zones in organized towns. No cutting is allowed within 25 feet of the St. John River in the zone occupied by the lousewort.

Effects of the action on the Gray Wolf

The gray wolf is listed as endangered in Maine, however, as of 2006 a breeding population is not known to occur in the state. Two wolves were killed in Maine in the 1990s, and other wolves have been killed in the last decade in northern New York (1), Vermont (1 pending investigation), and in Quebec south of the St. Lawrence (1 confirmed, 3-4 additional animals under investigation). Thus, wolves may be dispersing south into northern New England from populations in Canada. Canada lynx management will occur in matrix forest and will overlap with potential wolf habitat. Wolves and lynx coexist in managed boreal forest throughout Canada and Alaska. The Service and NRCS are not promoting a single-species focus on lynx for forest management in northern Maine. Instead, we promote managing forests for lynx (young regenerating forest) in balance with other biodiversity concerns (e.g. managing mature forest for pine marten and deer wintering areas) in a shifting mosaic so that a balance of young and older forests are present on the landscape at any time. Wolves rely on ungulate prey (deer and moose). There is some evidence that the presence of wolves is beneficial to lynx (by diminishing coyote populations, providing a source of carrion). Lynx habitat management at large landscape scales will benefit moose populations, which thrive in young, regenerating forest. Deer are rare in northern Maine because snow conditions limit the northern extent of their range and deer wintering areas are in short supply. We expect implementation of the HFRP to have beneficial

effects to wolves and would not likely adversely affect wolves if they disperse into Maine or began to reproduce here because:

- Wolves and lynx share managed forest habitat in the Rockies, Great Lakes, and throughout most of their range in Canada and Alaska with no apparent conflicts or inter-species predation or competition for food resources.
- Wolves do not currently occur in Maine as a breeding population.
- Forestry practices to benefit lynx should also improve habitat for moose and beaver and will maintain boreal habitat favorable for wolves.
- Comprehensive HFRP plans may provide for deer wintering habitat that will improve deer populations in northern Maine.
- If wolves establish themselves as a breeding population, forest management activities could have an affect in the form of disturbance near den sites, roads (indirect effects from human mortality from roads, illegal hunting, and incidental take from trapping), or the possibility of take (harm, harassment, mortality) from logging operations near den sites. However, we have no information to suggest if, or when, wolves may naturally reoccupy their historic range in Maine.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, private, or other non-federal entity activities on endangered and threatened species and their critical habitat that are reasonably certain to occur in the action area. Future federal actions unrelated to the proposed action are not considered in this section because they are subject to consultation pursuant to section 7 of the ESA. Numerous non-federal actions that could affect listed species are reasonably certain to occur within the action area. These include:

- Active management of industrial forest for a variety of forest products;
- Managed and unmanaged recreational activities including camping, hiking, berry-picking, hunting, fishing, trapping, and bird watching,
- Energy-related developments including wind and hydro-power. In the last decade, the Service has reviewed FERC re-licensing proposals for most of the hydroelectric projects in the action area. There are no known hydro projects planned for the future. The Service is reviewing two wind power projects within the action area. More projects are likely to be proposed in the future.
- Until recently development projects in the action area are minor and include new seasonal camps, woods roads improvements, new campsites, and skiing and snowmobile trails. Plum Creek Corporation recently proposed a 1,000-acre development in the Moosehead Lake region within the action area including subdivisions, lakeshore development, resorts, lodges, and RV parks. This is the largest single development project in Maine's history.
- The Maine Department of Inland Fisheries and Wildlife, University of Maine Department of Wildlife Ecology, Maine Cooperative Forestry Research Unit, and Maine Cooperative Fish and Wildlife Research Unit will continue to conduct research on forest management lynx and snowshoe hare ecology.

- Tribes will manage their lands for multiple resources including forest products and recreation (hunting, trapping, subsistence).

Each of these future activities could contribute to cumulative effects on listed species or their habitat in the action area. Some of these activities (e.g. some forest practices, research) will contribute additional benefits for lynx and their habitat. Some activities (e.g. some forest practices, trapping, and development) could result in taking or have a negative effect on lynx habitat.

The majority of the Canada lynx populations in northern Maine occur on private lands. Non-federal actions that may negatively influence Canada lynx include some forms of forest management, lack of forest planning, incidental take from hunting and trapping, development and habitat fragmentation, and climate change. Although these threats will likely continue, these activities, in conjunction with the proposed action, are not likely to significantly affect the continued survival and recovery of the Canada lynx.

CONCLUSION

It is the U. S. Fish and Wildlife Service's biological opinion that the HFRP, as proposed, will not jeopardize the continued existence of the Canada lynx. The action will not jeopardize the Canada lynx because the HFRP will provide incentives to landowners to develop forest management plans to provide a net conservation benefit for Canada lynx. Individual Habitat Restoration Plans will document the anticipated net conservation benefit. HRPs will contribute to the Service's recovery goals for the species. When conducting forest management activities to benefit lynx, incidental take may occur. Lynx may be killed on forest roads and dens may be destroyed during harvesting operations. The anticipated level of take from these sources is expected to be low and will not preclude recovery nor appreciably reduce the survival of lynx in northwestern Maine. Take may also take the form of reduced habitat quality or quantity if landowners decide to bring lynx habitat back to baseline conditions. This is unlikely for two reasons. First, this Biological Opinion acknowledged that baseline conditions for lynx is dynamic and will change over time. Lynx habitat is currently at historically high levels and will decline across the action area over the next 10 to 30 years as a young, regenerating forest matures. For some landowners, returning to baseline (2006) conditions would result in increased habitat. Second, once a forest management plan is in place, it is unlikely that landowners can "undo" the habitat that they have created during the 10-year cost share period. There are additional incentives (positive public relations, possible extension of take assurances, meeting requirements of forest certification, LIP or other future incentive programs) that will encourage landowners to maintain a forest management plan for lynx after the 10-year cost share period has concluded.

The action will not result in the destruction or adverse modification of the proposed critical habitat for the Canada lynx in northwestern Maine. When conducting forest management to benefit lynx, there will be temporary negative effects to primary constituent elements of the proposed critical habitat. Boreal spruce-fir habitat will be harvested and hare populations in recently-cut stands will temporarily decline below the density needed to support lynx. Older stands will be allowed to grow to maturity and will not support the hare density needed to support lynx at the latter stages of the forest rotation. Silviculture techniques used to create lynx habitat may cause a temporary negative effect to the primary constituent elements of the proposed critical habitat, but will provide a net conservation benefit that will contribute to the

recovery of the species. Forest management plans will ensure that the quantity, quality, and juxtaposition of habitats necessary to support lynx on the landscape will be present. The temporary negative effects of forest management will not appreciably diminish the value of the proposed critical habitat for both the survival and recovery of the Canada lynx.

It is the Service's biological opinion that the HFRP, as proposed, will not jeopardize the continued existence of the bald eagle. The action will not jeopardize the bald eagle because landowners will employ best management practices for bald eagles, and it is unlikely that forest management activities to benefit lynx will occur near bald eagle nests.

It is the Service's biological opinion that the HFRP, as proposed, will not jeopardize the continued existence of the Furbish's lousewort. This species occurs only on the banks of the St. John River. The action will not jeopardize the Furbish's lousewort because state Shoreland Zoning and Land Use Regulation Commission rules prohibit forest management in shoreline habitat occupied by the Furbish lousewort, and it is unlikely that forest management activities to benefit lynx would require forest harvest within the riparian area of the St. John River.

It is the Service's biological opinion that the HFRP, as proposed, will not jeopardize the continued existence of the gray wolf. The wolf is not known to occur in Maine, although occasional individuals may disperse here from populations in Canada. The action will not jeopardize the wolf because lynx management will benefit prey populations for wolves (moose and beaver), and HFRP promotes comprehensive management for other species, including deer wintering areas. Wolves and lynx coexist with each other with no apparent inter-species competition or predation throughout most of their range in Canada, Alaska, the Great Lakes states and the northern Rockies. Wolves thrive in managed forest throughout much of their range and forest management for lynx is not believed to adversely affect wolves if they occur in Maine as dispersing individuals or a breeding population.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which included, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out of an otherwise lawful activity. Under terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NRCS so that they become binding conditions of any grant, contract, or permit issued to parties conducting activities under the auspice of the HFRP, as appropriate, for the exemption in section 7(o)(2) to apply. NRCS has a continuing duty to regulate the activity covered by this incidental take statement. If NRCS (1) fails to assume and implement the terms and conditions or (2) fails to

require contractors or other parties conducting work on behalf of NRCS to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, contract, or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NRCS must monitor and report land use trends, habitat conditions, and HRPs to the Service as specified in this PBO.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

The Service expects that some take of Canada lynx and critical habitat will result from implementing HFRP plans, but that the plans will result in a net conservation benefit and help the Service meet recovery goals for the species. Until individual HRP plans are submitted, we cannot analyze or quantify the level of take that will occur. Each HRP will receive an individual incental take analysis as part of a biological opinion tiered to this programmatic (see next steps in consultation at the end of this document).

The Service believes that take of lynx from HFRP could occur in the form of:

- return of habitat to baseline conditions (harm);
- cutting forests and allowing forests to grow out of seral stages that support high population of snowshoe hares and lynx (harm); and
- disturbance to lynx dens from cutting operations (harm, harassment, mortality) and mortality of lynx on logging roads.

<u>Return to Baseline Conditions, Cutting, and Allowing Forest to Mature</u>

All Canada lynx in excess of baseline conditions could be taken as an incidental consequence of land use activities that return the property from restored and enhanced habitat conditions to baseline conditions. The precise number of Canada lynx subject to incidental take cannot be enumerated because of demographic and environmental stochasticity and uncertainty that underlie predictions of the precise number that will increase above the baseline in response to voluntary management to benefit this species. Furthermore, we lack methods to estimate lynx populations. Therefore, baseline conditions for Canada lynx will be based on the amount and quality of habitat. Quality lynx habitat in excess of baseline conditions could be taken as an incidental consequence of land use activities that return the property from restored and baseline conditions. Therefore, incidental take of Canada lynx above baseline conditions would be in the form of harm.

Because Maine has a young, regenerating forest recovering from the salvage of spruce budworm damage of the 1970s and 1980s, the forest will mature and overall habitat quality for snowshoe hares and lynx will undoubtedly decline. Because Maine's forest is maturing out of this highly unusual state, it is highly unlikely that any landowner can maintain the baseline habitat conditions during the term of HFRP 10-year cost agreements. Ten to 15 years hence (2016-21), many of the regenerating clearcuts that now provide quality habitat will be >35 years post-harvest and hare densities and habitat quantity will be expected decline. Although landowners will create new habitat as a result of HFRP lynx forest management plans, it is unlikely that most could replace the unusually large amount of habitat that occurs today. There are currently no markets for 10-35-year-old pole-stage lumber, and it is unreasonable to expect private landowners employing sustainable forestry practices to maintain young forests for hare and lynx

having no commercial value. The Service believes that in the long term, landowners who develop forest plans for lynx will provide a net conservation benefit ensuring a constant supply of quality habitat configured on the landscape needed to support a population of breeding lynx. Silvicultural systems in Maine have shifted dramatically from clearcutting (1970s and 1980s) to partial harvesting (1990s to present). As discussed previously in this document, it is unlikely that a future landscape dominated by partially-harvested cuts will support lynx in the way that the legacy of clearcutting does today.

NRCS and the Service acknowledge that any take of targeted species will be following the implementation of net conservation benefit standard and/or at the time upon which the landowner may exercise her/his rights to return to the original baseline conditions after the HFRP HRP expires for that specific landowner. We anticipate that HFRP plans will clearly identify whether a landowner intends to maintain baseline, reduce baseline, or shift baselines during the 10-year cost share period. It is important to note that such taking may or may not ever occur. It is also important to acknowledge that habitat conditions for lynx will likely begin to deteriorate for lynx within 10 to 15 years because of an aging forest. It is imperative to emphasize that landowners have created the lynx habitat we have today and continue to play a role in creating future habitat, particularly if they actively manage areas for lynx under a forest management plan. The voluntary management activities undertaken through HFRP will ensure the quality, quantity, and juxtaposition of future lynx habitat. Plans will also incorporate biodiversity considerations for other wildlife species, including trust resources to the Service (especially forest interior migratory songbirds).

Disturbance of Lynx From Cutting Operations and Lynx Mortality on Logging Roads

Implementation of the HRP and their prescribed management activities may have short-term negative effects on Canada lynx in the form of harm and/or harassment. Specifically logging activities may harm or harass individuals if cutting occurs near dens. It is extremely unlikely that mortality would occur because lynx readily move kittens to new den sites if disturbed. Over 30 lynx dens have been visited in the last 7 years by researchers in Maine, kittens have been handled and ear-tagged. Subsequent mortality has been observed on two occasions, but is it unknown whether the mortality is related to the den visit by researchers (J.Vashon, MDIFW, pers. comm.). Since the lynx was listed in 2000, 9 lynx have been killed on logging roads in Maine. Based on this information the Service anticipated mortality of approximately two lynx/year over an area exceeding 6 million acres, which currently supports over 500 adult lynx.

Detecting Incidental Take

The Service expects incidental take of lynx at dens will be difficult to detect because lynx dens are highly cryptic (no one has found one in Maine without the aid of radio-tagged females). Furthermore, lynx will likely be able to avoid mortality of kittens by moving their kittens to a new den, something they do regularly, if logging operations come near dens. Moving of dens in response to logging activity could be considered a form of harassment. Mortality of lynx killed along logging roads is detectable in some instances, but depends on whether a carcass is visible and reported to authorities for identification within a reasonable time. Given that 9 lynx have been documented killed on forestry roads, it is reasonable to expect this type of take to occur in the future.

CONFERENCE REPORT ON CRITICAL HABITAT FOR THE CANADA LYNX

On November 9, 2005 the Service proposed designating critical habitat for the Canada lynx in northwestern Maine. The action area for the HFRP is the same as the area proposed for Critical Habitat in Federal Register 70(216):68294-68328 (see Maine map on page 68317)(Fig. 1). Although the boundaries of the critical habitat could change when the final rule is published (anticipated November, 2006), for the purposes of this conference we assume that the critical habitat boundaries will remain the same. Tribal lands are proposed to be exempted from the critical habitat, so this conference applies to HFRP activities on private forest lands only.

The Service reviewed the effects of HFRP forest management plans for the Canada lynx on the primary constituent elements of the proposed critical habitat. The specific biological and physical feature, otherwise known as primary constituent elements, essential to the conservation of the lynx is:

<u>Boreal Forest Landscapes Supporting a Mosaic of Differing Successional Forest Stages and Containing:</u>

a. Snowshoe hare populations and their preferred habitat conditions: dense understories; and
b. Long-term average snow conditions that are deep and fluffy for extended periods of time; and
c. Sites for denning having abundant downed, coarse woody debris.

HFRP forest management plans will be based on Maine Lynx Habitat Management Guidelines, which recommend that landowners identify habitat management areas for lynx 35,000 acre or greater. Within these areas, landowners will manage softwood-dominated stands to create a continuous supply of dense, regenerating spruce-fir. These stands will be managed so that at 10-35 years of age they will support snowshoe hare populations >1.0 hares/ha. Implementing these landscape and stand guidelines will provide the quantity and quality of habitat needed to maintain a viable population of breeding lynx in Maine into the future. In keeping with sustainable forestry objectives, landowners will allow forest stands to grow to maturity (70 or 80-year rotation). The Service acknowledges that both cutting stands and allowing stands to grow will temporarily reduce hare population below 1 hare/ha, a threshold that may cause lynx populations to decline. Cutting and allowing stands to mature will remove some parts of the landscape from optimal habitat conditions for Canada lynx. The primary advantage of HFRP plans is to develop a system of forest management that ensures that 20% of the landscape is in optimal conditions for lynx and snowshoe hares at any time in the future. Forest management plans will document decade-by-decade where and how much lynx habitat will be present on the landscape. Plans will also document where new cutting will occur (and temporarily reduce hare populations) and where existing lynx habitat will be allowed to grow to maturity.

The alternative (no advanced forest management plans for lynx) would enable landowners to continue with forest management that may, or may not, provide habitat adequate to support a breeding population of lynx in the future. As mentioned earlier in this document, the silvicultural systems that created the habitat that lynx thrive in today (clearcut salvage of spruce budworm-damaged stands in the 1970s and 1980s) is substantially different from the silviculture used today (many forms of partial harvesting). Partial harvesting does not seem to consistently produce the high populations of snowshoe hares as have regenerating clearcuts. In some instances partial harvesting creates habitat supporting hare densities up to 1.6 hares/ha. In other instances, partial harvesting supports hare densities as low as .2 hares/ha. Although additional

research is needed understand why this occurs, there is some concern whether the Service can achieve recovery goals for the lynx in Maine with a partial harvesting silvicultural regime without active participation by landowners to apply silvicultural technques at a landscape scale that will ensure high densities of snowshoe hares that will support lynx. The status quo forestry may, or may not support a breeding population of lynx in the future. Private landowners with HFRP plans will ensure that lynx continue to thrive. Thus, the Service concludes that HFRP forest management plans will provide a net conservation benefit and will not affect this aspect of the primary constituent elements of the proposed critical habitat.

Long-Term Average Snow Conditions that are Deep and Fluffy for Extended Periods of Time

Forest management plans cannot influence climatic conditions that affect snow depth and qualities. Therefore, the Service concludes that HFRP forest management plans will not affect this aspect of the primary constituent elements of the proposed critical habitat.

Sites For Denning Having Abundant Downed, Coarse Woody Debris

HFRP forest management plans will be based on Maine Lynx Habitat Management Guidelines, which provides specified amounts of coarse woody debris be left on site after forest harvest. Habitat for lynx dens does not seem to be limited in Maine. Lynx den in dense regenerating softwood stands, which are also their preferred foraging areas. Coarse woody debris is abundant in forest stands and is not limiting. Maine lynx den in areas having slightly higher coarse woody debris than random sites. Therefore, the Service concludes that forest management plans will not affect this aspect of the primary constituent elements of the proposed critical habitat.

After reviewing the current status of the Canada lynx, the environmental baseline for the action area, the effects of the proposed HFRP, and the cumulative effects, it is the Service's conference opinion that the HFRP is not likely to jeopardize the continued existence of the Canada lynx, and is not likely to destroy or adversely modify proposed critical habitat.

This concludes the conference for the HFRP. The NRCS may ask the Service to confirm the conference opinion as an amendment to this programmatic biological opinion issued through formal consultation if the Canada lynx critical habitat is designated. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section & consultation will be necessary.

After designation of critical habitat for the Canada lynx and any subsequent adoption of this conference opinion, the NRCS shall request reinitiation of consultation if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the HFRP that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; 3) the HFRP is subsequently modified in a manner that causes and effect to the species or ciritcal habitat that was not considered in this conference opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action.

NEXT STEPS FOR CONSULTATION

The Service lacks sufficient information at this time from which to adequately assess the net conservation benefit, environmental baseline, and incidental take of the projects enrolled in HFRP. These details will be forthcoming in the individual HRPs. NRCS will contact the Service when each of the landowners receiving HFRP funds completes their HRP and will request formal consultation. The NRCS does not have to write a Biological Assessment for the individual projects appended to this programmatic biological opinion. The initiation package should clearly articulate the action and provide a statement of anticipated effects to listed species, and any other materials that could help the Service with its analysis. The Service will develop an abbreviated or tiered biological opinion under this programmatic biological opinion for each project. Site-specific impacts will be evaluated. Incidental take statements will be developed separately for each HFRP HRP as will reasonable and prudent measures and conservation recommendations where appropriate. Landowners will receive ESA assurances for the level of take identified in their individual tiered biological opinions as described earlier in this programmatic opinion. The incidental take assurances provided through these biological opinions will expire at the conclusion of the 10-year cost share agreement. At that time, the Service will offer landowners an opportunity to extend these assurances through a Safe Harbor Agreement or similar program. The Service will review the HRPs, and the HRPs will not be valid until signed by the Service, NRCS, and applicants.

EFFECT OF THE TAKE

At this time, the Service does believe that level of anticipated take associated with HFRP, a program intending to improve habitat for listed species on private lands, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes that with effective NRCS and Service cooperation and coordination as outlined in the PBO, implementation of the proposed HFRP does not require reasonable and prudent measures and terms and conditions since all components of the HFRP are considered as part of the proposed action. Individual reasonable and prudent measures may be required for individual HRPs.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse impacts of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. A primary goal of HFRP is to promote recovery of listed species. No additional conservation recommendations are necessary due to the inherent benefits that will occur during implementation of HFRP and the associated HRPs.

REINITIATION NOTICE

This concludes formal consultation pertaining to NRCS actions involving HFRP activities. As provided in 50 CFR Sec 402.16, reinitiation of formal consultation is required where

discretionary NRCS involvement or control over the action has been retained (or is authorized by law) and if:

1. the amount or extent of taking specified in the incidental take statement is exceeded;
2. new information reveals effects of NRCS' action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
3. NRCS' action is subsequently modified in a manner that was not considered in the PBO; or
4. a new species is listed, or critical habitat designated that may be affected by the action.

Programmatic Biological Assessment Approval

Joyce Swartzendruber, State Conservationist for Maine
Natural Resources Conservation Service

Programmatic Biological Opinion Approval

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U. S. Fish and Wildlife Service

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APPENDIX 1

NRCS Prescribed Forestry Standard, Specifications, and Scope of Work

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

PRESCRIBED FORESTRY

(Ac.)

CODE 409

DEFINITION

Manage forested areas for forest health, wood and/or fiber, water, recreation, aesthetics, wildlife habitat and plant biodiversity.

PURPOSE

- Maintain or improve forest health
- Protect soil quality and condition
- Maintain or enhance water quality and quantity
- Maintain or improve forest productivity
- Maintain or improve plant diversity
- Improve aesthetic and recreational values
- Improve wildlife habitat
- Achieve or maintain a desired understory plant community for forest products, grazing, and browsing.

CONDITIONS WHERE PRACTICE APPLIES

- On all forest land
- On land capable and suited to growing trees.

CRITERIA

General Criteria Applicable to All Purposes

Activities to achieve the intended purpose(s) shall be based on a forest prescription that addresses the owner's objectives as well as perpetuating a sustainable forest ecosystem based on ecological parameters such as forest types, soil types, past harvest history, natural community types and successional trends.

A forest prescription prepared under this practice shall follow the general criteria applicable to all purposes and shall contain at least one, but may contain many or all of the listed purposes for this practice.

A forest prescription prepared under this practice that is an element of a more comprehensive conservation plan shall recognize and be compatible with the other requirements of the plan.

The prescription shall include a description of the existing forest condition and desired sustainable forest condition. Where available use ecological site descriptions as guides or other natural plant community descriptions such as those developed by the Department of Conservation Maine Natural Areas Program.

The prescription shall include a written inventory report outlining the field work done to prepare the plan, especially to develop existing forest condition descriptions, prescriptions, and other information. This report shall also include the number and type of field plots/points, and related methods used. See the Prescribed Forestry Specification Guide Sheet for more detailed requirements for the inventory portion of the prescription.

The prescription shall integrate all criteria applicable to the intended purpose(s) of this practice.

The prescription shall be developed for a minimum management period of 10 years.

An existing prescription or inventory data may be used if it is not more than 5 years old and updated to meet the applicable practice criteria.

Describe and give rationale for selection of silvicultural system(s) including ecological and economic considerations.

Planned activities shall be examined collectively. Coordinate and time activities to optimize the stated purposes of conservation practices. Activities are not limited to NRCS conservation practices, but may include other activities essential to implementation of the prescription.

Comply with other NRCS practice standards as needed to implement the prescription, as well as any other legally binding requirements, such as biological opinions, conservation easement restrictions, contracts, etc.

All activities planned under this practice shall comply

with applicable federal, tribal, state, and local laws, rules and regulations.

Planned activities shall lead to a distribution of age classes appropriate to sustainable forest conditions, landowner objectives and local ecosystems.

Develop written guidelines that minimize the effects of forestry activities, such as construction of roads, trails and landings and site preparation for planting, on all the natural resources, including soil, water, air, plants and animals.

Do not use plants listed as invasive by the Maine Department of Conservation in any restoration plans.

Follow guidelines as outlined in the Prescribed Forestry Specification Guide Sheet, Job Sheet and Statement of Work.

Implementation will include preparing an annual schedule of activities or project plan that clearly describes management objectives and goals specific to the intended purpose or purposes, so that NRCS environmental compliance can be completed prior to the work.

Additional Criteria to Protect Soil Quality and Condition

Control or prevent erosion. Soil loss will not exceed allowable average annual soil loss (T) as defined by current, approved erosion prediction technology.

Maintain adequate cover to control soil erosion. Cover may include logging debris as well as vegetative cover.

Prevent gully formation.

Minimize impacts on the landscape when placing roads, harvest trails and landings.

Avoid soil compaction during all activities occurring in the forest.

Use other conservation practices when needed, such as forest trails and landings (655), critical area planting (342) and filter strip (393), to control or prevent soil erosion.

Additional Criteria to Maintain or Enhance Water Quality and Quantity

Develop written guidelines to maintain and enhance the quality and quantity of water flowing from and through forest management unit.

Assess and manage the impacts of forest activities on water quality and quantity.

Ensure road/trails/landing locations, design, construction maintenance, and vegetation reestablishment does not impair water quality. Develop written guidelines for the use of drainage measures. Include information on when, where, what types, and sizing.

Follow Filter Strip (393) and/or Riparian Forest Buffer (391) Practice Standards to install, operate, and maintain filter strips or buffers to remove or reduce the transportation of sediment or organic matter into streams, lakes or other sensitive areas.

Develop written guidelines for the use of stream crossings. Include information on when, where, what types, and sizing. Avoid altering stream courses and drainage patterns.

Additional Criteria to Maintain or Improve Forest Productivity and Health

Sustainable harvest levels shall be based on the following:

- Clearly documented growth and regeneration data
- Site index models (if available)
- Site productivity or culmination of mean annual increment (CMAI) growth
- Desired future sustainable condition
- Consideration of cyclical and natural disturbances.

Develop guidelines on protecting the residual forest, including regeneration, following harvest operations or other activities.

Identify tree and shrub species to be retained.

Follow established guidelines for spacing, density, size class, number and amounts of trees and understory species to be retained.

Ensure spacing is by species and size class distribution.

Identify pest problems, including insects, diseases, mammals and invasive/noxious plants, and develop management guidelines.

Use integrated pest management practices, such as maintaining a diversity of plants that discourages pest outbreaks, whenever possible.

Assess and manage the environmental impacts of pest management activities, including, but not limited to, application timing and amount, and disposal.

A timber harvest plan shall indicate harvesting techniques and equipment to be used.

Additional Criteria to Maintain or Improve Plant Diversity

Assess the current plant diversity condition of all forest

types on the management unit. Include descriptions of the ecological processes such as disturbance regimes, the unique natural plant communities such as old-growth, and the rare and imperiled plant species and plant communities such as floodplain forest.

Designate and delineate areas that contain these unique communities and develop and implement strategies to protect and maintain their functions and values. This may be accomplished by moving designated areas as conditions change or by maintaining the same area in that condition.

All native plant communities shall be inventoried and managed on the landscape to provide for vertical and horizontal structural complexity, and species diversity.

Develop written guidelines addressing the management of the native plant species and their communities. Include invasive species control and native plant species/community restoration plans if needed.

Additional Criteria to Improve Aesthetic and Recreational Values

Develop written guidelines for those practices that improve the aesthetic and recreational values indicated as important by the landowner. Include measures that will minimize any potential adverse effects associated with recreational uses.

Select and manage plant materials adapted to the soil and climatic conditions and that fulfill a specific aesthetic or recreational need.

Additional Criteria to Improve Wildlife Habitat

Develop written guidelines to identify protected Federal and State habitats and those with special needs and maintain or enhance those habitats.

Designate and delineate areas that contain these wildlife habitats and develop strategies to protect and maintain their functions and values. This may be accomplished by moving designated areas as conditions change or by maintaining the existing habitat.

Develop management strategies and prescriptions based on the best available science to provide for targeted species biological and ecological needs.

Barriers to aquatic organism passage will not be created.

Integrate forest and wildlife management objectives and activities.

Additional Criteria to Achieve or Maintain a Desired Understory Plant Community for Forest Products, Grazing, and Browsing

Develop written guidelines for inventorying plants, monitoring plant populations and protecting forest ecology while allowing the sustainable harvest of non-timber products.

Assess the impacts of timber production and harvest on the non-timber products.

Assess the impacts of grazing and browsing on the management unit, and develop strategies, such as Use Exclusion (472) to reduce or eliminate the adverse effects.

Space trees properly to produce desired forage production, increase desirable woody plants for browsing, and provide conditions favorable for understory forest products.

CONSIDERATIONS

Maine Forest Service's Best Management Practices (BMPs) for Forestry (2005) may be used to assist with minimizing potential adverse impacts associated with forestry operations.

Consider landscape-level, including adjacent and cumulative land use, effects.

Consider multiple resource use of forestland including, but not limited to, hunting, fishing, bird-watching, snowmobiling, cross-country skiing and other eco-tourism type activities.

Consider wildlife and biodiversity within all purposes. Manage for "umbrella" or "indicator" species, whenever possible, to benefit a wider range of species. See Prescribed Forestry Specification Guide Sheets for more information.

Consider developing an ecologically sound, sustainable forest management plan that qualifies the landowner for third-party forest certification.

Consider social effects of decisions.

Assess potential landowner and user liability in the development of specifications for this practice.

PLANS AND SPECIFICATIONS

Plans and specifications shall be in keeping with this standard and the Prescribed Forestry specification guide sheets, and shall describe the requirements for applying the practice to achieve its intended purpose(s).

The following minimum components shall be included in the forest prescription:

- A clear statement of landowner's goals and objectives, including the primary purpose or purposes under this standard.
- Description of ecological and silvicultural systems and rationale for selection of silvicultural system. Include individual stand descriptions
- Maps of forest and soil types, land location, access system, and sensitive areas
- Location of roads, property boundaries, protected areas
- Planned and applied management activities, including regeneration/harvest strategies and guidelines for addressing soil, water, air, plant, animal and human resource problems and concerns. They may or may not be conservation practices.

See Prescribed Forestry Specification Guide Sheet for a more detailed listing of prescription components.

OPERATION AND MAINTENANCE

Provide an Operation and Maintenance Plan that contains information on the frequency, intensity and description of the monitoring and evaluation of the current prescription.

Provide a yearly project/harvest plan, by an agreed upon date, that clearly indicates those activities specific to the intended purpose or purposes of the prescription, so that NRCS environmental compliance may be completed prior to implementation.

Conduct periodic inspections during and after treatment activities to ensure that the purposes are achieved and resource damage is minimized. The results of the inspections and the annual project plan shall determine the need for additional treatment under this practice.

Review timetables, schedules and coordination actions periodically, at least once per year, and modify the prescription as needed.

REFERENCES

Forest Stewardship Council-U.S. 2005.Northeast USA Regional Forest Stewardship Standard, Revised Final Version V9.0, 2/10/05. (http://www.fscus.org/images/documents/2006_standards/ne_9.0_NTC.pdf)

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Natural Resources Conservation Service
CONSERVATION PRACTICE SPECIFICATION GUIDE SHEET

PRESCRIBED FORESTRY

(Acre)
CODE 409

This prescribed forestry specification guide sheet encompasses only the following purposes from the 409 standard:

1. Improve wildlife habitat.
2. Maintain or improve plant diversity.

In addition, this specification is **ONLY** for use in the Healthy Forest Reserve Program.

The work shall consist of preparing and implementing a written document, herein termed "prescription", that provides all of the information required by the standard, this specification guide sheet, and any required guidelines developed for the target or focus species/habitat as designated in the program contract.

The Prescribed Forestry (409) Practice Statement of Work and Job Sheet may also be used as checklists for the required documentation.

The forest land or wildlife habitat land as delineated in the program contract will herein be termed "management unit" or "unit". Individual Plant Species/Habitat Management Units will be termed "subunit"

General Specifications

Inventory Data Required for the Management Unit and Subunits

Unit age and history: Include current plant age structure and the approximate date of subunit establishment (if even-aged), or of establishment of the primary age class (if multi-aged) and a general description of subunit development processes or events. (May be based on field observations, increment boring, and/ or historical information using such tools as aerial photos).

Subunit volume: An estimate of volume by primary species.

Subunit Stocking: A quantitative estimate of site occupancy by primary plant species/ habitat including identification of species, an estimate of basal area, mean overstory and understory tree diameter, number of live and dead trees per acre, mean overstory and understory tree height, percent canopy cover or crown spread, percent ground cover/herbaceous plants, downed woody material per acre, or other descriptors as approved by NRCS.

Descriptions must be provided for all forest/habitat types within the Management Unit. All descriptions must be based on adequate fieldwork to provide accurate and useful information, except for those few listed below in Inventory Fieldwork Required.

Inventory fieldwork Required

A field inventory based on fixed area plots or variable radius points is required, to include all primary plant species or habitats except:

- Where no management is planned for the target species or biodiversity due to:
  - o legal restriction, or
  - o terrain that is inoperable with conventional equipment. Lack of

existing access does not exempt habitats from this requirement.

Sample size: The field inventory for the management unit under contract must meet **one** of the following standards for sampling intensity. Sampling must occur in all subunits where the inventory is required:

In uniform subunits, typical sampling percentages range from 20 percent on small areas of from 20-40 acres to 5 percent on areas larger than 80 acres. In areas where trees are of irregular distribution, the percentage of area sampled may need to be increased to give adequate results. For small to medium-size acreage (less than 5000 acres):

- Fixed area plots: a minimum 3% sample by area (distributed randomly or systematically); **or**
- Variable radius plots: an average minimum intensity of 1 sample point (10 BAF) per 3 acres, or 1 sample point (20 BAF) per 1.5 acres (distributed randomly or systematically); **or**
- Estimated total subunit basal area, for each inventoried habitat, is within a sampling error of 30% with a probability (confidence interval) of 68% or greater. For statistical purposes individual stands of 10 acres or less may be grouped with another subunit of similar type and structure to produce a single statistical estimate/error; **or**
- Estimated total management unit basal area for all inventoried habitats is within a sampling error of less than 15% with a probability (confidence interval) of 90% or greater. For statistical purposes (e.g. stratified sampling) individual stands of 10 acres or less may be grouped with another stand of similar type and structure to produce a statistical estimate/error.

For large acreage, NRCS will approve the sampling method. Refer to Inventory Sampling Design in the Society of American Forester's Forestry Handbook.

Wildlife Habitat Specifications

When specific wildlife species are the focus of management (HFRP contract target species/habitat), strategies and prescriptions will be developed and implemented to provide for targeted species biological and ecological needs as required by HFRP contract.

When specific wildlife species are not the focus of management, consider targeting management for "umbrella" or "indicator" species. Umbrella species (e.g., American marten, Canada lynx, American woodcock) are those species to which management is directed and benefits will extend to a wide range of co-existing species in the same habitat, which may be lesser known and difficult to manage for otherwise. Indicator species are those whose status provides information on the overall condition of an ecosystem and are sensitive to changes in habitat conditions (e.g., salmonids, Canada lynx).

Use stream crossing methods and materials that reduce beaver-related damage and provide for passage of aquatic organisms and terrestrial wildlife. For example, install over-sized open-arch culverts or use removable, portable bridges.

Plant Diversity Specifications

When specific biodiversity concerns are the focus of management (HFRP contract target species/habitat), strategies and prescriptions will be developed and implemented to

provide for targeted species biological and ecological needs as required by HFRP contract.

When specific diversity concerns are not the focus of management, consider the following:

Delineate forest management unit by native plant communities.

Maintain functional, representative patches of all naturally occurring plant community types distributed throughout the management unit. This includes maintaining a mix of both even-aged and uneven-aged stands in various age classes. This shall provide a variety of successional stages.

Maintain connectivity of like communities.

Avoid creating units with long, straight, sharply defined boundary lines.

Maintain overstory inclusions, such as hardwoods in a softwood stand or softwoods in a hardwood stand, whenever possible.

Avoid whole-tree removal. When possible, delimb trees where felled or return slash to woods. Leave downed woody material on site after harvest operations when possible.

Retain a variety of vertical structures and crown closures over the landscape.

Base forest prescription on the natural disturbance regime for that community type and avoid converting to other community types.

Provide and implement management recommendations to enhance biodiversity at the management unit/subunit and landscape levels. For example, establish and manage wider riparian protection zones than required by law or needed to alleviate water quality concerns. Riparian habitat integrity and function will improve, as will habitat connectivity with adjacent forestland.

DOCUMENTATION

This guide sheet includes specific documentation requirements.

Prescribed Forestry practice documentation or “forestry prescription” will always include the following information:

1. General Property Information including: Landowner and Design Preparer name and address, property location including town and county, and number of years covered by this information.

2. Landowner goals and objectives, including long range wildlife habitat and silvicultural goals and specific objectives related to the HFRP target species/habitat.

3. Summary of Land Use/Forest Cover Types/Wildlife Habitat (subunits) and their acreages (for non-forest land follow NRCS land use designations).

4. General Conditions of the Property including forest/habitat management history, types and amount of topography/hydrology and soils, and types, amounts and condition of access. Also include references to other management plans that pertain to this property, including, but not limited to, wildlife habitat, NRCS conservation, Tree Growth, Tree Farm, and Third Party Certification.

5. Resource Inventory and analysis including: field inventory method(s) used, individual unit (i.e. plant community/wildlife habitat descriptions (include type, size, configuration, condition, temporal distribution of required habitat elements, and juxtaposition of different units), and type and amounts, if any, of soil, water, air, plant, animal and human problems or other negative impacts to the unit. Also inventory species and extent of plants and animals of special concern, types and amount of historic properties that may be affected, unique plant communities, and

other natural features (include recreation and aesthetic values when this is an objective) on the property. Tables, charts and maps may be used where appropriate and shall be included in the prescription document.

Field inventory method and accuracy shall comply with the above section titled "Inventory Fieldwork Required". Inventory data required for the unit shall comply with the above section titled "Inventory Data Required for the Management Unit and Subunit" and provide dominant overstory, understory and ground layer live and dead species descriptions with at least scientific name and estimated basal area, percent cover, or stems/units per acre amount depending on the vegetation type.

6. Maps delineating property boundaries, property location, topography, soils, land use/forest type/wildlife habitat maps, timber production areas, road/trail system, riparian buffers/zones, water resources, known special concern and protected species and habitat area occurrences, significant historic properties needing treatment, and other maps, tables, and charts as needed. Always include appropriate legends and interpretation sheets with maps. Provide maps with, at a minimum, enough detail and accuracy to be able to locate items in the field. An example of some items to include are: map scale, lat/long (at a minimum, but may be other approved GIS formats such as UTM 19N NAD83) of known property boundary corners, lat/long of known road locations, and lat/long of any other important natural and man-made features, like riparian buffers, and occurrences of protected species/habitats.

7. Prescription alternatives and specifications summarized for the entire property and by individual unit/subunit, including unit/subunit management specifications with type of silviculture/habitat management system to be used, location, practice amounts, intensity, frequency, estimated costs, and suggested time schedule for implementation.

8. Prescription shall also include specifications for the protection of other natural resources including but not limited to water, soil, wildlife, non-target plants and habitats, and cultural resources.

9. An Operation and Maintenance Plan that provides a template for evaluating the forest/habitat conditions yearly, at the minimum, and may revise the prescription(s) and/or annual project plan in accordance with both the findings of the evaluation, the target species/habitat management guidelines, and the prescribed forestry standard and specification guide sheet.

10. Summary of legal obligations, tax status and required environmental compliance, such as permits, if needed.

11. Include full references to other plans and literature cited.

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STATEMENT OF WORK
Prescribed Forestry
Maine

PRESCRIBED FORESTRY NOTE: For Healthy Forest Reserve Program ONLY

Deliverables:

All of the following required deliverables will demonstrate that the criteria in NRCS Prescribed Forestry practice (409) standard and specifications, as they relate to the HFRP target species/habitats, have been met and are compatible with other NRCS HFRP program requirements:

a. A complete statement of the management objectives including those related to the HFRP target species/habitats
b. Detailed resource inventories and analyses of the management units/subunits in the program, as well as related off-site information
c. Information on human considerations
d. Documentation of Environmental Compliance prior to all prescribed management activities for the HFRP target species/habitat within the management unit enrolled in the program including:
    i. Identification, evaluation and description of other ecological concerns, such as threatened and endangered species
    ii. Documentation showing that NRCS has completed its responsibilities for compliance with a historic preservation review under Section 106 of the National Historic Preservation Act; a statement of any remaining historic preservation activities to treat historic properties.
e. Land units, locations, determinations, and legal land relationships described
f. Identification of infrastructure physical features such as roads, houses, fences, power lines and other utilities
g. Identification of how resources are presently managed, including kinds, amounts, and timing of management activities
h. Clear statements of the present condition of the management unit(s) as well as related off-site information
i. A complete definition of problems, opportunities, and concerns related to management for the HFRP target species/habitat
j. A description of the set of practical prescription alternatives available to meet the requirements of the HFRP target species/habitat
k. Provide a list of applicable permits and certifications that have to be complied with for each alternative
l. An evaluation, for each alternative, displaying the effects and impacts to consider and use as a basis for decision making on the selected prescription alternative
m. The written document with the selected prescription alternative, including potential program or implementation opportunities, and operation and maintenance plan
n. Project Plan or specific schedule and design of all management activities including, but not limited to, harvests, silvicultural practice(s), road construction, pest management for first year and annually for the length of the prescription, or 10 years which ever is shorter
o. Certification that the prescription and the project plans meet practice standard criteria and specifications for the intended purpose(s), HFRP Program requirements, and complies with applicable laws and regulations

REFERENCES

- NRCS National Planning Procedures Handbook
- NRCS Field Office Technical Guide (eFOTG), All Sections
- NRCS National Environmental Compliance Handbook
- NRCS Cultural Resources Handbook
- USDA-NRCS. 2000. NRCS National Forestry Handbook.
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- Maine Forest Service. 2005. Best Management Practices for Forestry: protecting Maine's Water Quality. Maine Department of Conservation. 93pp.
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APPENDIX 2

Tiered Biological Opinions

*These documents will be appended to the PBO as they are developed for HFRP participants