Revised Draft Environmental Assessment For Issuance of a 10(a)(1)(B) Permit for the Incidental Take of Canada lynx (*Lynx canadensis*)

Associated with the

Maine Department of Inland Fisheries and Wildlife

Incidental Take Plan for

Maine's Fur Trapping, Predator Management, and Animal Damage Control Programs

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Summary

This revised draft environmental assessment (DEA) addresses the effects of issuing an incidental take permit (permit) under section 10(a)(1)(B) of the Endangered Species Act of 1973 (ESA), as amended, for the incidental take of Canada lynx in Maine's trapping programs. In support of its application for a permit, on August 13, 2008 the Maine Department of Inland Fisheries and Wildlife (MDIFW) submitted a draft Incidental Take Plan (ITP) (also referred to as a habitat conservation plan). The U.S. Fish and Wildlife Service (Service) issued a DEA in August 2011 and subsequently conducted a public comment period. On July 29, 2013, the MDIFW submitted a revised ITP that incorporates changes responding to public and Service comments. The revised ITP includes important changes and clarifications from the 2008 draft. The MDIFW has added its predator management and animal damage control programs in addition to fur trapping as covered activities. Several new methods of trapping are included (e.g., cage traps and cable restraints) and several new trapping regulations are proposed, including lifting the size restrictions on foothold traps. Measures to avoid and minimize take in the revised ITP are similar to those in the 2008 draft ITP, though include increased veterinary oversight, protocols for responding to orphaned kittens, increased trapper outreach, and increased compliance monitoring. In addition, the revised ITP incorporates contingencies to address a number of potential changed circumstances. The MDIFW is seeking permit coverage for up to 195 incidentally trapped lynx of which nine may experience major injury and three may be killed over the 15-year permit period. The remainder would be released with no or minor injuries.

The mitigation strategy in the revised ITP has been clarified and seeks to offset the anticipated lynx mortalities. Mitigation consists of maintaining and enhancing at least 4,785 acres of lynx habitat on a 10,411-acre area on the Maine Division of Parks and Public Lands (MDPPL) Seboomook Unit in northern Maine.

This DEA was prepared by the Service in accordance with the National Environmental Policy Act (NEPA) of 1969, the regulations of the Council on Environmental Quality (CEQ) for implementing NEPA (40 CFR 1500) and the U.S. Department of the Interior's implementing regulation (43 CFR Part 46).

The DEA: 1) identifies a revised purpose and need for a permit; 2) presents new alternatives to the proposed action; 3) describes the aspects of the human environment that would be affected by the MDIFW's trapping programs; and 4) evaluates the environmental consequences of the proposed project and mitigation measures. The DEA considers four alternatives including: 1) the status quo; continuing state trapping programs without a permit; 2) the status quo: no permit granted and discontinuing trapping in northern Maine; 3) the measures proposed in the 2013 revised ITP; and 4) an alternative that does not permit predator management and animal damage control activities that would take lynx in areas of the state where lynx occur. The DEA focuses on the most relevant environmental issues related to the proposed action and does not provide analysis or discussion on other environmental impacts. Therefore, the environmental analysis is largely focused on the effects from trapping related activities. Other aspects of the human environment are briefly summarized and rationale is provided for why they are not carried forward with additional analysis. Appendix 1 presents the Service's response to comments, received on the Service's 2011 DEA, which explain how issues are addressed in the MDIFW's revised ITP and the Service's revised DEA.

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1. Introduction

1.1 Environmental Assessment Overview

This DEA examines the environmental effects of the proposed issuance of an incidental take permit and approval of an incidental take plan (ITP 2013) for Canada lynx (*Lynx canadensis*) under section 10(a)(1)(B) of the ESA. The MDIFW submitted a revised ITP for Maine's trapping programs on July 29, 2013. The revised ITP supersedes all previous drafts, including the draft ITP submitted in 2008. The revised ITP provides measures and commitments to avoid, minimize, and mitigate the incidental take of the federally threatened Canada lynx by trappers authorized by the MDIFW in the State's trapping programs – recreational furbearer trapping (hereafter referred to as "fur trapping" or "fur trapping program" or "fur trappers"), predator management (PM), animal damage control (ADC), and other agents of the Commissioner of the MDIFW involved with trapping (ITP section 1.1 p. 12). The revised ITP accompanies an application by the MDIFW to the Service for the issuance of an incidental take permit pursuant to section 10(a)(1)(B) of the ESA.

This DEA was prepared in accordance with the National Environmental Policy Act (NEPA) - an environmental law with the purpose of promoting enhancement of the environment. NEPA also established the Council on Environmental Quality (CEQ) in the Executive Office of the President to formulate and recommend national policies to ensure that the programs of the Federal government promote improvement of the quality of the environment. The CEQ has set forth regulations (40 Code of Federal Regulations (CFR) 1500 to 1508) to assist Federal agencies in implementing NEPA and to ensure that the environmental impacts of any proposed decisions are fully considered, and appropriate mitigation is contemplated for anticipated environmental impacts. The Department of the Interior also promulgated complementary NEPA implementing regulations (43 CFR Part 46).

Environmental assessments (EA) are intended to be concise documents. The purpose of an EA is to determine if significant environmental impacts are associated with a proposed Federal action that would require the preparation of an environmental impact statement (EIS) and to evaluate the impacts associated with alternative means to achieve the agency's objectives. EAs are intended to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an EIS;
- Aid an agency's compliance with NEPA when no EIS is necessary; and
- Facilitate preparation of an EIS when one is necessary (40 CFR § 1508.9).

When determining whether an EIS should be prepared based on the findings of an EA, the CEQ lists two distinct factors that should be considered in determining significance: context, and intensity. "Context" means that the significance of an action must be analyzed in several settings, such as its impact on society as a whole, the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the impacts in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 CFR §1508.27(a)). "Intensity" refers to the severity of impact, and a number of sub-factors are generally considered in evaluating intensity. These include:

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial;
- The degree to which the proposed action affects public health or safety;
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;

- The degree to which the effects on the quality of the human environment are likely to be highly controversial;
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks;
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration;
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts;
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources;
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA; and
- Whether the action threatens a violation of Federal, state, or local law or requirements imposed for the protection of the environment (40 CFR § 1508.27(b)).

In addition to considering the above factors when determining whether an EIS is necessary, an agency should also consider its own procedures in determining whether the action requires an EIS. Additional criteria that the Service follows in determining whether to prepare an EIS include:

- Controversy over environmental effects (e.g., major scientific or technical disputes or inconsistencies over one or more environmental effects);
- Change in Service policy having a major positive or negative environmental effect;
- Precedent-setting actions with wide-reaching or long-term implications (e.g., special use permits for off-road vehicles, mineral extraction, new road construction);
- Major alterations of natural environmental quality, that may exceed local, state or Federal environmental standards;
- Exposing existing or future generations to increased safety or health hazards;
- Conflicts with substantially proposed or adopted local, regional, state, interstate or Federal land use plans or policies that may result in adverse environmental effects;
- Adverse effects on designated or proposed natural or recreation areas, such as wilderness areas, parks, research natural areas, wild and scenic rivers, estuarine, sanctuaries, national recreation areas, habitat conservation plan areas, threatened and endangered species, fish hatcheries, wildlife refuges, lands acquired or managed with Dingell-Johnson/Pittman-Robertson funds, unique or major wetland areas, and lands within a 100-year floodplain; and
- Removal from production of prime and unique agricultural lands, as designated by local, regional, state or Federal authorities; in accordance with the Department's Environmental Statement Memorandum No. (ESM) 94-7 (Service 1996).

Ultimately, the decision whether a significant impact exists and an EIS is required is made after consideration of the issues in question and the matters documented in the EA. The determination must be reasonable in light of the circumstances involved in the particular project being evaluated, and in light of any past, present or foreseeable future actions.

1.2 Federal Regulatory Framework

1.2.1 National Environmental Policy Act (NEPA)

This DEA has been prepared in accordance with the requirements of the NEPA, 42 USC § 4321 et seq., and CEQ regulations, 1500 et seq. and Department of the Interior's NEPA Implementing Regulations, 43 CFR Part 46. The DEA examines the environmental effects of the proposed issuance of an incidental take permit and approval of an incidental take permit for Canada lynx under section 10(a)(1)(B) of the ESA, 16 USC § 1531, et seq.

The ESA prohibits "take" of endangered and threatened species, and defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect such species or to attempt to engage in any such conduct." Section 10(a)(1)(B) defines "incidental take" as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity, and provides for the issuance of ITPs to authorize such take. Under section 10(a)(2)(A), any application for an ITP must include a "conservation plan" that, among other things, describes the impacts of the proposed take on affected species and how the impacts of the take will be minimized and mitigated. Accordingly, because take of Canada lynx will likely result from implementation of the MDIFW's trapping programs; it has applied to the Service for an incidental take permit and has prepared an ITP in support of that application (ITP 2013). Therefore, the Federal action under consideration in this DEA is the proposed issuance of an incidental take permit and the MDIFW's implementation the revised ITP.

In accordance with the NEPA, the EA analyzes and describes the potential direct, indirect, and cumulative effects of the proposed action on the environment, including the effects of the action on the threatened Canada lynx. Accordingly, the EA describes:

- The proposed action, purpose and need, and scope for the EA (see section 2);
- Alternatives to the proposed action that were considered in the course of the EA (see section 3);
- The affected environment by issuance of the permit (see section 4); and
- The environmental consequences of the proposed action and alternatives considered (see section 5).

If the Service determines the proposed action (i.e., issuance of a permit) does not have significant impacts, then a Finding of No Significant Impacts (FONSI) will be issued. If the Service determines that the proposed action is likely to have a significant impact then a Notice of Intent (NOI) to prepare an EIS will be issued. An EIS involves a more detailed evaluation of the effects of the proposed Federal action and alternatives and mitigation measures proposed to minimize or avoid these effects.

1.2.2 Endangered Species Act (ESA)

The Service is responsible for implementing and enforcing Federal wildlife laws, including the ESA. Federally listed threatened and endangered species and designated critical habitat are governed by the ESA of 1973, as amended (16 USC §§ 1531 to 1544) and the Service's implementing regulations at 50 CFR Parts 13 and 17. The Service is authorized to identify species in danger of extinction and provide for their management and protection. The Service also maintains a list of species that are candidates for listing pursuant to the ESA. Within the ESA there are three sections that directly pertain to this project, sections 7, 9, and 10.

ESA Section 9

Section 9 of the ESA prohibits certain activities that directly or indirectly affect listed species. These prohibitions apply to all individuals, organizations, entities and governmental agencies subject to United States jurisdiction.[1] Under the ESA and regulations, a variety of acts are prohibited. For the purpose of this EA and the underlying proposed permit, the most relevant is the prohibition on the take of wildlife species listed under the ESA. The ESA defines the term take to include harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these acts (16 USC § 1532(19)). The Service's implementing regulations further define the terms "harass" and "harm[2]." Take of listed wildlife is illegal unless otherwise authorized by the Service (see permitting and consultation "ESA Section 10" and "ESA Section 7" below).

ESA Section 10

Section 10 of the ESA, among other things, authorizes the Service to issue permits to incidentally take ESA-listed species. Entities pursuing activities that could result in take of federally protected species may apply for an incidental take permit, which protects them from such liability. The ESA and the Service's implementing regulations prescribe the process by which applications must be submitted and approved. Entities wishing to obtain an incidental take permit must submit a formal application that includes a conservation plan that specifies:

a) The impact that will likely result from such taking;
b) What steps the applicant will take to monitor, minimize, and mitigate such impacts, the funding that will be available to implement such steps, and the procedures to be used to deal with unforeseen circumstances;
c) What alternative actions to such taking the applicant considered and the reasons why such alternatives are not proposed to be utilized; and
d) Such other measures that the director may require as being necessary or appropriate for purposes of the plan.

To approve a permit, the Service must determine the applicant satisfies the general permitting criteria in 50 CFR Part 13 and also find that:

a) The taking will be incidental;
b) The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such takings;
c) The applicant will ensure that adequate funding for the conservation plan and procedures to deal with unforeseen circumstances will be provided;
d) The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild;
e) The measures, if any, required under paragraph (b)(1)(iii)(D) of this section will be met; and

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[1] See 16 USC § 1532(13) defining the term "person."
[2] Pursuant to 50 CFR § 17.3: *Harass* in the definition of "take" in the Act means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. *Harm* in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

f) He or she has received such other assurances as he or she may require that the plan will be implemented.

In making his or her decision, the Director shall also consider the anticipated duration and geographic scope of the applicant's planned activities, including the amount of listed species habitat that is involved and the degree to which listed species and their habitats are affected.

The alternatives evaluated in this DEA do not reflect the Service's decision on whether to issue a permit or conditions that may be placed on a future permit. In a separate process, the Service will review the information in the revised ITP, the final EA or EIS, and all public comments to determine whether to grant an incidental take permit with or without conditions, consistent with the Service's statutory and regulatory issuance criteria in the ESA.

ESA Section 7

Section 7 of the ESA states that any Federal agency that permits, licenses, funds, or otherwise authorizes activities must consult with the Service to make sure its actions will not jeopardize the continued existence of any listed species.

This proposed action is subject to the ESA because the MDIFW's trapping programs are anticipated to incidentally take federally-threatened Canada lynx. The Service is considering issuing an incidental take permit under section 10 of the ESA to authorize this take, which would otherwise be prohibited under section 9 of the ESA. Prior to issuing an incidental take permit, the Service must internally conduct an ESA section 7 analysis via formal consultation to ensure it will not jeopardize the continued existence of the species. The regulations governing consultation are found at 50 CFR Part 402. The Service's biological opinion (BO) will evaluate the direct, indirect and cumulative effects of the action, the anticipated take, whether a species' existence will be jeopardized. The BO typically also contains reasonable measures, or reasonable prudent alternatives, designed to minimize the impacts of the taking, as well as terms and conditions and conservation recommendations that will be incorporated into the Service's decision-making process for this project. The Service also will make independent findings regarding the above-listed permit issuance criteria.

1.2.3 Bald and Golden Eagle Protection Act (BGEPA)

The BGEPA (16 USC 668-668d, 54 Stat. 250) as amended, provides for the protection of the bald eagle (*Haliaeetus leucocephalus*) and the golden eagle (*Aquila chrysaetos*) by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. BGEPA prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The BGEPA provides civil and criminal penalties for persons who violate the law or regulations.

Under 50 CFR 22.3, disturb is defined as "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." The BGEPA's definition of disturb also addresses effects associated with human-induced alterations at the site of a previously used nest during a time when eagles are not present. Upon an eagle's return, if such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment, then this would constitute disturbance.

In fall 2009, the Service established rules (50 CFR 22.26 and 22.27) authorizing limited legal take of bald and golden eagles and their nests "when the take is associated with, but not the purpose of, an otherwise lawful activity, and cannot practicably be avoided." Such authorization is provided in the form of a permit issued by the Service, consistent with the regulatory criteria.

1.2.4 Migratory Bird Treaty Act (MBTA)

The MBTA (16 USC 760c-760g), as amended, implements protection of all native migratory game and non-game birds with exceptions for the control of species that cause damage to agricultural or other interests. According to 50 CFR § 10.12, a migratory bird means any bird, whatever its origin and whether raised in captivity, which belongs to a species listed in the Service's regulations,[3] or which is a mutation or a hybrid of any such species, including any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof. In total, 836 bird species are protected by the MBTA, 58 of which are currently legally hunted as game birds.

The MBTA prohibits the take of any migratory bird, part, nest, egg, or product. Take, as defined in the MBTA, includes by any means or in any manner any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof.

The MBTA does not explicitly include provisions for permits to authorize incidental take of migratory birds. Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (January 10, 2001), however, provides requirements for all Federal agencies to incorporate considerations of migratory birds into their decision-making, including the conservation of migratory birds, the proper evaluation of them in NEPA documents, and avoidance, minimization and mitigation of migratory birds impacts and take where appropriate.

1.2.5 National Historic Preservation Act (NHPA)

Section 106 of the National Historic Preservation Act (NHPA) sets forth Federal policy and procedures regarding "historic properties" - that is, districts, sites, buildings, structures and objects included in or eligible for the National Register of Historic Places. Section 106 of NHPA requires that Federal agencies consider the effects of their actions on such properties and resources, following regulations issued by the Advisory Council on Historic Preservation (36 CFR 800). Other legislation governing these resources include The American Indian Religious Freedom Act (AIRFA), which requires the U.S. Government to respect and protect the rights of Indian tribes to the free exercise of their traditional religions, and the Archeological Resources Protection Act (ARPA), which prohibits the excavation of archeological resources (anything of archeological interest) on Federal or Indian lands, without a permit from the land manager. In Maine, the State Historic Preservation Officer (SHPO) for the NHPA is the Maine Historic Preservation Commission.

This DEA addresses the effects of trapping throughout the state of Maine on the human environment, including cultural resources. We do not anticipate that covered activities will cause significant impacts to historic and cultural resources, largely because they are temporary, non-earth disturbing, and occur primarily in a linear fashion on the landscape. But, we intend to use the NEPA process to help fulfill our obligations under NHPA and consultation with Maine tribes. If undertakings associated with the

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[3] The Service maintains its official list of migratory birds, as recognized under the four Migratory Bird Treaties to which the United States is a signatory: 50 CFR § 10.13.

MDIFW's revised ITP occur in sensitive areas, we will develop in consultation with the tribes, alternatives and proposed measures to avoid, minimize, or mitigate any adverse effects of the undertaking on historic properties and describe them in the final EA. Finally, with regard to the potential for cultural resource impacts from activities on the mitigation lands, we will ensure that MDPPL will coordinate with the Maine Historic Preservation Commission under section 106 to assess the cultural resources on mitigation areas.

1.3 Project Description

Canada lynx occur throughout most of northern Maine and fur trappers, PM, and ADC agents sometimes incidentally capture lynx when legally trapping for other furbearing mammals (e.g., fox, coyote, bobcat, fisher, and marten). From 1999 to 2013, 84 lynx were reported or otherwise determined to be trapped[4]. Of these, five were killed in killer-type traps and two were caught in foothold traps and illegally shot (ITP table 4.1.4). In consultation with the Service, the MDIFW identified a 10(a)(1)(B) incidental take permit as the most appropriate regulatory instrument to authorize take of lynx while facilitating continuation of their fur trapping, PM, and ADC programs.

On August 13, 2008, the MDIFW submitted an application for an ESA 10(a)(1)(B) incidental take permit and the associated draft ITP (more commonly referred to as a habitat conservation plan). The Service issued a DEA in August 2011 for this plan and subsequently conducted a public comment period. On July 29, 2013, the MDIFW submitted a revised ITP that incorporates changes responding to public and Service comments.

The MDIFW is seeking statewide coverage of all aspects of take of lynx related to fur trapping, PM and ADC programs. The MDIFW has included incidental take coverage for cage traps and new trapping equipment such as non-lethal cable restraints. If an incidental take permit is granted to the State, all licensed fur trappers, including complimentary or reduced rate licensees, agents of the Commissioner (including full-time MDIFW employees, PM agents and ADC officers), landowners and junior trappers, and all other "agents of the Department" conducting otherwise legal trapping activities would receive incidental take coverage (ITP section 1.1, p. 12) according to limitations prescribed in the ITP and incidental take permit. The permit requested is only for incidental take of Canada lynx; other currently listed or future listed species are not included. As required under section 10(a)(2)(A), the draft ITP identifies measures to minimize and mitigate the impacts of incidental take of the Canada lynx during the State's trapping programs.

The MDIFW is requesting take of up to195 incidentally trapped lynx over a 15-year period. Of these:

- Up to three may be killed or have injuries severe enough that they cannot be fully rehabilitated and subsequently released;
- Up to nine may be severely injured but released following rehabilitation; and
- The remainder (i.e., 183 lynx) will be released with no or minor injuries.

[4] Fourteen additional lynx were trapped and reported in 2013 after the MDIFW submitted their ITP. All were caught in foothold traps; 11 by recreational fur trappers and three by PM trappers.

Fur trapping program

The MDIFW fur trapping program and the types of traps used are thoroughly described in section 3.1 of the revised ITP and incorporated by reference into this DEA. The following discussion focuses on the elements of the fur trapping program that pertain to the take of lynx.

Furbearer trapping is intended to provide recreational opportunity for trappers and to manage some furbearer species using common wildlife management principles. An average of 2,450 individuals acquired Maine trapping licenses (2006 to 2011 trapping seasons). This typically includes fewer than 100 nonresident trappers, about 200 junior resident license holders, and approximately 280 complimentary senior citizen license holders who trap (ITP section 3.1, p.40). Wildlife populations that are trapped are monitored using pelt-tagging records. All raw pelts must be tagged by a MDIFW agent or staff with the exception of weasel, raccoon, muskrat, skunk, and opossum. Annually, approximately 22,400 furbearers are trapped.

The MDIFW used furbearer registration data to estimate the number of trappers trapping in the lynx wildlife management district's 1 to 11, 14, 18, and 19 (WMDs, ITP Fig. 3.1.1, p. 41) and information from a trapper survey to estimate trapper effort. From fur registration data, the MDIFW estimates in the lynx WMDs there are an average of 329 trappers that set killer-type traps for marten and fisher and 305 trappers that set foothold traps for coyote, fox, and bobcats (529 trappers that set traps for all species). The MDIFW conducts an annual, voluntary trapper survey on how many traps they set and how many days they trap. Trappers are not required to report how many non-target, non-furbearing animals are caught in traps. The MDIFW used trapper effort surveys and fur harvest data to estimate that each trapping season in the lynx WMDs there are approximately 110,000 foothold trap nights and 150,000 killer-type trap nights (ITP section 3.1, p. 46).

Current trapping trends, pelt prices, and public attitudes toward trapping do not suggest there will be a significant increase in trapping rates. In North America, participation in trapping is generally declining (e.g., Armstrong and Rossi 2000, Muth et al. 2006). However, declines could be reversed if fur prices increase significantly (ITP p. table 5.4.1, p. 118).

The MDIFW promulgates some trapping rules and regulations according to WMDs (ITP figure 3.1.1). Initially, special trapping rules and regulations concerning lynx applied in WMDs 1 to 6 and 8 to 11, which roughly approximated the recovery area in Maine identified in the Service's Recovery Outline for the Canada lynx (USFWS 2005), modeled lynx habitat (Hoving et al. 2004, 2005), and the Service's Canada lynx critical habitat (FR 74(36):8515-8702). After consistent observations of lynx, on December 10, 2010 the MDIFW expanded special trapping regulations to WMDs 7, 14, 18, and 19. Based on the current knowledge of lynx distribution (ITP figure 1.1, p. 14), MDIFW and the Service consider the lynx WMDs to be 1 to 11, 14, 18, and 19.

Of the 84 lynx reported incidentally trapped in Maine from 1999 to 2013, 77 were trapped in the fur trapping program. Of these, seven were caught in killer-type traps (five of these were killed) and 70 in foothold traps (two of these were illegally shot by hunters while in the trap) (ITP table 4.1.4). We note that for the killer-type capture events, some of the traps were legally set at the time of capture, but under current trapping regulation would not be legal sets, some were illegally set at the time of capture, and some (e.g., a 2011 incident) were considered illegally set. None of the killer-type traps that killed lynx would be legal under current trapping regulations.

Predator Management

The MDIFW PM program is described in section 3.1 of the ITP (pp. 53 to 54, appendix 9) and is incorporated by reference into this DEA. The following discussion focuses on the elements of the PM program that pertain to the take of lynx.

In 2010, the MDIFW initiated a PM program to reduce the effects of predation by coyotes on deer in wintering areas. Coyotes are killed by trapping, shooting over bait, and hunting with the use of dogs. The MDIFW is requesting an incidental take permit only for the trapping portion of the PM program. PM activities occur primarily in western, northern, and eastern Maine, which broadly overlaps with lynx WMDs. The PM program involves contracts between the MDIFW and qualified licensed trappers to trap coyotes in or adjacent to deer wintering areas. PM agents are compensated for their time and mileage.

The Commissioner of the MDIFW is authorized to control nuisance wildlife (MRSA §10053.8) and maintain a coyote control program (MRSA §10108.11). At one time, the coyote control program permitted the use of lethal snares to control coyotes during the winter months under certain conditions. The MDIFW discontinued the coyote snaring program in 2003 because of concerns about the take of Canada lynx. The MDIFW Commissioner resumed a PM program in 2010 with the objective to reduce coyote predation of deer in wintering areas by hunting and trapping. In 2011, the Legislature established a predator control and deer habitat fund to pay for predator control (MRSA §10264). The program is currently funded by $100,000 annually from state general funds as approved by the Legislature and funding from the predator control and deer habitat fund.

The MDIFW regional biologists select trappers to participate in the PM program. Trappers selected for the PM program are required to trap in or near certain deer wintering areas. Subsidies may encourage some trappers to travel to northern Maine or trap longer than they would normally.

Regional biologists identify priority areas currently supporting deer for coyote reduction and assign PM trappers to these areas. PM trappers are restricted to using only equipment and methods currently authorized by the MDIFW's trapping regulations, although the ITP considers future use of non-lethal cable restraints[5]. Use of cable restraints will be phased in, initially being evaluated with the PM and ADC programs. If sufficiently protective of lynx, the MDIFW may allow the use of these in the recreational trapping program. PM trappers are only permitted to set foothold traps for coyotes. PM trapping occurs during the first 45 days of Maine's trapping season (mid-October to the end of November), which is 40 percent fewer days than the fur trapping season. According to the revised ITP (pp. 53 to 54):

> The MDIFW did not want to direct its contractors to trap coyotes in December, which could increase overall trapping effort for coyotes above the regular trapping season, and in turn, incrementally increase the possibility of catching a lynx.

Although approved in 2010, the trapping component of PM was first implemented in 2011 with 13 trappers participating. In 2012, 27 trappers were permitted to set traps from October 17 through November 30 in 26 priority deer wintering areas and 18 trappers actually set traps. In 2013, 26 trappers were enrolled in the PM program, and 19 trappers actually participated. In 2013, 107 coyotes were trapped by PM agents, mostly in the lynx WMDs.

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[5] Non-lethal cable restraints are also referred to in the literature as cable restraints, non-lethal neck snares, and non-lethal cable restraint snares. The intent of these is to capture an animal around the neck and hold it in place until the trapper arrives. The MDIFW refers to these as non-lethal cable restraints in their 2013 revised ITP, and therefore we use the same term.

PM contractors reported trapping no lynx in 2011, four lynx in 2012, and three lynx in 2013. All seven lynx trapped in the PM program were evaluated by the MDIFW biologists and wardens and released with no, or relatively minor, injuries (ITP table 4.1.3, 2013 MDIFW lynx trapping reports).

The MDIFW did not project trends in participation or trapper effort in the PM program during the 15-year permit period. However, the MDIFW believes overall coyote trapping effort is not expected to increase because of this program (ITP section 3.2, p. 54) because PM trappers would normally participate in fur trapping for coyotes. The MDIFW does not collect information on the number of traps or trap nights for PM trappers. To be paid, they are required to report the number of hours spent trapping and the number of coyotes and non-target captures (J. Vashon, MDIFW, March 21, 2014 email).

Animal Damage Control

The MDIFW ADC program is described in section 3.1 of the ITP (pp. 53 to 54, appendix 10) and is incorporated by reference into this DEA. The following discussion focuses on the elements of the ADC program that pertain to the take of lynx.

The MDIFW is authorized under Maine's statutes (MRSA §10053.8) to coordinate and administer an ADC program (ITP, appendix 10). The objective of this program is to resolve conflicts between people and wildlife using strategies and methods which offer the best chance for a permanent or long-term solution, and, in the process, conserves wildlife resources when practical and possible. The MDIFW encourages the use of preventive measures to reduce the occurrence of human/wildlife conflicts. However, selective removal of wildlife that pose a significant threat to other wildlife, fisheries, human health, safety, or property is used when preventive measures are not sufficient.

ADC trappers are permitted to set traps anywhere in the state for wildlife causing damage to property (except protected species such as lynx). The ADC trapper must have a valid Maine trapping license. Unlike fur trappers and PM trappers, ADC trappers are permitted to set traps throughout the year. However, they are only permitted to use traps allowed during Maine's regulated trapping season, with the exception that ADC trappers can set cage and Hancock traps anywhere in the state. The ITP establishes a process for phasing in the use of non-lethal cable restraints. These devices will initially be evaluated with the PM and ADC programs and if sufficiently protective of lynx, the MDIFW may allow the use of these in the recreational trapping program. ADC trappers are not permitted to set lethal snares unless completely submerged underwater for aquatic furbearers. In certain circumstances, the MDIFW regulations allow landowners to trap or kill wild animals causing damage (ITP appendix 10). A person may lawfully kill, or cause to be killed, any wild animal, night or day, found in the act of attacking, worrying, or wounding that person's domestic animals or domestic birds or destroying that person's property. However, Maine regulations specify that it is not legal for persons to engage in non-lethal (e.g., trapping) or lethal take of wildlife that are state- or federally-protected (e.g., migratory birds) or listed (e.g., Canada lynx).

The MDIFW had 624 active ADC agents in 2013. In that year, 14 species were taken or relocated: bats (2), beaver (193), chipmunks (7), deer (2), flying squirrel (2), fox (2), gray squirrel (18), red squirrel (6), milk snake (1), muskrat (1), porcupine (5), opossum (9), raccoon (44), skunk (67), snapping turtle (1), and woodchuck (21). Thus, the majority of the ADC effort targets beaver and occurs statewide. The MDIFW provided no information concerning the number and type of traps used for ADC work, trapper effort, or the number of trap nights.

The ADC program once included a coyote snaring program (from 1979 to 2005). Certified ADC agents were authorized to set neck snares for coyotes near deer wintering areas where predation was deemed a

problem by the MDIFW (Peek et al. 2012). Snaring was discontinued in 2003 because of threatened litigation concerning the Canada lynx and ADC agents have not resumed coyote control activities since.

To date, no lynx have been reported caught by trappers during ADC activities as the program is currently structured. From 2008 to 2012, 61percent of ADC activities involved beaver, 28 percent involved medium-sized mammals (e.g., squirrels, raccoons, opossum, porcupine, and woodchucks), nine percent involved small mammals (e.g., squirrels, chipmunks, mice, bats), two percent involved other home and garden pests (e.g., pigeons, starlings, deer, bear, fox)(MDIFW Memorandum to the Service, August 9, 2013; appendix 2). The few birds captured by ADC agents are not protected by the MBTA (e.g., European starlings, pigeons, house sparrows). Most submerged beaver traps and snares would poses few risks to lynx, unless set on beaver dams or in shallow water around the margins of a beaver flowage. Although the MDIFW does not anticipate any lynx to be incidentally caught as a result of trapping conducted under its ADC program, the MDIFW is seeking coverage in the event that a take occurs.

1.4 Project History

In response a 2007 lawsuit, *Animal Protection Institute v. Roland D. Martin*, the MDIFW and the Animal Protection Institute reached a settlement agreement that was memorialized in a Consent Decree and Order (Case 1:06-cv-00128-JAW, Document 134, Filed 10/04/2007; see http://www.law.du.edu/images/uploads/apiMartin.pdf, last accessed on April 11, 2014). The Consent Decree imposed restrictions on trapping activities conducted in WMDs 1 to 6, 8 to 11 (table 1.4), in addition to those restrictions the MDIFW had implemented through their trapping regulations. The MDIFW will pursue a court order terminating the Consent Decree if they are issued an incidental take permit[6] by the Service. Many of the fur trapping regulations resulting from the Consent Decree are incorporated into the ITP or the MDIFW's existing regulations and thus will continue to be implemented in the event the Consent Decree is lifted. However, the MDIFW proposes to make several significant changes to laws and regulations concerning the fur trapping program in lynx WMDs, which are described in the ITP (pp. 31 to 37, table 3.0) and table 1.4.

[6] The Consent Decree specifies that the Commissioner of MDIFW may seek an order terminating this Decree if any of the following actions are taken by the Service: (1) issuance of an Incidental Take Permit to MDIFW for its trapping program; (2) promulgation of a 4(d) Rule addressing the incidental take of lynx resulting from trapping activities; or (3) removal of Canada lynx from protection under the ESA. If the Commissioner seeks termination of this Decree upon the occurrence of any of these actions taken by the Service, the Court will terminate this Decree only if it finds that the action has become permanent. For actions of this paragraph, an action is permanent if it is not subject to any further judicial review or if no judicial review has been sought by anyone (whether or not a party to this Decree) within 90 days of taking of the action. An incidental take permit will be deemed not to be in effect if it is vacated, stayed, or enjoined by a court of competent jurisdiction.

Table 1.4 Consent Decree and proposed changes in the MDIFW's trapping programs.

Consent Decree	Under Proposed Permit (Alternative 3)
a) The Commissioner shall prohibit the use of all foothold traps (also known as leg hold traps) that have an inside jaw spread of more than 5 $^{3}/_{8}$ inches, except that such traps with an inside jaw spread of more than 5 $^{3}/_{8}$ inches may be used if they are set so as to be fully or partially covered by water at all times. The Commissioner shall require that foothold traps that are permitted be equipped with at least one chain swivel. Subsequent rules restricted use of foothold traps greater than 5 $^{3}/_{8}$" jaw spread in WMDs 1 to 6 and 8 to 11 (Rule 09-137 Chapter 4.01 J).	The MDIFW will rescind current regulations that restrict the size of foothold traps in lynx WMDs. Foothold trap size will be unrestricted. There will be no size limit. The MDIFW will require at least one chain swivel on all foothold traps in WMDs 1 to 11, 14, 18, and 19.
b) The Commissioner shall prohibit the use of cage traps which have an opening of more than 13 inches in width or more than 13 inches in height (except for use in wildlife research and surveys, removal of animals that are causing damage to property, or to capture bear).	The MDIFW will rescind current regulations that prohibit cage traps greater than 13 by 13 inches and suitcase style cage traps in lynx WMDs. Cage traps of any size will be allowed statewide. Suitcase style traps will be allowed in lynx WMDs only for wildlife research and surveys or removal of animals causing damage to property (i.e., the ADC program).
c) The Commissioner shall retain regulations currently in effect that prohibits foothold and killer-type traps from being set within 50 yards of bait that is visible from above and that permits bait to be used for trapping only if it is completely covered to prevent it from being seen from above and is covered in such a way as to withstand wind action and other normal environmental conditions. Bait is defined as animal matter including meat, skin, bones, feathers, hair or any other solid substance that used to be part of an animal. This includes live or dead fish. For the purposes of this paragraph, bait does not include animal droppings (scat), urine or animals, dead or alive, held in a trap as the result of lawful trapping activity.	Continue these regulations. The MDIFW will continue to allow the use of blind sets in upland settings, which in Maine allows the use of animal droppings and urine.

Table 1.4 Continued.

Consent Decree	Under Proposed Permit (Alternative 3)
d) The Commissioner shall keep regulations currently in effect (which were subsequently amended) that prohibits the setting, placing and tending of any killer-type trap unless set completely underwater or at least 4 feet above the ground or snow level in the manner described in paragraph 5(e) below, except that killer-type traps with an inside jaw spread not to exceed 5 inches may be permitted under the following conditions: (1) when set so as to be partially covered by water at all times, or (2) when set under overhanging stream banks, or (3) when used as blind sets. For purposes of this paragraph, a blind set is defined as any set designed to catch a wild animal, without the use of bait, lure or visible attractor, by intercepting the animal as it moves naturally through its habitat. Bait, lure and visible attractor do not include animal droppings (scat) or urine.	The MDIFW will continue leaning pole regulations and requirements for killer-type traps as amended. In WMDs 1 to 11, 14, 18, 19, killer type traps set on the ground must be in exclusion boxes. The MDIFW will continue to allow the use of blind sets in upland settings, which in Maine allows the use of animal droppings and urine
e) Killer-type traps set at least 4 feet above ground or snow level may be permitted by the Commissioner for use in WMDs 1 to 6 and 8 to 11 so long as such traps are affixed to a pole or tree that is at an angle of 45 degrees or greater to the ground and that is no greater than 4 inches in diameter at 4 feet above the ground or snow level. Subsequent rules prohibited wooden based rat traps set for weasels and squirrels in WMDs 1 to 6 and 8 to 11 (Rule 09-137 Chapter 4.01 J).	The MDIFW will retain current regulations, which require killer-type traps be set as specified in the Consent Decree. Emergency regulations were implemented in 2011 to further clarify the leaning pole requirements. After the Consent Decree is vacated, these requirements will be extended to all lynx WMDs 1 to 11, 14, 18, and 19. The MDIFW will allow the use of wooden based rat traps set for weasels and squirrels recessed within a wooden box with a hole no larger than 2 inches in diameter statewide. Currently legal only in WMDs 7, 12 to 29.
f) The Commissioner shall not permit the use of snares for any purpose other than to catch beaver and bear unless and until the MDIFW obtains an Incidental Take Permit explicitly authorizing additional uses of snares.	The MDIFW will develop new regulations allowing the use of cable restraints, consistent with the phased approach contemplated in the ITP. Tending time will be 24 hours. The ITP indicates cable restraints will have a cable diameter of $^{1}/_{8}$ inch or $^{3}/_{32}$ inch, a relaxing mechanical lock of a reverse-bend washer with a minimum diameter of 1 ¼ inches, at least one swivel, and two stops. Regulations will require cable restraints to be staked and free of wood vegetation greater than or equal to ½ inch in diameter within reach of the restrained animal.

Table 1.4 Continued.

Consent Decree	Under Proposed Permit (Alternative 3)
g) The Commissioner shall recommend to trappers that they not set on the ground foothold traps with an inside jaw spread of more than 5 inches that are otherwise authorized by paragraph 5(a) unless such traps are equipped with offset jaws recommend trappers use foothold traps with offset jaws.	The MDIFW's ITP contains no commitments to recommend traps with offset jaws.
h) The Commissioner shall maintain a telephone hotline which will be staffed 7 days a week, 24 hours per day, during trapping season. Trappers shall be made aware of the hotline and will be advised that they are to call the hotline in the event that a lynx is incidentally captured. When the hotline staff receives a report of an incidentally captured lynx, they shall either dispatch a MDIFW employee to the scene to assist in the assessment and release of the lynx, or, if a MDIFW employee is not available, shall advise the trapper on how to assess the lynx for any injuries and safely release the lynx.	The MDIFW will continue as described in the ITP.
i) If any lynx sustains an injury as a result of an incidental trapping, the Commissioner shall direct the MDIFW to be responsible for the rehabilitation of the lynx and for release back into the wild once rehabilitation is complete. In consultation with veterinarians, the MDIFW shall, by the time the trapping season starts on October 14, 2007, implement and distribute to its staff specific guidelines detailing when a lynx should receive veterinarian attention.	The MDIFW will continue to rehabilitate lynx as described in the ITP.
j) The Commissioner shall establish a network of qualified veterinarians and animal rehabilitators whom the MDIFW can call upon as needed to provide care for injured lynx.	The MDIFW will continue to maintain a network of qualified veterinarians and animal rehabilitators as described in the ITP.
k) The Commissioner shall direct the MDIFW to investigate each incidental lynx trapping and will advise the Service, API, and the interveners regarding the details of each trapping incident and provide the relevant support and documentation.	The MDIFW will continue to investigate each incidental trapping incident as described in the ITP. The Service will be advised of each trapping incident
l) The Commissioner shall continue to prohibit the intentional trapping and hunting of lynx.	Maine laws prohibit intentional hunting and trapping of lynx.

2. Proposed Action and Purpose and Need

2.1 Description of the Proposed Action

The MDIFW has submitted an application to the Service for an incidental take permit pursuant to section 10(a)(1)(B) of the ESA, as amended (87 Stat 884, 16 USC § 1531 et seq.) to address take of federally threatened Canada lynx associated with Maine's trapping programs –fur trapping, PM, and ADC. To fulfill the application requirements, the MDIFW has developed an ITP that describes measures to avoid, minimize, and mitigate the incidental take of lynx. The proposed action being evaluated by this DEA is the Service's issuance of a 15-year incidental take permit for Canada lynx associated with the MDIFW's

trapping programs and implementation of the ITP. A full description of the covered activities and the avoidance, minimization, and mitigation measures that will be implemented by the MDIFW are detailed in the revised ITP (ITP 2013) and are hereby incorporated by reference.

Considerable background information is provided in the revised ITP concerning the Canada lynx (section 2.2.1), trapping statutes and regulations (appendix 1 and 2)[7], the MDIFWs trapping programs (sections 3.1 and 3.2), and new forms of trapping (sections 3.1, 4.1, and appendix 13).

2.2 Purpose and Need

As required by NEPA, the purpose of this DEA is to evaluate the effects of issuance of an incidental take permit and implementation of the MDIFW's revised ITP, and alternatives to the issuance of this permit, on the quality of the human environment. The need for action is for the Service to respond to the MDIFW's incidental take permit application. The MDIFW's proposed covered activities (i.e., fur trapping, PM, and ADC) are likely to result in incidental take of Canada lynx. Therefore, the MDIFW is seeking a permit under ESA section 10(a)(1)(B) and its implementing regulations and policies.

2.3 Scope of the EA

The intent of this DEA is to provide an evaluation of environmental effects that may result from the proposed action (i.e., the issuance of an ITP and the MDIFW's implementation of the revised ITP) and other alternatives. Consistent with the CEQ's 2012 guidance, this DEA focuses on the most relevant environmental issues related to the proposed action and does not provide analysis or discussion on other environmental impacts.

Given the nature of the MDIFW's trapping activities, they will have only limited effects to the human environment. Trapping activities generally involve driving to trapping areas and setting traps in upland or aquatic settings, depending on the species of furbearing animal sought. Setting traps requires relatively minor impacts to soil and vegetation. Maine trapping regulations require trappers to check restraining traps daily (e.g., foothold traps, cage traps, and possibly non-lethal cable restraints in the future) or killer traps every 5 days (in most lynx WMDs, but every 3 days in a few areas within lynx WMDs). Trappers typically check traps by vehicle or on foot. Trappers access off-road areas by foot or by all-terrain vehicles (which are not allowed on most private industrial forest lands) and snowmobiles. Trapping activities occur primarily in October and November when there is access to trapping areas by logging roads. Access is greatly restricted by snow, usually in December, when most trappers retrieve their traps for the season.

In addition, the ITP includes habitat management as mitigation, and therefore, there are potential effects to some vegetation resources. Mitigation will occur on the Seboomook Unit, managed by the Maine Division of Parks and Public Lands (MDPPL). The Seboomook Unit is a 41,436-acre area located north and west of Moosehead Lake in Pittston Academy Grant, Soldiertown Township, Plymouth Township, Seboomook Township, and Little W Township. It includes 40,583 acres surrounding Seboomook Lake and extending south to the north end of Moosehead Lake, with 58 miles (mi) of water frontage; and 853 acres in a 24-mi shoreland strip adjacent to Canada Falls Lake and the South Branch of the Penobscot River, which flows out of Canada Falls Lake and drains into Seboomook Lake.

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[7] MDIFW has voluntarily instituted several new trapping regulations since submitting their draft ITP in 2008. Some of these will be maintained and others rescinded (ITP, table 3.0, p. 31).

Mitigation activities will involve implementing forest management to maintain and enhance high quality lynx habitat. Several thousand acres may be manipulated via shelterwood harvesting[8] to maintain lynx habitat, thus having some effect on aspects of the human environment.

2.3.1 Resources Evaluated

Based on the Service's review of the MDIFW's ITP and our understanding of Maine's trapping program activities, the aspects of the human environment that are most likely to be affected by the proposed action and alternatives include:

- Threatened and endangered species (State or Federal)
- Other wildlife
- Recreation and socioeconomics
- Vegetation and habitat

Therefore, these are the resource areas described in detail in section 4 and carried forward for analysis in section 5 of this DEA.

2.3.2 Resources Dismissed From Further Evaluation

Based on the Service's review of the MDIFW's ITP and our understanding of activities associated with Maine's trapping programs, other aspects of the human environment such as land use, cultural, historical, and paleontological resources, climate, topography/geology, and hydrology, scenic and aesthetic values will not be or only minimally be affected by the proposed action and associated alternatives. Therefore, these aspects of the human environment will not be more fully analyzed in this DEA. The rationale for excluding these resources from further evaluation is provided in this subsection.

2.3.2.1 Land Use

We do not anticipate that issuing an incidental take permit for trapping activities and associated mitigation will affect land use in Maine.

Land use is summarized in the revised ITP (section 2) and is incorporated here by reference (ITP 2013). The report *The Cost of Sprawl* (MSPO, www.maine.gov/spo/landuse/docs/sprawlandsmartgrowth/costofsprawl.pdf) provides additional detailed information on land use patterns in Maine and some parts of the report are summarized briefly below.

Approximately 55 percent of Maine is owned by forest management companies, timber investment companies, and industrial forest landowners. These forestlands, located in the eastern, northern, and western portions of the state, are inhabited by few people, generally do not have town governments, and at 10 million acres comprises the largest tract of undeveloped forest in the eastern United States. Land use, including forestry practices, in these so-called "unorganized" townships is regulated by county governments and the Maine Land Use Planning Commission.

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[8] Shelterwood harvesting removes a portion of the overstory of mature trees that causes sunlight to penetrate the canopy and spur growth of young trees in the understory. Once these young trees have become well-established and grown to a certain height, the remaining overstory is removed. This "overstory removal" can occur in one or two cutting events. The young, regenerating understory then replaces the older trees.

The remaining 45 percent of Maine is owned and managed by a variety of entities such as small private landowners, Native American tribes, land trusts and conservation organizations, and state or Federal government.

The quantity of forestland in Maine has remained virtually unchanged, as gains in some regions were offset by losses in others (Griffith and Alerich 1996). Development, climate change, invasive species, and adverse forest practices are recognized as the greatest threat to forest in the region (Wildlands and Woodland report, 2013 http://www.wildlandsandwoodlands.org/home last accessed May 5, 2014).

Commercial forestry is the predominant land use in the areas where most trapping activities will occur that will be impacted by the proposed action. Issuing an incidental take permit for trapping activities will not affect land use ownership or patterns of land use, which are largely influenced by real estate investment and forest economics.

In addition, the area where the mitigation will be applied is currently managed for multiple uses, which includes forest management activities. Therefore, forestry manipulations to maintain lynx habitat will not affect the underlying land use on the mitigation lands.

2.3.2.2 Soils and cultural, historical, and paleontological resources

We do not anticipate that issuing an incidental take permit for trapping activities and associated mitigation will affect soils, cultural, historical, or paleontological resources.

The area that now comprises Maine was populated before European settlement by various Native American tribes belonging to the Wabanaki cultural group. The Penobscot, Passamaquoddy, Micmac, and Maliseet were the most prevalent Wabanaki tribes in what is now Maine. All four tribes are federally-recognized and hold lands in northern Maine purchased after the Maine Indian Lands Claims Settlement Act (1980). Native American tribes own roughly 1 percent of the Maine forest. The Penobscot Indian Nation 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. The Aroostook Band of Micmacs and the Houlton Band of Maliseets own much smaller parcels of a few thousand acres each.

Maine was settled by several European ethnicities over the course of the 17th and 18th centuries. Maine became a state in 1820, but much of the Aroostook region did not join the United States until 1842.

Numerous archeological and historical sites have been documented throughout the state. Locations of archeological and historical sites are maintained by the Maine Historic Preservation Officers (SHPO) and are too extensive to provide in this DEA (see www.state.me.us/mhpc).

Trapping takes place in nearly every organized and unorganized town in Maine. Trappers may encounter cultural, historic, and paleontological sites. However, the state is heavily forested and most archeological, historic, and paleontological resources are not readily detectable or accessible. Trappers may encounter artifacts while conducting their activities along waterways throughout the state.

It is unlikely that trappers would affect historic buildings or structures because Maine statutes require that traps cannot be placed within 200 yards of occupied dwellings without written permission from the owner or within 0.5 miles of a compact or built up portion of a town.

Trappers routinely alter soils around traps to create conditions conducive to capturing an animal. For example, trappers make dirt-hole sets to a depth of about 6 inches to bury bait in front of a foothold trap hidden in loose dirt. Dirt-hole sets become difficult to make once the soil freezes in November. A

trapper may set as many as 100 foothold traps, each affecting less than 0.5 square foot area to a depth of 6 inches. If each trapper moves his/her traps twice to a new location they would disturb 100 square feet of soil. Assuming roughly 2,450 trappers (licensed or otherwise authorized) in Maine made such soil disturbance, less than 6 acres of soil would be disturbed in a state 20.4 million acres in size. Thus, effects of trapping activities on soils are minor, limited to the immediate location, and are of very short duration. Soil disturbance is generally not at a depth that would disturb archeological resources.

Forest practices associated with mitigation on the MDPPL Seboomook Unit have the potential to affect soils and cultural, historical and archeological resources. Forestry activities affect geology and soils by creating permanent logging roads and temporary skid trails.

Although the MDPPL Seboomook Unit has an extensive forest road network, it is possible that new permanent and temporary roads will be built to harvest mitigation areas. Each mile of road affects about 10 acres of soil disturbance (Noss 1995). If 5 miles of new road were required to achieve the mitigation forestry, then 50 acres of soils would be disturbed or about 0.2 percent of a township (36 square miles (mi.^{2})). The number and distribution of roads required to be constructed is unknown because mitigation areas within the Seboomook Unit and access to them have not been identified (ITP section 5).

Similarly, the Seboomook Unit has a legacy of existing skid trails that were used to remove wood from previous forest harvests. Skid trails have the potential to disturb soils, especially if cutting is done outside of the winter months. Placement and amount of skid trails change each time the forest is harvested depending on the type of forestry used and harvesting equipment used. Puettmann et al. (2008) documented that 13.7 percent of clearcut areas were skid trails in northern Minnesota and that soil disturbance persisted in stands up to 11 years post-harvest. In a worse-case scenario, harvesting of all 4,785 acres on the Seboomook Unit (ITP section 5.3), could result in up to 655 acres of soil disturbed by skid trails. This has a moderate impact at a township scale (2.8 percent of a typical 36 mi.^{2} township), but a negligible impact at the statewide scale.

The MDPPL lands are managed "to demonstrate exemplary land management practices, including silvicultural, wildlife and recreation management practices, as a demonstration of state policies governing management of forested and related types of lands" (12 MRSA 1833.1)(ITP p. 115). Historical resources are mapped on the MDPPL lands and consulted prior to any road building. The MDPPL also consults with the SHPO before undertaking new forest road construction to ensure cultural and archeological resources are not affected. The MDPPL policy (www.maine.gov/doc/parks/programs/planning/index.html last accessed May 5, 2014) requires that forestry projects be reviewed according to the following procedures:

- If improvement projects appear likely to have an impact on cultural and historical resources, managers will contact the historic site specialist who, as appropriate, will coordinate further assessment, evaluation, or mitigation with the Maine Historic Preservation Commission, Maine State Museum, potentially affected Native American and other communities, interest groups, or entities specified by law or regulation.
- The MDPPL will provide for professionally conducted, interdisciplinary historical and cultural resource inventories during the preparation of management plans, and persons with historical/cultural resource expertise will be included on management plan advisory committees.
- The MDPPL will provide for professionally conducted, interdisciplinary surveys of historical and cultural resources on undeveloped MDPPL lands to identify, protect, and monitor resources that will not be addressed by management plans in the near future. Priorities for this work will be based on the expected presence and value of historical and cultural resources and the threat of loss or damage to the resources. As much as possible, the MDPPL will use the content and results of inventories and surveys as opportunities for public education.

Areas of cultural and paleontological resources have been identified on state forest lands. Additional survey work may be needed before forest management begins on the MDPPL Seboomook Unit. Before forest management begins, the MDPPL would announce management plans and activities and request public review and comment.

Therefore, based on currently available information, issuing an incidental take permit for trapping activities will have little to no effect to soils, cultural, historical, or paleontological resources.

2.3.2.3 Air quality and climate

Climate is summarized in the ITP (section 2) and is incorporated here by reference.

Trapping may slightly affect air quality because trappers drive gasoline-powered vehicles to check their traplines. There is no information available on the number of miles driven by approximately 2,450 Maine trappers, but the number of miles driven and emissions produced would be miniscule compared to a single day of commuter traffic in Maine. In 2007, Maine's annual greenhouse gas emissions from transportation were 8.96 million metric tons (24,547 tons per day) (EPA 2009, http://www.epa.gov/climatechange/emissions/state_energyco2inv.html last accessed May 5, 2014). If each Maine trapper drove 100 miles daily for 60 days (at 20 miles per gallon), total emissions would be less than 7,920 metric tons, or 0.09 percent of the greenhouse gasses produced in Maine annually (all-terrain vehicle and snowmobile emissions are included in this estimate).

The CEQ provides NEPA guidance to address contributions of projects on greenhouse gas emissions and how climate change will affect projects (CEQ Memorandum for Heads of Federal Departments and Agencies, February 18, 2010). Estimated greenhouse gas emissions generated by 2,450 trappers in Maine are less than 8,730 tons annually, which is less than the 27,557 tons CEQ annual guideline that may trigger more detailed quantitative analyses. Global climate change is the result of numerous and varied sources, each of which may make a relatively small addition to global greenhouse gas in the atmosphere.

Mitigation activities (e.g., forestry, logging, transporting forest products) would create greenhouse gas emissions and could affect carbon sequestration by altering the age of the forest. Forest harvest in Maine and associated trucking contribute 1.4 pounds of CO_2 per cubic foot of wood harvested (Cameron et al. 2013). Assuming that the average stocking rate of mature timber on MDPPL land is approximately 15 cords per acre and a cord is 78 cubic feet, harvesting up to 4,785 acres on the Seboomook Unit for mitigation would produce about 3,818 tons of CO_2. This is below CEQ's 27,557 metric ton guideline.

There is little information on how different forest management strategies used in Maine affect carbon sequestration. It is difficult to estimate the effects of the mitigation on carbon balance without utilizing complex models and making many assumptions. Mitigation harvesting of a mature forest will result in a net loss of carbon, but carbon will be sequestered as biomass as of the new forest grows. While rapid carbon sequestration can occur in a growing young forest, the greatest whole-ecosystem carbon accumulations are typically in old growth forests (Jacobsen et al. 2009). The amount of carbon sequestration that occurs after harvesting is related to many variables - changes in net photosynthesis, weather, soil respiration, and decay of slash above and below ground. Carbon balance also depends on the type of silviculture and how much wood was removed. Harvesting 4,785 acres represents about 0.01 percent of the annual 500,000-acre forest harvest in Maine. Thus, we conclude that mitigation activities will have a minuscule effect on the carbon balance and sequestration in the Maine forest.

Climate change may affect trapping and furbearing wildlife populations during the 15-year duration of the incidental take permit. Anticipated changes to Maine's climate will likely affect the distribution and

abundance of wildlife and their habitats (Jacobson et al. 2009, Whitman et al. 2010). For example, climate change is expected to reduce spruce-fir habitat, which could reduce the range of lynx, marten, and other boreal furbearer species; reduce snowfall, which could favor temperate furbearer species like bobcat, fisher, gray fox, and opossum; and result in warmer, dryer summers, which could affect beaver, muskrat, and other aquatic furbearers. Shifts in furbearer populations and their habitat are likely to occur incrementally over many decades or within the next 100 years (Jacobsen et al. 2009, Whitman et al. 2010). MDIFW's ITP specifically addresses this issue in a couple of ways. The plan incorporates a commitment to specifically extend the avoidance and minimization measures to areas newly occupied by lynx. In addition, the plan incorporates changed circumstance triggers related to the potential for higher capture rates and/or higher mortality rates of lynx. MDIFW's plan will adjust to climate change impacts that may affect trapping.

Therefore, issuing an incidental take permit for trapping activities will have little to no effect to air quality or climate resources.

2.3.2.4 Topographic and geologic resources

Topographic and geologic resources are summarized in the ITP (section 2) and are incorporated here by reference. Issuing an incidental take permit for trapping will have no effect on topographic and geologic resources.

2.3.2.5 Hydrology, wetland and jurisdictional waters of the U. S., and water quality

Hydrology and wetland resources are summarized in the ITP (section 2) and are incorporated here by reference.

Issuing an incidental take permit for trapping will have little effect on aquatic furbearer trapping and produce negligible effects on hydrology, wetlands, or water quality. Trapping does not pollute or impound waters. Intensive trapping, in some instances, may affect local beaver populations. If all beavers are trapped from an area trapping could cause a localized, temporary, loss of beaver-created wetlands. However, these circumstances are anticipated to be very rare and have only minor, localized effects.

The mitigation could affect forested wetlands to the extent that they occur in the lynx mitigation area. Some coniferous forests (especially black spruce flats) in Maine are forested wetlands and logging of forested wetlands is permitted in Maine. Logging in forested wetlands is usually done in the winter, and ice and snow protect the wetland soils and herbaceous vegetation from impacts. If forested wetlands are logged to create lynx habitat, the MDPPL will use best management practices, including winter harvest, to avoid effects to wetland soils. Although logging will affect the age structure of the forest, it will not affect the vegetation type. Forested wetlands that may be logged would be expected to regenerate into a similar forest composition (i.e., dominated by larch or black spruce). Forested wetlands are widely distributed and common in northern Maine. We estimate that forested wetlands on the MDPPL Seboomook Unit likely comprise less than one percent of all of the forested wetlands in the lynx WMDs.

Therefore, we conclude that issuing an incidental take permit for trapping activities will have little to no effect to hydrology, wetlands, or water quality resources.

2.3.2.6 Scenic resources

Encounters with trappers, traps, or trapped animals may influence aesthetic experiences for some people. However, trapping activities are discrete. Trapping does not affect landscapes or vistas. Issuing an

incidental take permit or any of the alternatives considered would have little effect on aesthetic and scenic resources in Maine.

Mitigation on the MDPPL Seboomook Unit could have a minor effect on the scenic resources on state lands. Visitors are used to seeing and recreating in a mature forest condition on many public lands. The Seboomook Unit was recently purchased by the State with a legacy of previous forest practices – extensive young forest created by clearcutting and high density of logging roads. Some recreational users (e.g., moose watchers and hunters) prefer this type of forest because of the abundance and diversity of wildlife that it supports. There is little topographic relief on the Seboomook Unit. There are few long-distance vistas and shelterwood harvests will generally not be visible from the main roads on the Unit. Visitors would have to drive small, secondary logging roads to encounter the mitigation forestry. Thus, it is unlikely that maintaining and enhancing a young forest on this area of the Seboomook Unit will reduce scenic experiences.

Therefore, issuing an incidental take permit for trapping activities will have little to no effect to scenic resources.

3. Alternatives

NEPA requires that Federal agencies consider a range of reasonable alternatives to the proposed action when evaluating the environmental effects of an action. Accordingly, this section describes the proposed action and alternatives to the action that were considered:

- **Alternative 1 (No Action – Trapping Programs as Currently Managed)**: Status quo. This alternative represents the existing baseline conditions that incorporate the programs according to how the MDIFW is currently implementing them. No incidental take permit is issued. Fur trapping is continued consistent with the 2007 Consent Decree and the PM and ADC programs are continued statewide.

- **Alternative 2 (No Action – No Permit; Trapping Discontinued in Lynx WMDs)**: No incidental take permit is issued. Fur trapping, PM, and ADC programs are continued statewide. To avoid incidental take of Canada lynx from trapping related programs, the MDIFW discontinues all upland trapping in lynx WMDs.

- **Alternative 3 (Proposed Action – Fur Trapping, PM and ADC Programs Implemented Consistent with the MDIFW's ITP)**: The Service issues an incidental take permit and the MDIFW manages the fur trapping, PM, and ADC programs according to the revised 2013 ITP.

- **Alternative 4 (Fur Trapping, Implemented Consistent with the MDIFW's ITP; PM and ADC Discontinued in Lynx WMDs)**: The Service issues an incidental take permit only for the MDIFW's fur trapping program. The PM and ADC programs are not covered by the permit and therefore, the MDIFW manages these programs in a manner that avoids incidental take of Canada lynx. For the purposes of the analysis of this alternative we assume that the MDIFW discontinues elements of the PM and ADC trapping in lynx WMDs that could take lynx (e.g., coyote and fox control). In addition, we assume that the MDIFW phases in the use of non-lethal cable restraints, but does so outside of the lynx WMDs.

These alternatives fulfill the Service's NEPA responsibility to evaluate reasonable alternatives to the proposed action that are technically and economically practical or feasible and meet the purpose and need of the proposed action. The NEPA process requires the Service to evaluate how this range of alternatives

affects the human environment. In contrast, our responsibility under the ESA will be to assess whether the MDIFW's revised ITP minimizes and mitigates take to the maximum extent practicable (among other requirements, see section 1.2.2). The alternatives evaluated in this DEA do not reflect the Service's decision on whether to issue a permit or conditions that may be placed on a future permit.

We note that developing NEPA alternatives for this proposed action (i.e., issuance of an incidental take permit and the MDIFW's implementation of the revised 2013 ITP) was particularly difficult for several reasons. First, the baseline for our evaluation reflects the fact that current trapping programs are guided by a court-approved Consent Decree. Alternative 1 acknowledges this and assumes for the purpose of NEPA that the conditions of the Consent Decree remain in effect. For alternatives 2 to 4, we presume that the programs described would replace the requirements of the Consent Decree.

Second, there are two versions of the no action alternative. These are intended to reflect what would happen if no permit is issued. As stated above, alternative 1 reflects what the MDIFW is currently doing consistent with the Consent Decree. The other no action alternative presumes that to avoid take liability for itself and trappers, the MDIFW would implement programs that avoid take of Canada lynx altogether.

Third, restraining traps[9] used in furbearer trapping (e.g., foothold traps, non-lethal cable restraints, cage traps) are somewhat non-discriminating and generally catch any species that encounter them. We are unaware of techniques that can be implemented that will preclude the incidental trapping of Canada lynx in restraining traps. Therefore, outside of prohibiting the use of restraining traps in lynx areas (which we did include in alternatives 2 and 4) there are few alternatives that would reduce the actual captures of Canada lynx.

Fourth, the MDIFW's ITP focuses on reducing the effects of the incidental lynx captures by implementing measures and procedures to minimize and address injury rates. While there are potentially alternative ways to achieve those same objectives, such an alternative would not result in significantly different effects to the human environment beyond what is already being analyzed here. For example, the MDIFW anticipates the potential that up to 195 lynx could be captured in traps under the revised ITP. The Service could include an alternative that incorporates different components to a trapping program, but ultimately those 195 lynx will likely still be captured. While one alternative may allow for more or less certainty, the MDIFW's revised ITP includes changed circumstances that will allow the plan to respond to uncertainty. We note that other alternatives are considered in section 3.2 but not carried forward for detailed analysis.

We also note that the analyses and alternatives in this DEA are somewhat different than those previously presented in the Service's 2011 DEA. The key reason is, at that time, the Service did not feel that MDIFW had fully considered various trapping techniques or approaches in developing its 2008 draft ITP. We therefore included alternatives comprising suites of various trapping methods and minimization measures, in part to solicit input on their desirability and effectiveness. Having now considered public response to those alternatives, the MDIFW, in consultation with the Service, has subsequently addressed those issues in the revised 2013 ITP. In doing so, MDIFW has focused on those measures that are most likely to achieve the stated biological goals and objectives of its trapping programs. As a result, the revised DEA takes a somewhat broader approach to defining alternatives that does not include the detailed suite of measures, other than those addressed in the revised draft ITP. To the extent that the

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[9] The MDIFW's ITP incorporates measures with lethal trapping techniques to make them more selective (e.g., exclusion boxes, leaning pole sets). The MDIFW does not believe lynx will be captured by lethal trapping techniques due to these measures.

alternatives do not include certain trapping techniques previously considered, we address these changes in our response to comments in appendix 1 of the DEA.

Given the challenge of developing NEPA alternatives for this proposed action, we feel that these alternatives provide a reasonable range of actions that address the purpose and need and allow for meaningful analysis of effects to the human environment. These are summarized in the table below.

Table 3.0 Summary of alternatives considered.

Regulation/Action Description	Alternatives			
	1 No action – status quo	2 No action – avoid lynx take	3 ITP – proposed action	4 Limited ITP – no PM and ADC trapping in lynx WMDs
ESA incidental take permit	No	No	Yes	Yes
2007 Consent Decree	Yes	No	No	No
Fur trapping program	Statewide	Not in lynx WMDs	Statewide	Statewide
Predator management program	Statewide	Not in lynx WMDs	Statewide	Not in lynx WMDs
Animal damage control program	Statewide	Not in lynx WMDs	Statewide	Limited ADC; no coyote, fox and bobcat trapping in lynx WMDs. No shallow water sets and no Hancock traps for beaver in lynx WMDs
Mitigation	No	No	Yes	Yes
Cable restraints	No	Not in lynx WMDs	Statewide – phased in initially with the PM and ADC programs	Not permitted within lynx WMDs

Table 3.0 Continued.

Regulation/Action Description	Alternatives			
	1 No action – status quo	2 No action – avoid lynx take	3 ITP – proposed action	4 Limited ITP – no PM and ADC trapping in lynx WMDs
Foothold traps	Statewide; size restricted size per Consent Decree	None in lynx WMDs; unrestricted size[10]	Statewide; unrestricted size	Statewide; unrestricted size
Killer-type traps	Statewide; use restricted per Consent Decree	None in lynx WMDs; current restrictions on use outside lynx WMDs	Statewide; in lynx WMDs leaning poles if off ground and exclusion boxes if on ground	Statewide; in lynx WMDs leaning poles if off ground and exclusion boxes if on ground
Cage traps	Restricted per Consent Decree; no use lynx WMDs	Not in lynx WMDs; current restrictions remain in place outside lynx WMDs	Statewide; no restriction	Not by PM and ADC in lynx WMDs; current restrictions elsewhere
Suitcase or Hancock traps	Statewide for ADC use only	Not in lynx WMDs; current restrictions elsewhere	Statewide for ADC use only	Not by ADC in lynx WMDs; current restrictions elsewhere

3.1 Description of Proposed Alternatives

The following subsection describes the alternatives that are evaluated in this DEA.

3.1.1 Alternative 1 (No Action – Trapping Programs as Currently Managed): Status quo. This alternative represents the existing baseline condition that incorporates the programs according to how the MDIFW is currently implementing them.

Under alternative 1, the MDIFW would not receive a section 10(a)(1)(B) permit for the incidental take of Canada lynx for their trapping programs. The MDIFW would continue to conduct fur trapping, PM, and ADC programs in accordance with the 2007 Consent Decree resulting from *Animal Protection Institute v. Roland D. Martin* and subsequent regulations (ITP table 3.0). It is unlikely that the Federal courts would

[10] In the ITP, the MDIFW states that coyote traps are less than 6 ¾" and prior to Consent Decree foothold trap size was not restricted.

allow the Consent Decree to continue indefinitely, but we include this alternative to serve as a baseline from which to compare the other alternatives.

This alternative represents the existing baseline condition that incorporates the programs according to how the MDIFW is currently implementing them. The MDIFW would continue ongoing outreach and education, lynx handling procedures, trapping practices, and monitoring measures to minimize the incidental take of lynx in their fur trapping, PM, and ADC programs.

The measures and regulations that the MDIFW is currently employing to address incidental take of lynx in the fur trapping program are described in the MDIFW's revised ITP (section 5.2.1, pp. 80 to 102). Measures to address incidental take of lynx in the MDIFW's current PM and ADC programs are the same as those used in fur trapping, because PM and ADC trappers abide by the same regulations (ITP appendix 1)[11]. There is no mitigation currently being done to offset the take of lynx in traps.

3.1.2 Alternative 2 (No Action – No Permit; Trapping Discontinued in Lynx WMDs): No incidental take permit is issued. Fur trapping, PM, and ADC programs are continued statewide, but the MDIFW discontinues all upland trapping in lynx WMDs. As a result, there is no take of lynx attributable to the trapping programs.

The MDIFW would retain minimal outreach and education and lynx handling protocols to address the unlikely event that a lynx disperses outside of the lynx WMDs and is incidentally trapped.

Non-lethal cable restraints would be used only outside of lynx WMDs.

This alternative provides a point of reference for examining the environmental consequences of the proposed action (i.e., issuance of an incidental take permit and the MDIFW's implementation of the revised 2013 ITP) because it reflects a no take scenario. However, this alternative would clearly not meet the MDIFW's interest in maintaining an effective statewide furbearer trapping program.

3.1.3 Alternative 3 (Proposed Action – Fur Trapping, PM and ADC Programs Implemented Consistent with the MDIFW's ITP): The Service issues an incidental take permit and the MDIFW manages the recreational fur trapping, PM, and ADC programs according to the revised 2013 ITP.

The MDIFW would continue all of the outreach and education, lynx handling procedures, trapping practices, and implement additional avoidance, minimization, and mitigation measures specified in its ITP (ITP 2013, table 3.0; DEA table 1.5).

Alternative 3 is similar to alternative 1 (the status quo) because the MDIFW has been incrementally adding measures to address the incidental take of lynx. The following are some of the substantive new commitments in the ITP and unique to alternative 3 (ITP section 5.0):

- The MDIFW will produce and distribute a DVD that demonstrates techniques for reducing incidental lynx captures and injuries within 2 years after the MDIFW receives an incidental take permit. The DVD will be produced by the MDIFW Information and Education staff in consultation with wildlife biologists and be used in trapper educational courses (by students and instructors). Both ADC and PM trappers will be required to review the DVD during their

[11] Although ADC trappers can trap year round, they otherwise have to abide by Maine fur trapping regulations. ADC trappers can also use suitcase or Hancock traps for beaver which fur trappers cannot.

certification/recertification training. Upon completion, the DVD will be distributed to all licensed trappers and remain on the MDIFW's website (OE 7, ITP p. 96).

- The MDIFW will continue to implement standard operating procedures for responding to lynx captures (ITP, Appendix 8) and will update these procedures with a veterinarian every 3 years, or as necessary. The MDIFW will also develop and implement a field based injury scoring system for evaluating incidentally captured lynx within 1 year of permit issuance and update every 3 years or as necessary (IM 3, ITP pp. 86 to 87).
- Starting in the fall of 2012, and every 3 years thereafter, the MDIFW biologists will be trained by a veterinarian on how to evaluate injuries of incidentally captured lynx. Any new biologists will not respond to lynx captures until they have received such training unless they accompany trained biologists (IM 6, ITP p. 89).
- In the fall of 2012, a veterinarian accompanied the MDIFW staff to three lynx captures. This will be repeated for three more lynx captures within each 3-year period during the permit period (IM 7, ITP p. 89).
- If an adult female lynx with kittens is killed or held for treatment of capture related injuries, the MDIFW may capture and radio-collar or hold kittens in captivity until the female can be released or until the kitten reaches dispersal age (i.e., 1 year old) as described in the ITP (section 5.2.1 (IM 8, pp. 90 to 91).
- The MDIFW will continue regulations that require killer-type sets that have a jaw spread greater than 5 inches to be set on leaning poles with the exception of blind or water sets. The MDIFW will rescind a current regulation that does not permit killer-type (except blinds) to be set on the ground in lynx WMDs and will permit killer-type traps to be set on the ground if set with an exclusion devices in all lynx WMDs. Killer-type traps set on the ground cannot exceed 7 ½ inches inside jaw spread. Exclusion devices will not be required for blind sets or killer-type traps set on leaning poles (RC 1, ITP pp. 81 to 83).
- The MDIFW will rescind the Consent Decree requirement that restricts use of foothold traps greater than 5 $^{3}/_{8}$ inch jaw spread in WMD 1 to 6 and 8 to 11. Instead, foothold trap size will not be restricted (i.e., traps can be larger but likely less than 6 ¾ inches) whether set on land or underwater (ITP table 3.0), since capture and injury rates did not differ for lynx when larger foothold traps were permitted (i.e., prior to 2008).
- The MDIFW will rescind the Consent Decree requirements that require that wooden based rat traps set for weasels and squirrels recessed within a wooden box with a hole no larger than 2 inches in diameter are prohibited in WMD 1 to 6 and 8 to 11. Instead, new regulations would allow the use of these traps statewide, since no lynx have been reported captured in these traps in Maine or elsewhere.
- The MDIFW will rescind the Consent Decree requirements that prohibit use of cage traps with openings greater than 13 by 13 inches within the lynx range except for wildlife research, animal damage, or to capture black bears. Instead, new regulations will permit the use of cage traps statewide without size restrictions, except suit-case style cage traps (e.g., Hancock traps) will continue to be prohibited for use during the beaver season, unless set for wildlife research, surveys, or ADC. Take is anticipated to be low and lynx can be released with no injury or no more than minor injury.
- The MDIFW will obtain regulatory approval and phase in the use of non-lethal cable restraints first by PM and ADC agents, then by fur trappers statewide if take of lynx is not projected to exceed the amount of take previously authorized (ITP pp. 29 to 30, 39, 57 to 58, 72, 316, appendix 13).

- The MDIFW will promulgate regulations that make it illegal to set traps with teeth on land[12]. Traps with teeth would only be used if covered by water or under ice from the opening day of the trapping season to the opening day of the deer firearm season (ITP p. 83).
- Each year, the MDIFW wardens will check at least 60 trappers setting killer-type traps in the lynx range to record the number of traps set in compliance with regulations. MDIFW biologists will analyze the data to inform the MDIFW's changed circumstances plan (PI 4, ITP pp. 99 to100).

The MDIFW addressed potential uncertainty through changed circumstances and contingencies that are described in the revised ITP (section 5.4). If circumstances change (e.g., an increase in the incidence of incidentally trapped lynx, an increase in injuries detected, an increase in mortality, use of new trapping technologies, a situation where fewer than 90 percent of trappers are documented to be in compliance with State regulations[13], or the legislature changes trapping regulations), then the MDIFW may implement the following contingencies:

- Address problems through outreach and education,
- Make regulatory changes that may include restricting the size of foothold traps, evaluating other trap sets, and/or use of exclusion devices on killer-type traps,
- Restrict trapper effort, including emergency closures, area closures,
- Increase law enforcement or increase penalties, and
- Work with the Legislature and/or modify impacts of legislation.

This DEA describes these changed circumstances, but does not analyze the precise environmental consequences of these measures. That is in large part because they generally trigger a suite of several different contingency measures that will be tailored to the particular situation that caused the trigger to be invoked. However, the measures (e.g., restrictions on trapping, trapping effort, etc.) will serve to increasingly restrict aspects of the trapping program with the intent of reducing lynx injuries and fatalities below a threshold consistent with the take authorization.

Finally, the MDIFW proposes to mitigate for the lethal take of up to three lynx by maintaining and enhancing 4,785 acres of high quality hare habitat on a 10,411-acre area on the MDPPL Seboomook Unit (ITP pp. 103 to 115, section 5.3)[14]. The amount and type of management will be described in a forest management plan, which will be completed within 3 years of issuance of an incidental take permit. Forest management will include the appropriate forest harvest techniques (e.g., shelterwood harvesting) to maintain and enhance young conifer habitat (ITP p. 113). In addition, the MDIFW will employ a number of the guidelines in the Service's *Canada lynx habitat management guidelines for Maine* (Service 2007). The MDIFW indicates that the forest management to benefit lynx would be completed within the requested 15-year permit period.

Existing high quality hare habitat in the proposed mitigation area is expected to grow out of lynx habitat by 2029. The mitigation area is currently comprised of maturing clearcuts of conifer-dominated stands that were last managed in the 1970s and 1980s. Harvested stands generally provide lynx habitat for 35 to 40 years post-harvest and therefore forests on the mitigation lands will grow out of habitat suitability over the next 15 years. Therefore, without active forest management it is possible that the mitigation area will

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[12] According to the MDIFW, this regulation was promulgated in 2013 and will take effect during the 2014 trapping season.

[13] A trapper will be in compliance if 90 percent or more of the traps that are checked are set in compliance with regulations (ITP p. 124).

[14] Note that there is a discrepancy in the mitigation acreage presented in appendix 11 of MDIFW's revised 2013 ITP. The memorandum of understanding will be revised to reflect the 10,411-acres described in the ITP.

not have sufficient habitat to support lynx, especially during the latter part of the requested 15-year permit period.

To create new habitat, the MDPPL will harvest stands after a forest management plan is completed. Hares begin to use regenerating conifer stands about 10 years after harvest, but it takes approximately 18 years for understory conditions to fully develop and support maximum hare populations that will attract lynx (Simons 2009, p. 136). Thus, it is likely that the habitat created by mitigation activities will not be suitable for lynx for 10 to 18 years post-harvest, but would then continue to provide habitat for a 35 to 40-year period. The forest management plan will provide the details as to when, how much, and precisely what activities are required to ensure that 4,785 acres of high quality hare habitat are enhanced and maintained on the mitigation area. However, there may be a lag time before the management activities create optimal lynx habitat. Habitat created by the mitigation proposal will be in a suitable condition to support lynx until 2052 to 2064, depending on when forest management occurs during the permit period. The MDIFW is proposing that trapping be allowed on the mitigation area.

3.1.4 Alternative 4 (Fur Trapping, Implemented Consistent with the MDIFW's ITP; PM and ADC Discontinued in Lynx WMDs): Under alternative 4, we evaluate the environmental consequences of the MDIFW receiving a section 10(a)(1)(B) permit for the incidental take of Canada lynx for its fur trapping program only. The MDIFW would implement the minimization and mitigation measures described in its ITP for the fur trapping program as described above in alternative 3. The PM and ADC programs would not be covered by the permit and therefore, the MDIFW would manage these programs in a manner that avoids incidental take of Canada lynx. For the purposes of the analysis of this alternative we assume that the MDIFW discontinues elements of the PM and ADC trapping in lynx WMDs that could take lynx (e.g., coyote and fox trapping).

The Service is including this alternative because the MDIFW's revised ITP now includes the PM and ADC programs as covered activities in its incidental take permit request, in addition to the fur trapping program. By having an alternative that excludes the two programs, it will highlight to the public and Service decision makers the environmental consequences of including them on a permit. This alternative meets the Service's purpose and need for NEPA and would allow the MDIFW to implement all of the trapping related programs, but could reduce the effectiveness of the MDIFW's PM and ADC programs within the lynx WMDs.

Under this alternative, the MDIFW could phase in non-lethal cable restraints as a new method of trapping in their fur, PM, and ADC programs as described in the ITP and alternative 3. However, to avoid the potential for incidental capture of lynx, non-lethal cable restraints would be restricted to use only outside of lynx WMDs.

Mitigation under alternative 4 would be the same as mitigation under alternative 3.

3.2 Alternatives Not Considered for Detailed Analysis

This DEA focuses on the effects of issuance of an incidental take permit and implementation of the MDIFW's ITP and reasonable alternatives to that proposed action on the human environment. Below we present and explain some of the initial alternatives that were considered but then eliminated from further detailed analysis.

1. **Discontinue all forms of fur trapping, predator management, or animal damage control statewide.** The MDIFW did not consider a statewide ban on trapping because (ITP section 7.1):

- Discontinuing a state trapping program is contrary to the Maine state legislature's directive for the Commissioner of the MDIFW to establish an open season for the trapping of furbearing animals.
- The number of lynx killed in traps is unlikely to have a population level effect, thus a statewide ban is not warranted.
- This would eliminate harvest of some species that could negatively affect the lynx populations indirectly through increased competition or predation.
- Trapping cannot be replaced with an alternative means of harvesting and managing furbearer populations (ITP sect 7.1).

This alternative would end furbearer trapping activities in Maine, and thus avoid trapping-related incidental take of lynx, however, it would not serve the purpose and need of this DEA. This alternative would discontinue all forms of trapping (e.g., aquatic sets for muskrat and beaver) that have little or no potential to capture or otherwise take lynx. This alternatives would also prohibit trapping that, with appropriate modifications or restrictions would minimize the incidental take of lynx (e.g., some forms of upland trapping). Therefore, we did not carry this alternative forward for detailed analysis in this DEA.

2. **Discontinue trapping for certain furbearing species.** The MDIFW did not consider discontinued trapping for certain species (ITP section 7.2) because:

   - This would reduce the trapping harvest for some furbearer species.
   - The public may incur a significant loss of fur trapping opportunity.
   - This would eliminate harvest of some species that could negatively affect lynx populations indirectly through increased competition or predation.

   Most lynx have been incidentally trapped in sets for fox, coyote, bobcat, marten, and fisher. Discontinuing trapping for one or more of these species would eliminate an otherwise lawful activity. Therefore, we did not carry this alternative forward for detailed analysis in this DEA. However, we note that the MDIFW may in the future opt to reduce trapping opportunity for some furbearers to manage their populations. For instance, for 2014, the MDIFW limited the fisher season in southern Maine in response to perceived population decline.

3. **Limit the number of furbearers that a fur or predator management trapper could take in a season.** This provision may decrease total trapping effort and may reduce the total number of lynx incidental trapped. There are quotas for American marten (25) and fisher (10) in Maine. The MDIFW incorporates the potential for reducing trapper effort if take or injury of lynx is higher than initially anticipated (ITP section 5.4). Therefore, we do not carry this forward as a distinct alternative for detailed analysis in this DEA.

4. **Limit the number of trappers or traps in lynx WMDs.** This provision would decrease trapping effort and may reduce the total number of lynx incidental trapped. The MDIFW incorporated contingencies that are described in the revised ITP (section 5.4) to address a number of potential changed circumstances. If circumstances change (e.g., increased incidence of incidentally trapped lynx, increase in injuries detected, increase in mortality, new trapping technology; fewer than 90 percent of trap sets are in compliance with State regulations, or the Legislature changes trapping regulations), then the MDIFW may:

   - Address problems through outreach and education;

- Make regulatory changes, including restricting the size of foothold traps, evaluating other trap sets, requiring exclusion devices on killer-type traps;
- Restrict trapper effort, including enforcing emergency closures, area closures;
- Increase law enforcement or increase penalties; and
- Work with the Legislature and/or modify the impacts of legislation.

The DEA addresses these measures in alternative 3, but does not analyze the environmental consequences of each of these measures. Because it is already an integral part of the MDIFW's ITP, we do not carry this forward as a distinct alternative for detailed analysis in this DEA.

5. **Increase the fisher harvest to reduce predation on lynx.** The MDIFW believes this provision may reduce fisher predation on lynx and thus may increase the overall lynx population in Maine (ITP section 4.2). The Service does not incorporate this as an alternative to the proposed action that is considered in detail because we believe it would be unlikely that the MDIFW would intentionally over-harvest one of Maine's most valuable furbearer species that has low population densities at the northern part of its range. Fisher populations are currently declining in southern Maine (http://www.maine.gov/ifw/hunting_trapping/trapping/pdfs/Commiss%20Trapping%20-%20Letter%20to%20trappers%2010-11-13_Fnl_signtr.pdf. Last accessed May 29, 2014.). We were also uncertain that the desired outcome could be achieved or monitored. For example, rather than increasing fisher harvest, for 2014, the MDIFW limited the fisher season in southern Maine in response to a perceived population decline. Therefore, this alternative is not carried forward.

6. **Discontinue foothold trapping in December.** The MDIFW explained that foothold trapping efforts decline substantially in December because foothold traps currently in use perform poorly in frozen ground and snowy conditions (ITP section 7.2). No lynx have been reported trapped in foothold traps in December, when freezing of toes and feet of trapped animals could be an issue. However, trapper effort in December could increase if larger, more powerful foothold traps are used. Trappers indicated in public comments that they wanted larger traps to trap coyotes in snow and frozen conditions. The MDIFW chose to address increased injury to lynx in December as a changed circumstance (ITP section 7.2). We evaluate the interrelated issue of December trapping and larger foothold traps in comparing the environmental consequences of alternatives 1 and 3 and do not consider discontinuing December trapping as a unique alternative.

7. **Alternative forms of mitigation.** The Service did not consider alternate forms of mitigation (e.g., captive breeding, signage to avoid road mortality) in the NEPA alternatives because they are untested and have uncertain outcomes, and we do not have information to assess the degree of benefit likely to be realized. From 2011 to 2012, we did not receive comments on other practicable forms of mitigation.

4. Affected Environment

The MDIFW submitted an incidental take plan requesting statewide coverage for incidental take of Canada lynx for all types of traps and for all trapping programs. Areas affected by the proposed action include, but are not limited to, private and public property; state, county, municipal lands, including park lands; historic sites; state and interstate highways and roads; railroads and their right-of-ways; property areas in or adjacent to human development; timberlands; croplands and pastures; and federally-owned or managed lands. Maine's Native American tribes control trapping activities on trust and reservation lands, and the ITP, the associated mitigation, nor the NEPA alternatives considered in this DEA affect tribal lands.

4.1 Environmental Setting

The environmental setting description for the proposed action and alternatives is summarized in the ITP (section 2) and incorporated into this DEA in its entirety by reference.

4.2 Threatened, Endangered, Candidate Species, and Other Protected Wildlife Species

Forty-five State-listed endangered or threatened wildlife species are detailed in appendix 1 of the revised ITP (ITP pp. 196 to 198)[15]. The Maine Natural Areas Program tracks 352 species of plants that are rare in Maine and maintains unofficial state endangered, threatened, and special concern lists. The proposed action does not affect state-listed plants because they are dormant during the trapping season. The Maine Department of Marine Resources maintains a State list of endangered and threatened marine mammals, turtles, and fish. The proposed action does not affect marine mammals, turtles, or fish because trapping activities occur inland. The bog lemming (State-threatened) usually occurs at high elevations in northern Maine and is not likely to be affected by trapping. The proposed action does not affect most state-listed wildlife because listed migratory birds, amphibians, reptiles, and invertebrates have migrated or are dormant during the trapping season.

But several species of federally and State-listed threatened and endangered species are known to occur or have the potential to be affected by the proposed action and alternatives. We evaluate each of these species below to determine the likelihood of effects and whether further analysis is warranted. These species are the Canada lynx, Atlantic salmon (*Salmo salar*), gray wolf (*Canis lupus*), eastern cougar (*Puma concolor couguar*), New England cottontail (*Sylvilagus transitionalis*), bald eagle, golden eagle (*Aquilla chrysaetos*), and the northern long-eared bat (*Myotis septentrionalis*). For the reasons described below, we only carry forward the Canada lynx and two eagle species as we consider the consequences of the action on the human environment.

4.2.1 Canada lynx

Considerable life history information is provided in the ITP concerning the Canada lynx (section 2.2.1). Additional information on lynx natural history, population dynamics, habitat, distribution, status and factors causing the listing of the lynx is found in the Service's Notice of Remanded Determination of Status for the Contiguous U.S. Distinct Population of the Lynx (Remand) (July 3, 2003; 68 FR 40076) and the Final Rule Determining Threatened Status for the Contiguous U.S. Distinct Population Segment of the Lynx (March 24, 2000; 65 FR 16052) and is incorporated by reference here. The most current and best available science on the life history and status of the Canada lynx in the coterminous United States was published in 2013 by the Interagency Lynx Biology Team in the 3rd edition of the *Lynx Conservation Assessment and Strategy* (LCAS)(Interagency Lynx Biology Team 2013); http://www.fs.fed.us/biology/resources/pubs/wildlife/LCAS_revisedAugust2013.pdf accessed in April, 2014). The MDIFW summarized information on the biology and status of lynx in Maine in a Canada Lynx Assessment (Vashon et al. 2012; https://www.maine.gov/ifw/wildlife/pdfs/Lynx%20Assessment%202012_1_Final.pdf accessed in April, 2014).

Our understanding of lynx status in Maine has changed little since our 2011 DEA. Maine is believed to support the largest population of lynx in the contiguous United States. Population estimates are imprecise because no survey methods have been developed in North America to provide population estimates over

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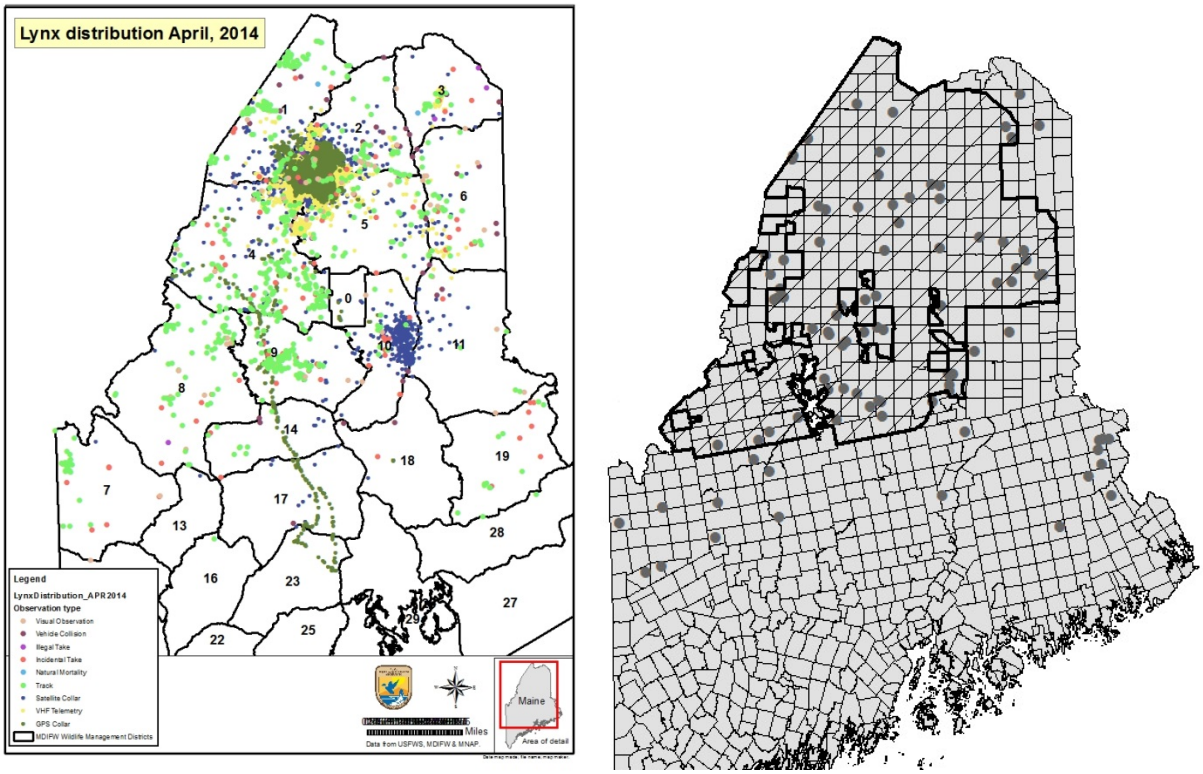
[15] The MDIFW is currently revising its list of State-endangered and threatened species. Several new species are likely to be proposed for listing in 2014.

large landscapes[16]. Typically, lynx and bobcat populations in North America are monitored using harvest data (McKelvey et al. 2000, Roberts and Crimmins 2010). Lynx are not harvested in Maine, elsewhere in the contiguous United States, or the Canadian Maritime provinces. Lynx are harvested immediately north of Maine in the Gaspe region of Quebec. Records there show evidence of weak population fluctuations or cycles, which is factored into the provinces' fur management program (Ministry of Environment and Fauna 1995). Habitat in northern Maine and the Gaspe region of Quebec can support lynx densities of 9.2 to 13.0 lynx per 39 square miles (mi^2)(Vashon et al. 2008a, Vashon et al. 2012, Ray et al. 2002) that are substantially higher than populations in the western United States (Koehler 1990) and similar to some northerly populations during the peak of the snowshoe hare cycle (Brand et al. 1976, Parker et al. 1983, O'Donaghue et al. 1997).

Fig. 4.2.1. Left – The confirmed occurrences of Canada lynx in Maine 1999 to 2013 (includes radio-telemetry, incidental take in traps, illegal and road mortality, track survey data, observations from the MDIFW staff). Numbered regions of the state are the MDIFW's wildlife management districts (WMDs). Right – Location of Canada lynx that were incidentally trapped (does not include those trapped in Quebec). Cross-hatched area in the critical habitat designated for Canada lynx in Maine (74 FR 8616: February 25, 2009).[17]



[16] Norway monitors a small (250 to 500 animals) Eurasian lynx (*Lynx lynx*) population using a system of snow track transects and counting family groups as part of a national large carnivore monitoring and management program (Linnell et al. 2001, Andren et al. 2002, Linnell et al. 2010).

[17] In 2013, the Service proposed to revise critical habitat for the Canada lynx, including Maine. The final rule is expected to be completed by October, 2014. See FR 78: 59429-59474 for details.

By utilizing two different methods, the MDIFW estimated there were between 750 and 1,000 adult lynx in northern Maine in 2006 (ITP p. 22; Vashon et al. 2012, appendix IV) about the time when the MDIFW believed that lynx populations peaked (ITP p. 64). Simons (2009, p. 102) used a lynx habitat model and calculated the summed probability of lynx occurrence using a fixed, non-overlapping home range-sized grid to estimate a population of approximately 236 to 355 adult lynx on a 3.56 million acre study area (160 townships) that comprised about half of the 6.8 million acre lynx critical habitat. Both methods have shortcomings, but indicate that northern Maine supports a population of more than 500 adult lynx.

The MDIFW reviewed the listing status of lynx, under Maine's Endangered Species Act, in 2014. The agency determined that the lynx population does not warrant listing in part because the current population exceeds 500 animals. Rather, the MDIFW recommended that lynx remain a State species of special concern, which does not impart special regulatory status.

Increases in Maine's lynx population throughout the 1990s and early 2000s are the result of regenerating forest conditions created by extensive clearcuts treated with herbicides to preemptively cut and salvage softwood forest damaged caused by a spruce budworm (*Choristomneura fumiferana*) outbreak in the 1970s and 1980s (Homyack 2003, Hoving et al. 2004, Fuller 2006, Vashon et al. 2008b). In addition, substantial areas of northern Maine experience deep snow (Hoving et al. 2005), which lynx are physically adapted to travel on and which provide a competitive advantage (Krohn et al. 2004, Hoving et al. 2005) over potentially competing carnivores (e.g., fisher and bobcats).

Silviculture in northern Maine substantially changed as a result of the Maine Forest Practices Act (1989). In the decade following passage, the total annual acreage harvested from commercial forestlands increased from roughly 250,000 acres to roughly 500,000 acres and the percentage of clearcut acreage declined from 40 percent to 4 percent. Partial harvesting replaced clearcutting. Many forms of partial harvesting result in greatly reduced landscape hare densities (Scott 2009). Regenerating spruce/fir saplings stands that support snowshoe hare and lynx increased in Maine since 1985 and may have peaked in 2007 (Simons 2009, chapter 4). Although Maine's historic lynx population was sometimes abundant (Hoving et al. 2003), the current inventory of spruce/fir sapling forest and the snowshoe hare and lynx populations that they support are probably at historic high levels (McWilliams et al. 2005, Hoving et al. 2004, Vashon et al. 2012).

Maine's lynx population is expected to decline in response to a maturing forest and associated decline in amount and quality of hare habitat (Simons 2009). Under several silvicultural scenarios, the habitat for lynx is expected to decline over the next 5 to 20 years (Simons 2009). The majority of lynx habitat is also projected to shift southward due to forest practices, where lynx experience greater competition with bobcats and fisher and may be at greater risk from declining snowfall as a result of climate change. Lynx populations are projected to decline by 65 percent by 2032 if current silviculture trends continue (i.e., prevalent partial harvesting). Even under the best scenarios (maximum clearcutting allowed) lynx density may decline by 55 percent by 2032 (Simons 2009). Despite these declines, there will still be more habitat present in 2032 than occurred in Maine in the 1970s and 1980s (Simons 2009) and a smaller population of lynx is expected to persist.

Lynx populations are affected by fluctuations and cycles in hare populations. From the mid-1990s until 2006, snowshoe hare densities in optimal, regenerating conifer habitat remained relatively stable and ranged from 0.7 to 0.9 hare per acre (Fuller and Harrison 2005, Scott 2009). From 2007 until 2012, hare densities in Maine and southern Quebec declined across all forest stand types and ranged from 0.3 to 0.5 hare per acre in optimal regenerating conifer habitat (Scott 2009, Assels et al. 2007, D. Harrison, University of Maine, unpublished data). Whether this represented a stochastic or natural fluctuation or attenuated hare cycle is unknown. To accommodate hare declines, landscapes needed to support lynx home ranges in Maine may need to be considerably larger in the future and in some areas landscape hare

density may decline to a point no longer able to support lynx (Scott 2009). During the recent hare decline, Maine lynx exhibited some of the same characteristics of cyclic populations in central Canada and Alaska including greatly reduced reproduction on the Clayton Lake study area from 2006 to 2009 (Vashon et al. 2012, table 1.2). When hare populations began to rebound (D. Harrison, University of Maine, unpublished data) all radio-tagged female lynx produced young in spring 2010 and there was evidence of high survival rates of the kittens (Vashon et al. 2012, Mallett 2014).

Hare density affects home range and movements of lynx. Lynx typically increase their home range size dramatically following declines in the hare cycle (Ward and Krebs 1985, Slough and Mowat 1996, O'Donaghue et al. 2001). However, Maine median annual lynx home ranges (males: 23.5 mi^2 at high hare densities and 14 mi^2 at low; females: 12 mi^2 at high hare densities and 9.6 mi^2 at low) did not change significantly between high and low periods of hare density (Mallett 2014), perhaps because hare densities may not have reached low enough levels to require lynx to respond spatially. In Montana where hare densities are lower (0.2 hare per acre in optimal habitat; Griffin 2004), annual lynx home ranges (77 mi^2 males; 34.7 mi^2 females, Squires and Laurion 2000) are three to four times the size of average annual home ranges in Maine (20.8 mi^2 males; 10 mi^2 females, Vashon et al. 2007, 2102) where hare densities are four times higher (0.4 to 1 hare per acre in optimal habitat at peak hare population; Robinson 2006, Scott 2009).

Threats to the Canada lynx

Threats to Canada lynx are summarized in the final listing rule (65 FR 16052) and Remand (68 FR 40076). In summary, the Service concluded that the lack of Federal land management plan guidance for conservation of lynx and the potential for forest management plans to allow direct actions that adversely affect lynx were a significant threat. Threats to Canada lynx are also summarized in the LCAS (Interagency Lynx Biology Team 2013) and MDIFW Canada lynx assessment (Vashon et al. 2012).

In Maine, forest practices on private timber lands may have the greatest influence on lynx recovery. Change in silvicultural practices resulting from the Maine Forest Practices Act is a significant threat. Extensive use of some forms of partial harvesting is not beneficial to hares and limit lynx recovery. The lack of planning on private forest lands threatens lynx in Maine in the same way the lack of planning on Federal lands in the West and Great Lakes States threatens lynx. The LCAS (Interagency Lynx Biology Team 2013) considered climate change, vegetation management (i.e., forestry), wildland fire management (in the West), and habitat fragmentation as the greatest anthropogenic risks to lynx conservation in the lower contiguous United States. Maine's Wildlife Comprehensive Conservation Strategy (2005, chapter 5, table 34) identified incidental take (including trapping), illegal take, edge of range, and habitat loss as threats to lynx.

In our 2009 lynx critical habitat designation (50 CFR 8616) and 2012 proposed critical habitat revisions (FR 78(187): 59430-59474), the Service presented new information on the threat of climate change to lynx and their habitat (e.g., Gonzalez et al. 2007, Knowles et al. 2006, Danby and Hick 2007, Carroll 2007, Johnston et al. 2012, Interagency Lynx Biology Team 2013). This information suggests that climate change may be an issue of concern for the future conservation of lynx if snow depth and conditions change and lynx distribution and spruce-fir habitat shifts northward or to higher elevation as temperatures increase (Gonzalez et al. 2007, Interagency Lynx Biology Team 2013).

Habitat fragmentation includes isolation of habitat patches, permanent or temporary removal of forest cover, development of highways and associated infrastructure, and intensive mineral or energy development (Interagency Lynx Biology Team 2013). In Maine, landscapes where habitat was more contiguous supported more snowshoe hares than landscapes where high quality hare habitat was more fragmented (Simons 2009). Lynx avoid large openings, particularly during winter (Squires et al. 2010).

Fragmentation of the naturally patchy pattern of lynx habitat in the contiguous United States can affect lynx by reducing their prey base and increasing the energetic costs of using habitat within their home ranges (Buskirk et al. 2000). Highways fragment lynx habitat and pose a risk of direct vehicle-related mortality. Between 2000 and 2012, 32 lynx were reported killed on roads (both paved and unpaved) in Maine (ITP p. 68), four in Minnesota, one in Idaho, and one in Montana (Interagency Lynx Biology Team 2013).

Incidental lynx trapping as a threat to lynx

In the 2000 final listing rule (65 FR 16052) and the Remand in 2003 (68 FR 40076), the Service recognized that individual lynx may be lost from local populations as a result of incidental trapping, but that there was no evidence that the loss of these individuals had negatively affected the overall ability of the contiguous lynx population in the United States to persist. In this same rule, we concluded that over-trapping is not a threat to contiguous lynx population in the United States. We determined that lynx occur at naturally low densities and that the rarity of lynx at the southern portion of the range compared to more northern populations is normal. The rarity of lynx is based largely on limited availability of primary prey, snowshoe hares. At southern latitudes, low snowshoe hare densities are likely a result of the naturally patchy, transitional boreal habitat. Such habitat prevents hare populations from achieving high densities similar to those in the extensive northern boreal forest (Wolff 1980, Buehler and Keith 1982, Koehler 1990, Koehler and Aubry 1994, Hodges 1999a, 1999b, McKelvey et al. 2000).

On September 24, 2001, the Service completed a formal biological opinion on the effects of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Export Program for appendix II furbearer species on the contiguous United States distinct population segment of the Canada lynx pursuant to section 7(a)(2) of the ESA. This biological opinion analyzed the effects of the Service's regulation of export of bobcat pelts to ensure their export did not adversely affect or result in take of the Canada lynx. We concluded the export of bobcat pelts was not likely to jeopardize the lynx, and provided an exemption for the prohibition against take for two lynx mortalities and two lynx injuries annually in the United States from trapping and hunting activities specifically targeting bobcat. We anticipate that there will be little overlap between this biological opinion and the MDIFW's ITP for lynx because there is relatively little targeted bobcat trapping in lynx WMDs. For example, there is no bobcat harvest in the most northerly lynx WMDs and low harvest in others (ITP table 3.1.2, p. 45). The average harvest of bobcats in lynx WMDs is 112 animals. This includes 87 bobcats caught in WMDs 7, 11, 18 and 19, which provide good bobcat habitat, but have few lynx. In the WMDs where lynx primarily occur, few bobcats are taken incidental to trapping for other furbearer species (primarily fox and coyote). Therefore, most incidental take of lynx in Maine occurs in areas where there are few, if any, bobcat and traps are generally set primarily for fox, fisher, marten, or coyotes.

The LCAS (Interagency Lynx Biology Team 2013) identified incidental trapping as a lower tier risk. In Maine 84 lynx were reported or otherwise discovered to be caught in traps set for other furbearers from 2000 to 2013, of which five were reported mortalities. In Minnesota, 22 lynx were reported captured in traps and snares, of which at least 12 were killed. In Montana, 10 lynx were reported trapped, of which at least four died. Two lynx were trapped in Idaho. Lynx were also incidentally trapped and snared in New Brunswick and Nova Scotia where they are a protected species. These figures reflect the reported captures only.

In Canada, incidental or illegal harvest of lynx likely occur throughout its range and have been raised as potential threats to the Cape Breton Island, Nova Scotia population, exacerbated by the increase in use of lethal snares for sympatric species (M. Elderkin, personal communication, D. Banks, personal communication in Poole 2003). Parker (2001) did not believe the incidental take of five to six lynx annually from the small population on Cape Breton was a major threat, except during low periods in the

hare cycle. In areas with short trapping seasons or quotas, the degree of incidental or illegal trapping may be substantial. However for most of Canada where relatively liberal trapping seasons and open quotas are the norm, incidental and illegal harvests are likely a very small proportion of the overall harvest (Poole 2003).

Throughout this DEA it is important to note the differences between incidental trapping of lynx that results from otherwise legal trapping of other furbearer species and the intentional (or targeted) lynx trapping programs as identified in the proposed and final listing rules. With the exception of its southern range in the contiguous U.S. and the Maritime provinces of Canada, lynx are hunted and trapped as a furbearing animal throughout most of their non-listed range in Canada and Alaska (Bailey et al. 1986, Poole 2003, Golden 2004).

The MDIFW was given authority to establish open trapping seasons for furbearing animals in 1973 (Title 12, Chapter 301, §1960 A). Maine has had no open hunting or trapping season on lynx since 1968.

4.2.2 Atlantic salmon

The federally endangered Atlantic salmon is an anadromous fish that spends most of its adult life in the ocean but returns to freshwater to reproduce. Atlantic salmon have a complex life history that includes adults returning to spawning rivers, eggs, parr, and smolt stages in freshwater, migration back into the ocean and extensive feeding migrations on the high seas.

The Gulf of Maine Distinct Population Segment (GOM DPS) includes all anadromous Atlantic salmon whose freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, and wherever these fish occur in the estuarine and marine environment (74 FR 29344; June 19, 2009). The marine range of the GOM DPS extends from the Gulf of Maine, throughout the Northwest Atlantic Ocean, to the coast of Greenland

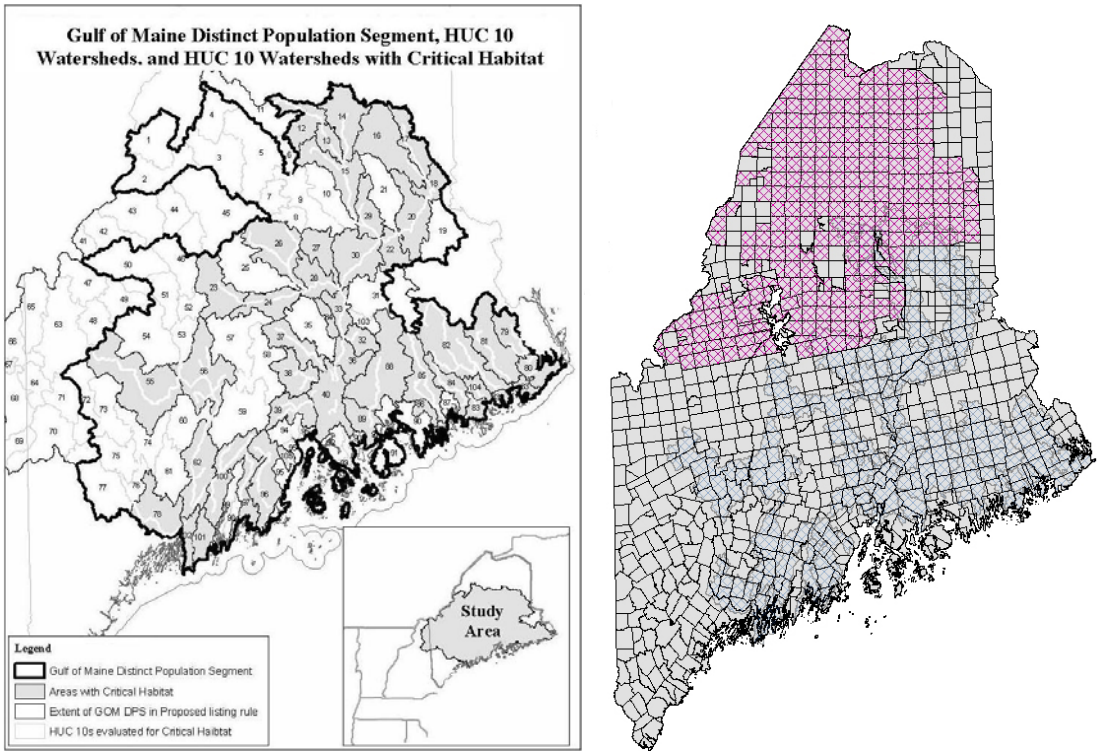
Critical habitat is designated for the GOM DPS of Atlantic salmon (74 FR 29300; June 19, 2009) and includes much the range of the salmon in Maine (see figure 3.2.2b). Atlantic salmon critical habitat includes about one third of Maine and intersects with a large portion of WMDs 1 to 11, 14, 18 and 19 where incidental take of lynx from trapping is most likely to occur.

The proposed action and alternatives considered are not anticipated to have much potential to affect Atlantic salmon. While it is possible for Atlantic salmon to be captured in traps set for aquatic furbearers, the chance is very remote. For example, it has been reported that one adult salmon was caught in a killer-type trap set in a beaver dam in a river in eastern Maine (W. Mahaney, Service, pers. comm.). However, returns of adult Atlantic salmon to freshwater spawning areas are at extremely low levels (e.g., 495 in 2013 for all GOM DPS rivers, http://www.nefsc.noaa.gov/USASAC/Reports/USASAC2014-Report%2326-2013-Activities.pdf last accessed May 29, 2014). Very few adult fish are likely present in headwater streams where beaver and otter trapping may occur. Therefore, we believe that the probability of incidentally trapping a salmon is discountable because it is so unlikely. Alternatives 1 to 4 address variation in traps set in upland habitats only (except alternative 4, which considers ADC traps in aquatic habitats, only if they are set greater than 10 inches below the water surface). The probability of take of Atlantic salmon through furbearer trapping is similarly low for all alternatives.

Mitigation activities at the MDPPL Seboomook Unit is within the GOM DPS for the Atlantic salmon, however all mitigation activities are in the upland and will not affect Atlantic salmon or their habitat. The potential exception is if roads are constructed to facilitate logging activities associated with the mitigation and road stream crossings are not adequately designed to allow for migration movements. The MDIFW and MDDPL will develop a forest management plan within 3 years of permit issuance that provides the

specific details on forestry prescriptions, harvest locations, and timeframes that will be implemented to achieve the goal of providing 4,785 acres of young forest habitat to support lynx within the 15-year permit period. The Service will review the forest management plan to ensure that there will be no adverse effects to Atlantic salmon.

Figure 3.2.2b. HUC 10 watersheds designated as Atlantic salmon critical habitat within the GOM DPS (left) and overlap of Canada lynx critical habitat (red) and Atlantic salmon critical habitat (blue)(right).



Neither the proposed action nor the alternatives are anticipated to affect Atlantic salmon; therefore this species will not be discussed further in this DEA.

4.2.3 Gray wolf

The gray wolf (*Canis lupus*) is the largest North American canid and is primarily a predator of medium and large animals (e.g., deer, moose, and beaver). The gray wolf once ranged throughout most of North America, and likely Maine where it could have hybridized with the eastern Canadian wolf (*Canis lycaon*)(Rutledge et al. 2010). Wolves were extirpated by humans from over 95 percent of its historic range, including from Maine in about the 1890s (Krohn and Hoving 2010). Recovery has been successful in the northern Rockies and Great Lakes States. The gray wolf is federally listed as endangered in the Northeast, including Maine. However, on June 13, 2013, the Service proposed to delist the gray wolf and recognized the eastern Canadian wolf as the species that historically occurred in the Northeast (FR 78(114):35664-35719, Chambers et al. 2012, Rutledge et al. 2012). Final listing decisions were not available at the time of publishing this DEA.

Although several wolves were found in Maine and elsewhere in the Northeast during the last 20 years, a breeding population is not known to exist south of the St. Lawrence River. A wolf was shot in Maine in

the1993 and another trapped and killed in 1996. Isotope analysis indicates these animals were likely of captive origin (Kays and Feranec 2011). Two wolves were trapped and killed in southern Quebec near the Maine border in 2002 (Villemure and Jolicoeur 2004), and another shot in New Brunswick in 2012 (D. McAlpine, New Brunswick Museum, unpublished paper). The closest wolf population to Maine occurs in southern Quebec on the north shore of the St. Lawrence River.

Dispersing wolves could occasionally occur in Maine and be incidentally trapped by fur, PM, and ADC traps set for coyotes. The MDIFW proposes to allow larger foothold traps, which may be more effective at trapping and holding wolves but the MDIFW is not seeking an ESA section 10 permit for wolves because they do not currently exist in the state (ITP section 2.2.2). If wolves were to become established in Maine (and they remained federally-listed), the MDIFW would consider measures to protect those animals from incidental take.

The proposed action and alternatives considered could affect wolves dispersing from Canada into the Northeast. Alternative 2 considers closing northern Maine to all upland trapping programs and alternative 4 considers closing northern Maine to ADC and PM trapping. These alternatives would reduce the already low potential for dispersing wolves to be incidentally trapped. Alternative 3, the proposed action, and alternative 1, the status quo, could result in trapped wolves, but this has been a very rare event (one wolf captured and killed in over 20 years) and the MDIFW has taken measures to address this possibility (ITP section 2.2.2). Mitigation activities at the MDPPL Seboomook Unit are similar to logging operations throughout northern Maine and would have no effect on wolves. Wolves will not be evaluated further in this DEA.

4.2.6 Eastern cougar

The eastern cougar (*Puma concolor couguar*) once occurred throughout eastern North America. This large felid was a predator of ungulates (e.g., deer and moose) and other small mammals (e.g., porcupines, snowshoe hare, and beaver). The last known eastern cougar in eastern North America was trapped and killed in Somerset County, Maine in 1938 (Parker 1998). The Service conducted a 5-year review of the status of the eastern cougar and concluded the eastern cougar subspecies is extinct from eastern North America and plans to delist this subspecies (Service 2010). Although cougars have been documented in recent years in Maine, New Brunswick, Quebec, and elsewhere in eastern North America, the evidence suggests that these are of captive origin or dispersing from western populations and are not the eastern cougar subspecies. Neither the proposed action nor alternatives affect the eastern cougar because wild populations no longer occur in Maine and therefore this species will not be discussed further in this DEA.

4.2.7 New England cottontail

The New England cottontail (*Sylvilagus transitionalis*) is a medium-sized rabbit that occurs in early successional habitats or thickets in York and Cumberland County Maine. The New England cottontail is listed by Maine as endangered and is a candidate for Federal listing. A final Federal listing determination is expected in 2015.

New England cottontails have undergone a dramatic decline in their numbers and distribution in recent years. There are likely fewer than 200 rabbits in southern Maine (W. Jakubas, MDIFW, pers. comm.). Although New England cottontails have demographic characteristics that enable fast population growth, they occur primarily in small habitat patches where they experience low over-winter survival, primarily caused by predation (Litvaitis and Tash 2006). Deep snow and low survival at small habitat patches have reduced cottontail populations to just 17 of the sites that previously held cottontails in the mid-2000s (MDIFW 2009). The primary threat is loss of habitat. Approximately 200 rabbits occur at fewer than 10

locations in southern Maine. There are substantial efforts to create habitat for this species in southern Maine and elsewhere throughout its range.

The MDIFW did not consider take of New England cottontail rabbits in the ITP because the species is not presently listed under the Federal ESA and MDIFW does not have reports of New England cottontail being trapped in foot-hold or killer type traps (W. Jakubas, MDIFW, 6/24/14 pers. comm.). There is no hunting or trapping season for this species in Maine. Trapping is not considered a threat to the New England cottontail rabbit, though we know that other species of rabbits and hares can be frequently caught in traps (Barrett et al. 1989, Proulx et al. 1989, Mowat et al. 1994, Naylor and Novak 1994, Nocturnal Wildlife Research 2008). We believe trapping poses an extremely small risk to New England cottontails because major population centers on the Sprague Corporation lands in Cape Elizabeth, state parks, and the Wells Estuarine Reserve are closed to trapping. Some of the rabbit populations are within 0.5 mi of densely settled towns or villages, which are closed to trapping by the MDIFW regulations. Nevertheless, the MDIFW has been concerned that trapping pressure in southern Maine is too high in the limited areas where trapping is allowed, and the number of furbearers trapped is similar if not higher in southern Maine than the rest of the state (W. Jakubas, MDIFW, 6/24/14 pers. comm.).

Alternatives 1 through 4 do not affect trapping activity in southern Maine where the New England cottontail occurs. PM activities do not occur within the range of the New England cottontail, though some ADC activities could occur near cottontail populations. MDIFW has explained that most ADC activities (especially in residential settings) involve cage traps, which would serve to minimize potential effects to the species. Mitigation to address impacts of take to lynx will not affect New England cottontails because the species does not occur in vicinity of the mitigation lands. We conclude that take of New England cottontails in traps is unlikely in all four alternatives because trapping activities largely do not occur in the vicinity of cottontail populations. Therefore, effects to New England cottontails from the proposed action and the alternatives will not be further evaluated in this DEA.

4.2.8 Bald eagle

The bald eagle was removed from the Federal threatened list on August 8, 2007 (72 FR 37345) and is now protected from take under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Bald eagles were removed from Maine's endangered species list in September 2009. Under BGEPA "take" means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. The term "disturb" under the BGEPA was defined as to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or, 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior (June 5, 2007; 72 FR 31332).

Maine is a primary breeding area for bald eagles in eastern North America, and supports over 90 percent of the bald eagle pairs nesting in New England. Bald eagles currently breed in all of Maine's 16 counties. More than 60 percent of the population still resides and overwinters in Maine (Todd 2004). In 2013, there were about 620 nesting pairs in Maine and the population is increasing approximately 8 percent annually. In addition to nesting birds, thousands of bald eagles migrate through the state. Thousands of non-breeding eagles reside in the state year-round.

In all seasons, bald eagles usually associate with seacoasts, rivers, or lakes, although they may also be found congregated at some inland settings near food sources (especially carrion in winter). Proximity to open water with adequate prey, mature trees in shoreland zones, and limited human activity are fundamental habitat requirements for breeding eagles. Coastlines and major rivers that remain ice-free are Maine's primary winter habitats, thus winter distribution is skewed toward the coast. Adults are

usually sedentary and shift locally only to acquire food (Todd 1979). Eagle numbers in Maine probably peak in spring and summer when all adults and most subadults native to the state are in residence. In addition, there is an influx of southern eagles from Florida (Broley 1947) which disperse northward along the Atlantic seaboard as far north as the Canadian Maritime provinces. Eagle numbers begin to decline in late summer as eagles from southern states depart from Maine. Peak fall migration occurs from mid-September through early October. Migrant eagles continue to diminish in late October and November (coinciding with the beginning of trapping season) as some resident birds move south and winter in southern New England or in the Mid-Atlantic States. It is difficult to predict the number of eagles that over-winter in Maine from year-to-year as numbers vary with the severity of ice cover and winter conditions. Severe winter conditions could limit food availability and, in turn, the birds' winter range. Fish are preferred eagle foods over most of their range in Maine and North America, but regularly eat carrion (scavenging) and will consume, for example, dead deer, livestock, and seal pups. Most wintering eagles subsist in part by scavenging, and can be attracted to uncovered bait in traps.

The MDIFW discussed take of bald eagles in the ITP (section 2.2.3). The MDIFW is not seeking a permit for take of bald eagles because it found that the risk of take is low (ITP section 1.5). No bald eagles have been captured in a legal trap since the MDIFW restricted the use of visible bait in 2007. Although the possibility of incidental take of a bald eagle is low, the effects of the proposed action and alternatives will be evaluated in this DEA.

4.2.9 Golden eagle

The golden eagle (*Aquilla chrysaetos*) is protected under the BGEPA and MBTA and is an endangered species under the Maine Endangered Species Act. Golden eagle populations have declined in the East throughout the last century, and were extirpated 20 to 40 years ago in other eastern states. Golden eagles have always been rare in Maine. Only 10 nesting territories have been documented in Maine historically, but at least 18 other localities are suspected (Todd 2000). The last known nesting pair lingered in Maine until 1999, and then disappeared from an eyrie (a large nest) that had probably been occupied by successive generations of eagles for hundreds of years. In recent years, sporadic observations of golden eagles have been documented during the nesting season, raising hope that individuals from Canada may reoccupy former eyries. Populations in eastern Canada are poorly documented, yet likely number 200 or more pairs. There are approximately 10 territories in the Gaspe region of Quebec, immediately adjacent to Maine, and these birds migrate through and sometimes winter in Maine (Katzner et al. 2012). Counts of migrating golden eagles at hawk watch sites in the East indicate that the eastern population is slowly increasing.

In Maine, golden eagles have typically associated with mountainous areas in the western and northwestern portions of the state. Golden eagles are most numerous in Maine during September through November and March and April when birds migrate through the state. Wintering areas are from Maine and the Maritime Provinces to the southeastern states, depending on the availability of food. In Maine, food remains at the nest have consisted entirely of wading birds (bitterns and herons). Normal diets elsewhere include ground squirrels, marmots, ptarmigan, and seabirds (at coastal eyries).

Marginal habitat conditions (lack of food, open space for hunting prey) limit golden eagles in the East. Historically, shooting, trapping, and poisoning reduced golden eagle numbers. Five dead golden eagles have been recovered in Maine since 1985: two died of natural causes, one was trapped, one was shot, and another was killed on a logging road (Todd 2000).

The MDIFW discusses take of golden eagles in the ITP (section 2.2.3). The MDIFW is not seeking a permit for take of golden eagles because they believe the risk of take is low (ITP section 1.5). No golden eagles have been captured in a legal trap since MDIFW restricted the use of visible bait in 2007.

Although the possibility of incidental take of a golden eagle is very low, the effects of the proposed action and alternatives will be evaluated in this DEA.

4.2.10 Northern long-eared bat

The northern long-eared bat (*Myotis septentrionalis*) is proposed for Federal listing as endangered (FR 78(191):61046-61080). The status of the northern long-eared bat is not well known in Maine, but they were in recent years considered a common species in Maine and likely occurred statewide. Their populations have declined by over 90 percent in recent years because of a fungal infection known as white-nosed syndrome.

Northern long-eared bats are not incidentally trapped in Maine. Rather, the species is considered in this DEA because the mitigation project will result in 4,785 acres of forest management that may affect bat roost trees and foraging habitat. Alternatives 1 and 2 would likely have no effect on the bat because there is no mitigation. Alternatives 3 (proposed action) and 4 have potential to affect the bat.

The MDIFW and MDDPL will develop a forest management plan within 3 years of permit issuance that provides the specific details on forestry prescriptions, harvest locations, and timeframes that will be implemented. The Service will review and approve the forest management plan so as to ensure that appropriate conservation measures are incorporated to avoid adverse effects to the northern long-eared bat. If, for some reason, adverse effects cannot be avoided, the ITP and incidental take permit will need to be amended to address impacts to northern long-eared bats from the mitigation project. Such an amendment would likely be a major amendment requiring re-initiation of the ESA section 7 consultation and additional NEPA analysis.

We conclude that there will not be effects to northern long-eared bat from trapping and that the mitigation project will be implemented in a manner that avoids adverse effects. Therefore, effects to northern long-eared bats from the proposed action and the alternatives will not be further evaluated in this DEA.

4.3 Other Wildlife

Maine's wildlife is reviewed in the revised ITP (section 2.1), which is included here by reference. The Maine Comprehensive Wildlife Strategy (2005) further addresses the full array of wildlife and their habitats in Maine including vertebrates and invertebrates in aquatic (e.g., freshwater, estuarine, and marine) and terrestrial habitats.

Susceptibility of non-target species to incidental trapping is influenced by their geographic distribution, abundance, seasonal movements, life history, diet, and habitats shared with the target species (Shivik and Gruver 2002). Selectivity of traps is determined by trapper experience, type of trap, trap modifications, manner in which the trap is set, its location (Novak 1987, Powell and Proulx. 2003), selectivity of the device (e.g., use of pan tension device; Turkowski et al. 1984), trap size (Newsome et al. 1983), proportion of animals that are restrained by the trap without escape (Shivik and Gruver 2002), and type of bait used (Novak 1987). Some non-target species die in traps, some are released with no injuries, some are released with minor injuries, and some are released with major injuries. Non-target species, particularly those smaller than the target species, can be severely injured in foothold traps (Onderka et al. 1990, Powell and Proulx 2003, Iossa et al. 2007, American Veterinary Medical Association 2008), and those released alive may have impaired survival (Chapman et al. 1978). Large carnivores can be caught in traps intended for small carnivores, and if the trap is not well anchored, the larger animal may escape with a small trap on its paw.

Several North American studies document the high frequency of capture of non-furbearer species[18] in foothold traps (Beasom 1974, Berchielli and Tullar 1980, Litvaitis 1984, Novak 1987, Barrett et al. 1989, Onderka et al. 1990, Proulx and Barrett 1993, Naylor and Novak 1994, Iossa et al. 2007). Rates of incidental trapping of non-furbearer species in foothold traps ranged from 0.12 per furbearer (Berchielli and Tullar 1980) to 2.0 per furbearer (Reynolds 1953, 1955 and de Vos et al. 1959 as reported in Novak 1987; note that trapping equipment, methods, and regulations in effect 50 years ago are much different than today). In Maine, Litvaitis et al. (1983) incidentally caught 0.81 non-furbearing species per furbearer (Litvaitis, 1984, Novak 1987). BMP studies of foothold trap effectiveness for fox and coyote in Maine, New York, and Pennsylvania documented 20 percent of animals trapper were non-furbearing animals such as birds, dogs, and cats (IAFWA 2000). Skinner and Todd (1990) documented 0.42 non-furbearers taken per furbearer caught including porcupines, snowshoe hares, birds, deer, and domestic dogs and cats. Additionally, several studies document take of non-furbearer species in killer-type traps (Novak 1987, Barrett et al. 1989, Proulx and Barrett 1993, Naylor and Novak 1994). Incidental trapping of non-furbearer species in upland use of conibear traps ranged from 0.68 per furbearer (Barrett et al. 1989), to 0.74 per furbearer (Naylor and Novak 1994). To approximate whether this is an issue that needs further evaluation, we applied low (12 percent, Berchielli and Tullar 1980) and high (81 percent Litvaitis et al. 1983) rates of incidental trapping of non-furbearer species to Maine's furbearer harvest in the lynx WMDs (1 to11, 14, 18, and 19) (a mean of 9,858 animals annually). Mean values were calculated using pelt-tagging records from the 2006/2007 to 2011/2012 trapping seasons (ITP p. 45). Potentially, 1,182 to 7,984 non-furbearing animals could be incidentally trapped annually.

Migratory birds and mammals have the greatest potential to be affected by the proposed action, alternatives, and associated mitigation. These groups of wildlife are briefly described below. Because of the large number of species of resident wildlife, we chose species that represent a guild or group of animals to evaluate the effects on the human environment. We chose gray jays (*Perisoreus canadensis*) to represent migratory birds and northern flying squirrel (*Glaucomys sabrinus*) and snowshoe hare (*Lepus americanus*) to represent resident mammals.

4.3.1 Migratory birds

Approximately 292 species of migratory birds reside in or migrate through Maine, 103 of which have been identified by the Maine Comprehensive Wildlife Strategy as species of greatest conservation need (2005). The MBTA protects these species from take (section 1.2.4). The Service has no explicit regulatory mechanism to authorize the incidental take of migratory birds.

The majority of migratory bird species migrate out of Maine by the time trapping season occurs (mid-October to December). About 60 species of birds typically reside in Maine for the winter (e.g., chickadees, crows, ravens, jays, herring and ring-billed gulls, woodpeckers, turkeys, ruffed grouse, mourning dove, several owl species) or migrate to Maine to winter (e.g., redpolls, pine siskins, evening and pine grosbeaks, hawk and snowy owls, several species of sea ducks) (http://www.mainebirding.net/news/cbc last accessed April 15, 2014).

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[18] For many research studies, trap selectivity is frequently presented as the ratio of the number of trapped non-target species to trapped target species (Linhart and Linscombe 1987, Shivik and Gruver 2002). However, in other studies and all BMP trap studies, trap selectivity is presented as the ratio of the number of trapped non-target species to all legally harvested furbearer species (not just the target furbearer species). Legally harvested furbearer species vary by state and province. Many of the studies cited in this section include the red squirrel as a furbearer. In Maine (but not NH, VT, CT, MA) the red squirrel is considered a furbearer. Inclusion or exclusion of red squirrels can change the ratios significantly. Where possible in this EA, the ratio of non-furbearing animals/legally harvested furbearers (including red squirrels) is presented.

The scientific literature regarding incidental trapping of non-furbearer species in Maine and boreal environments indicates that the birds expected to be caught in traps in upland settings in Maine would likely include gray jays, blue jays, ravens, and crows, and less frequently owls, and hawks (Litvaitis et al. 1983, Stocek and Cartwright 1985, Novak 1987, Barrett et al. 1989, Proulx et al. 1989, Mowat et al. 1994, Naylor and Novak 1994). Bald and golden eagles have been caught infrequently in Maine (see discussion below). With the exception of bald and golden eagles and goshawk (*Accipiter gentilis*), the wildlife species most likely to be incidentally trapped have robust populations and are not represented on Maine's special concern and threatened and endangered species lists. The upland species most likely to be incidentally trapped in Maine (e.g., gray and blue jays, crows, ravens, hawks, owls) are not species at risk.

The MDIFW has limited information on the number of birds incidentally taken by fur trappers in traps[19]. An August 9, 2013, memorandum provided to the Service by the MDIFW describes the current information on both the potential for trapping related take of birds as well as efforts the agency is implementing to address this issue (appendix 2). The memo explains why the data collected through several different efforts demonstrates that the take of migratory birds from furbearer trapping in Maine is very low and would have negligible impact on migratory bird populations. To respond to potential issues with take of avian species, in 2007 the MDIFW implemented regulatory changes that require bait to be covered with vegetation so the bait cannot be seen from above when used in furbearer trapping activities. This regulation will continue to be implemented in the revised ITP and has minimized the incidental capture of all birds. For example, no eagles are known to have been taken in legally set traps in Maine since the covered bait regulations have been in place. In addition, spring muskrat trapping regulations reduce risk to waterfowl and bald eagles by requiring that killer-type traps be set underwater or foothold traps on floats covered with hardware cloth (to prevent access by birds)(J. DePue, MDIFW, pers. comm.).

For the purposes of our analysis in this DEA, we examine the effects of trapping on gray jays. Although this is not the only species incidentally trapped, it likely represents the most frequently trapped non-furbearer species in boreal environments (e.g., Novak 1987, Barrett et al. 1989, Naylor and Novak 1994) and represents a likely "worse-case scenario" for a migratory bird species.

In addition to the potential for trap related impacts to migratory birds, trapping activities can have additional effects. For example, in the process of trapping, trappers may disturb migratory birds (e.g., vehicle use on forest roads, snow mobiles use, walking through the woods, etc.). These effects are anticipated to be temporary in duration (i.e., the animal will recover from the disturbance as soon as the vehicle or person has passed) and small in scale and therefore will not affect the survival or reproduction of these species. Trapping may also affect migratory birds by removing predators and competing species. This in turn could increase the survival or reproduction of some migratory birds. However, these effects are expected to be temporary (i.e., a few months) and minor because furbearing mammals are abundant and new individuals will replace those that are trapped. Trapping may also affect migratory birds by removing potential prey species. For example, trapping that targets muskrats in a locality could reduce that species as a prey item for large raptors (e.g., eagles). However, this effect is likely only temporary (i.e., a few months) and raptors are expected to find other prey items such that we do not anticipate effects to their survival or reproduction. Because most of the ancillary effects of trapping on migratory birds are

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[19] Maine's hunting and trapping rules specify than any animal found in a trap must be removed. If it is alive, it may be released or humanely dispatched. If the animal is caught at a time when trapping is not allowed for that species, the animal must immediately be released alive. If the animal is found dead in the trap, the incident must be reported to a game warden as soon as possible and the animal turned into the MDIFW (http://www.eregulations.com/maine/hunting/trapping-rules/ last accessed July 22, 2014). Maine trapping laws MRSA title 12 §10108 require that PM trappers must report non-target species taken, but none have been reported. The MDIFW has indicated that it does not keep records of non-target species caught in traps by fur trappers.

of temporary duration, small in scale, and minor in terms of overall impact, our subsequent DEA analysis for migratory birds largely focuses on the effects of trap related impacts on migratory bird populations.

Mitigation described in the ITP (i.e., maintaining and enhancing 4,785 acres of early successional habitat) will affect migratory bird species in the MDPPL Seboomook Unit. For example, birds that require mature forest (e.g., blackburnian, bay-breasted and Canada warblers, ovenbird, hermit thrush, pileated woodpeckers) will be replaced by bird species that require young forest (e.g., chestnut-sided warblers, mourning warbler, white-throated sparrows, American kestrels, and woodcock). These changes would be temporary as a natural succession of plants and animals occurs as the mitigation areas mature. We examine these broad effects of mitigation in the Environmental Consequences section of this DEA.

4.3.1.1 Gray jay

Gray jays consume a wide variety of carrion, are attracted to human-related sources of food, spend over 95 percent of the day caching food, and thus are particularly vulnerable to traps baited with exposed meat (Strickland and Ouellet 1993). Gray jays are monogamous, remain on their territory year-round, first breed at 2 years of age, and have low reproductive rates (Ha and Lehner 1990, Ibarzabal and Desrochers 2004). Literature on population-level effects of trapping on gray jay populations is limited. In one experimental study in Ontario, gray jays were subjected to “10-times normal trapping pressure,” which did reduce the local population (deVos et al. 1959 cited in Strickland and Ouellet 1993). In the first fall and winter of the study, 292 gray jays were killed in traps (nearly all of the birds estimated to occupy the study area). This study does not represent the amount of incidental take of gray jays that would be expected under normal trapping pressure. There are reports of gray jays taken in traps in northern Maine; prior to visible bait restrictions, 19 gray jays were reported taken in 1 day by one trapper in the 1980s though it is unclear if these traps were set legally (R. Joseph, Service, pers. comm., November, 2009, Stocek 1985, Novak 1987, Barrett et al. 1989, Proulx and Barrett 1993, Mowat et al. 1994). Because visibility of bait is now restricted in Maine, we expect the take of grey jays to be lower than has been previously reported. We believe that bait used in conjunction with exclusion boxes (i.e., for killer-type traps set on the ground) likely successfully deters gray jays. There is no indication that incidental trapping has a serious impact on gray jay populations even at a local level (Novak 1987).

4.3.2 Mammals

Maine has 61 mammal species not associated with the marine environment. Most species (except for migratory bats) are resident in the state year-round. Six of these species (wolf, Canada lynx, Penobscot meadow vole, northern bog lemming, New England cottontail, and eastern small-footed bat) have been identified in the Maine Comprehensive Wildlife Strategy as species of greatest conservation need (2005). The MDIFW is considering state-listing several bat species because of dramatic population declines caused by white-nosed syndrome (C. Todd, MDIFW, pers. comm. April 9, 2014).

Maine law requires that any non-furbearing animal caught in a trap be removed. If the animal is alive it may either be released or humanely dispatched. Trappers are not allowed to keep trapped non-target animals unless the trapper has a license to possess captive wildlife. If the animal is found dead in the trap, trappers must report the incident to a game warden as soon as possible and turn the animal over to the MDIFW.

As previously noted, the MDIFW does not keep information on incidental capture of non-furbearer species and the number and species composition of non-furbearer species caught in Maine traps is unknown. There have been no summaries prepared of incidental take of non-furbearing animals in Maine (W. Jakubas, MDIFW, 7/2/09 pers. comm.). According to the MDIFW, no information is available on

the proportion of non-furbearer animals neither released alive, released injured, or dead in traps, nor is there information documenting the effects of trapping on non-target wildlife populations.

We further examine the effects of trapping and mitigation on the snowshoe hare because it is the primary food of the Canada lynx and occasionally incidentally trapped. We also examine the effects on the northern flying squirrel because they are the most frequently trapped non-furbearer species in boreal environments (Novak 1987, Barrett et al. 1989, Naylor and Novak 1994).

Mitigation described in the ITP (i.e., maintaining and enhancing 4,785 acres of early successional habitat) will affect the species composition of plants and wildlife on, and adjacent to, the mitigation lands. For example, plants and wildlife that require mature forest (e.g., deer wintering habitat, American marten) will be replaced by species that require young forest (e.g., moose, snowshoe hare). These changes will be continuous as a natural succession of plants and animals occurs as the mitigation areas mature over 60 to 80 years. Large patches of early successional habitat may affect local mammal movement patterns and corridors and affect the distribution and abundance of species that are sensitive to changes at the landscape scale (e.g., fisher, marten). We examine these broad effects of the mitigation in the Environmental Consequences section of this DEA.

4.3.2.1 Snowshoe hare

The snowshoe hare is one of the most abundant land mammals in Maine and is distributed throughout the state wherever appropriate habitat exists. Although it is found in all forest types, it reaches its highest density (average 2.0 hares per 2.5 acres, Scott (2009)) in dense, regenerating softwood stands. Populations cycle about every 10 years in Canada and Alaska, and hares likely have dampened cycles or fluctuations in Maine (Hodges 2000, Scott 2009). Between 2006 and 2012, snowshoe hare populations in Maine and southern Quebec declined to 50 percent of their former abundance (Scott 2009). In boreal ecosystems, lynx populations (and other predators) cycle in tandem with snowshoe hare. Snowshoe hares are a primary prey species for many predators in Maine including Canada lynx, bobcat, eastern coyotes, fox, fisher, American marten, weasels, great-horned owls, red-tailed hawks, and other large raptors.

Snowshoe hares are a hunted species in Maine with liberal seasons (October through March) and daily limits of four animals per day. Approximately 250,000 are believed to be killed by hunters each year in Maine, although there have been no hunter surveys to determine harvest since the early 1980s (Jakubas and Cross 2002). The MDIFW estimated statewide populations to be approximately 8.5 million animals in the mid-1980s, the last time such estimates were made (Jakubas and Cross 2002). Over the last two decades, the amount of high quality habitat for snowshoe hare has increased significantly (Vashon et al. 2012).

4.3.2.2 Northern flying squirrel

Northern flying squirrel populations seem to be secure in Maine and elsewhere in the northern part of their range. There are only six records of southern flying squirrels in Maine, all in southern and coastal Maine outside of the range of the Canada lynx (O'Connell et al. 2001). Flying squirrels have demographic characteristics that contribute to their rarity – delayed age to first breeding; low reproductive rates for a small mammal; small, single litters annually; females are prone to reproductive failure or delay; often distributed in small, isolated populations; and high annual variability in population size (Smith and Person 2007, Weigl 2007). A large portion of their diet is fungi and staminate cones of spruce and fir, but they readily consume carrion, and are vulnerable to traps baited with meat (Novak 1987, Naylor and Novak 1994).

4.4 Vegetation and habitat

There are approximately 1,432 native and 643 introduced species of vascular plants in Maine. The State's vascular plants include both typically Appalachian representatives at the northern edge of their range and typically boreal representatives at the southern limit of their range (Gawler et al. 1996). About seventeen percent of Maine's native flora (254 species) are considered rare, threatened, or endangered (Gawler et al. 1996).

Trapping effects on vegetation and habitat are minimal. As described in section 2.3.1.2, trappers collectively may disturb up to 6 acres of land annually in Maine, but the nature of soil disturbance (typically 8 inches^2) has insignificant effects of plants. Trappers may manipulate live vegetation by pruning or cutting vegetation to use as bait (for beavers) or to cover bait (for exposed bait for killer-type traps). Non-lethal cable restraints would affect vegetation most because all woody vegetation ½ inch or larger in diameter within reach of the restrained animal (diameter of the cable and loop) would be impacted. If 30 percent of Maine's 2,450 trappers eventually deploy cable restraints, and each trapper deploys 20 cable restraints, and woody vegetation is cleared in a 7-foot radius for each trap (154 feet^2), then 51 acres (0.08 mile^2) would be cleared annually. This is insignificant in a state that is 35,385 square miles. The effects of trapping on vegetation and habitat will not be evaluated further in this DEA.

Mitigation on the MDPPL Seboomook Unit may affect up to 4,785 acres of forested habitat. The nature of this habitat is described in the ITP (section 5.3) and is predominantly northern hardwood (e.g., aspen, beech, red maple) and conifer (e.g., red spruce and balsam fir). Detailed information is available in the Seboomook Unit management plan (Eickenberg et al. 2007) though a complete compartment examination (i.e., forest inventory) has not been conducted. We evaluate the effects of mitigation on vegetation and habitat for the proposed action and alternatives.

4.5 Outdoor recreation and socioeconomics

Outdoor recreation is central to Maine's economy. Maine ranks eleventh nationally when comparing the percentage of residents who participate in hunting, fishing, trapping, and wildlife related outdoor recreation (U. S. Department of the Interior, U. S. Fish and Wildlife Service 2011). Although trapping is not specifically addressed, the surveys portray trends in wildlife-associated recreational activities. Of the total number of participants, 413,000 state residents and nonresidents 16 years old and older fished or hunted and 838,000 participated in wildlife watching activities, which include observing, feeding, and photographing wildlife. Many individuals engaged in more than one wildlife-related activity. Annual expenditures for wildlife-related recreation totaled $1.4 billion.

Declining trends in Maine hunting and fishing participation and increasing trends in non-consumptive wildlife watching activities mirror national trends. Declining consumptive wildlife use is reflected in declining hunting and fishing license sales.

The effects of the proposed action, alternatives, and mitigation occur in northern Maine. This area of the state is remote, has fewer amenities, and attracts far fewer visitors, but is an extremely important and unique area for outdoor recreation. The North Maine Woods is a gated area of 3.5 million acres jointly managed on behalf of 23 timber companies, which roughly equates with the core Canada lynx habitat and contains the MDPPL Seboomook Unit mitigation area. Gate registration (May through November) is about 100,000 visitors annually, which has been declining. Approximately 50 percent of visitors participate in hunting and trapping. Tens of thousands of additional visitors used the region during the winter snowmobile season.

Baxter State Park is the largest recreational site in northern Maine and attracts about 60,000 visitors annually. There is no trapping and limited hunting in this 200,000-acre preserve.

The proposed mitigation is unlikely to affect outdoor recreation in the MDPPL Seboomook Unit. The Seboomook Unit is within a vast area of industrial forest and has a legacy of previous forest practices – extensive young forest created by clearcutting and high density of logging roads. Some recreational users (e.g., moose watchers and hunters) prefer this type of forest because of the abundance and diversity of wildlife that it supports. Recreational use includes camping, canoeing, hiking, snowmobiling, hunting, and trapping. However, many visitors (except hunters and trappers) are unlikely to drive small, secondary logging roads and encounter the forest management treatments implemented for the mitigation. Additionally, people that recreate on Maine's public lands are used to seeing forest operations on these lands. Recreational uses of the Seboomook Unit are a small fraction of recreational activity in northern Maine. Therefore, we anticipate that mitigation activities will have negligible effects on outdoor recreation activity in the State.

The proposed action, alternatives, and mitigation are unlikely to affect hunting, fishing, camping, snowmobiling, canoeing, or other outdoor recreation in northern Maine. Therefore, our analysis will focus on how the proposed action, alternatives, and mitigation affect trapping activities in northern Maine.

Trapping in Maine

Participation in trapping has diminished throughout the United States in recent years (Southwick 1993, Armstrong and Rossi 2000, AFWA 2005, 2007). Reasons for this decline include the loss of habitat, changing demographics and public interests, declines in pelt prices, loss of access, and increasing political pressure from the animal rights movement. The estimated number of trappers in the United States was 142,287 in 2003 to 2004, down from 158,752 in 1989 to 1990 (AFWA 2005) and 300,000 in 1987 (IAFWA Fur Resources Committee 1993). The AFWA (2005) report also documented that trappers were older and had higher average household incomes in 2004 than in 1992. Trappers in 2004 averaged fewer days trapping and used fewer traps than they did in 1992. Trapping related expenditures were lower in 2004 than in 1992.

Participation in trapping in Maine mirrors national trends. Maine trapping license sales were below 1,700 from 1955 to the mid-1970s, when increasing values of upland furbearer pelts apparently caused an increase in the number of trappers. The number of trapping licenses sold rose from 3,345 in 1976 to a peak of 5,612 in 1980. Since then, sale of trapping licenses has declined reflecting demographic and societal trends and outdoor recreation trends summarized above. Annually, an average of 2,616 individuals acquired Maine trapping licenses (1999 to 2005 trapping seasons), which generates over $100,000 annually to support the MDIFW. The MDIFW anticipates that participation in trapping will continue to decline in the future.

Trapping provides both recreation and a supplemental source of income (Zwick et al. 2002) from the sale of pelts and other wildlife products. The average annual income from trapping-related activities for trappers in the Northeast in 2004 was $1,587 (AFWA 2005). However, according to one study, financial gain is often not the primary motivation for trapping. The challenge of trapping animals, escape and relaxation, appreciation of nature, personal achievement, health and fitness, and affiliation with others are greater motivators (Siemer et al. 1994).

Total annual household income derived from trapping in 2004 averaged $1,587 for Northeast trappers, and average trapping-related expenditures of Northeast trappers were $924 (AFWA 2005). On average, Northeast trappers earn about $600. Armstrong and Rossi (2000) classified "avocational" trappers

(trapping for recreation) into two groups; those who will trap regardless of fur prices and those whose participation is dictated by the fur market. About 78 percent of Northeast trappers said that trapping was "not at all important" as a source of income (AFWA 2005). However, to many trappers selling fur is an important source of income and is an important part of the trapping experience.

A socio-cultural study of trapping in the northeastern states included Maine (Daigle et al. 1998). The authors found participants in trapping are predominantly white (98 percent), males (98 percent), with a mean average age of 45. About 69 percent reported gross annual household incomes between $10,000-50,000 (early 1990s dollars). Forty percent of Maine trappers belonged to other sportsmen's organizations. The study found that participation in trapping, similar to hunting and fishing, is motivated by many needs including tradition, outdoor recreation, and economic gain. Trapping takes place in a round of seasonal activities that often includes hunting, fishing, gathering wild edible plants, cutting firewood, and planting a vegetable garden.

Trapping, especially the use of foothold traps has come under increased scrutiny by the public (Novak 1987, Andelt et al. 1999). The foothold trap was banned in Great Britain in 1958 and is now banned in at least 80 countries (Nocturnal Wildlife Research 2008). Ballot or legislative initiatives to ban or limit trapping have passed in eight states (Fox and Papouchis 2004). A survey of wildlife professionals documented 46 percent believed the foothold trap should be outlawed (Muth et al. 2006). Public opposition to foothold traps has been consistently high – 78 percent opposed foothold traps in a 1978 survey (Kellert 1979) and 74 percent opposed in 1996 (Fox and Papouchis 2004). Although trapping will likely remain vulnerable to legislative attacks (Minnis 1998), wildlife professionals are optimistic that animals-rights and anti-trapping issues can be resolved (Novak 1987, Todd and Boggess 1987).

As a result of these challenges, trapping has become an increasingly regulated activity with regulations relating to training of trappers, trap size, trap placement, tending times, use of bait, bag limits and a number of different topics incorporated into state furbearer programs (IAFWA 1995). Batchelder et al. (2000) believed that that trappers need to adapt to meet societal needs if trapping is to continue. Novak (1987) also proposed that the future of trapping is dependent on substantial and swift change by trappers and wildlife management agencies to adapt to changing sociocultural conditions.

State agencies manage furbearer populations for the benefit of a public with diverse opinions. Wildlife managers balance diverse objectives including preserving sustainable populations of furbearing animals. Trapping is an important source of income and recreation and an important component of Maine's wildlife tradition. Like other states in the Northeast, the MDIFW conducts various trapping programs for furbearing species recognizing the biological, ecological, economic, aesthetic and subsistence values of furbearer species (Northeast Furbearer Technical Committee, http://www.conservewildlife.org last accessed May 5, 2014). Trapping, in part, is conducted to manage furbearer populations and can be an effective means of controlling local wildlife problems (Northeast Furbearer Technical Committee, http://www.conservewildlife.org last accessed May 5, 2014, Armstrong and Rossi 2000). Most state wildlife agencies, including the MDIFW, routinely refer nuisance furbearer complaints to licensed trappers as this is often the most cost-effective way for agencies to address wildlife damage and nuisance problems. Animal damage control complaints increase when trapping is banned or discontinued in an area (Loker et al. 1999, DeStefano and DeGraaf 2003). Trapping is also an important management tool for capturing furbearers for research purposes and removing predators to enhance the recovery of listed species (Northeast Furbearer Technical Committee, http://www.conservewildlife.org last accessed May 5, 2014). The level and intensity of "avocational or recreational" fur trapping today is declining and may not be as effective as it once was to regulate or manage furbearer populations across broad geographic areas (Scott 1977, Armstrong and Rossi 2000).

We further evaluate the effects of the proposed action, alternatives, and associated mitigation on recreational opportunity and economics for trappers in chapter 5.

5. Environmental Consequences

Environmental consequences provide a reasoned analysis of the known and predicted effects of the alternatives considered on ecological, aesthetic, historical, cultural, economic, or social resources. Consistent with the CEQ's 2012 guidance, this DEA focuses on the most relevant environmental issues related to the proposed action and does not provide detailed analysis or discussion on other environmental impacts:

- Threatened and endangered species – focus will be on Canada lynx, bald and golden eagles
- Other wildlife – focus will be on trapped wildlife, representative non-target species
- Outdoor recreation and socioeconomic – focus will be on trapping and trappers
- Vegetation and habitat – focus will be on the Seboomook Unit mitigation area.

We analyze the environmental consequences for the proposed action (alternative 3) and three other alternatives on each of these resources. Cumulative effects are analyzed in section 5.6.

5.1 Alternative 1 (No Action – Trapping Programs as Currently Managed)

Under this alternative, the MDIFW would continue the statewide trapping programs and the requirements of the 2007 Consent Decree remain in place. This alternative represents the existing baseline conditions that incorporate the programs according to how MDIFW is currently implementing them. Our discussion of alternative 1 is the longest, because it presents the baseline information from which the other three alternatives are analyzed.[20]

5.1.1 Threatened and endangered species

5.1.1.1 Canada lynx

The MDIFW provides a description of the current and historical incidental trapping incidences and the associated impacts on lynx (ITP section 4.1). From 1999 to 2013, 84 lynx were incidentally trapped (77 by fur trappers, seven by PM trappers, none by ADC trappers; ITP tables 4.1.3, 4.1.4, also see footnote 4). The ITP also describes the rate of injuries and fatalities associated with these captures. The MDIFW provides data from a 12-year telemetry and monitoring study that shows that most lynx caught in foothold traps survived and produce offspring. No lynx have been reported captured or killed in legally set killer-type traps. The MDIFW examined 32 lynx caught in foothold traps by fur and PM trappers from 1999 to 2012, and determined that 19 percent had no visible injuries, 75 percent had mild injuries, and 6 percent had moderately severe to severe injuries (ITP table 4.2.2).

For alternative 1, we assume this same rate of capture and injury will continue because there are no changes to the current program. The MDIFW anticipates that the annual number of lynx reported as

[20] We introduce a number of elements of the MDIFW's revised ITP into the discussion of alternative 1 to provide a robust comparison of issues and effects, though it is important to understand that the ITP measures will only be implemented under alternatives 3 and 4 (for aspects affecting the fur trapping program).

trapped in the combined fur/PM/ADC trapping programs will be 11, for an anticipated total of 165 over the next 15 years.[21] Applying the MDIFW's calculations of injury rates (ITP table 4.2.1), of these:

- Up to 31 incidentally trapped lynx are expected to have no visible injuries;
- Up to 124 lynx are expected to have minor injuries that will not affect their subsequent survival; and
- Up to 10 lynx may experience moderately severe to severe injuries.

We assume that some proportion of the lynx that have moderately severe to severe injuries may die from their injuries. For the ITP incidental take request, the MDIFW is requesting coverage for up to three fatalities. Therefore, we will assume that is the number that could also be anticipated in this alternative.

Effects of incidental take to lynx in Maine

The MDIFW presents data from a population model that shows that three lynx mortalities over 15 years will have little effect on Maine's lynx population (ITP pp. 72-73, appendix 7). We agree that the anticipated level of lethal take is anticipated to have negligible effects on the lynx population. An alternative way to analyze population impacts is to consider furbearer harvest rates. This may seem counterintuitive given that there is no harvesting of lynx in the Maine. But lynx are hunted and trapped as a furbearing animal throughout most of their range (Bailey et al. 1986, Poole 2003). We use those harvest numbers as a backdrop against which to compare loss of individuals and sustainable populations. The amount of anticipated lethal take (i.e., three lynx over the 15-year permit period or less than 0.03 percent of the current lynx population annually) is within the harvestable surplus[22] of lynx produced in Maine and would not have significant effects to the Maine population. Lynx harvest rates from areas where lynx may be legally trapped or hunted vary considerably, depending on the status of the snowshoe hare cycle (see below). Taking into account this variability, the MDIFW estimated that on average over 10,000 lynx are harvested for their fur each year in Canada and Alaska and this harvest does not threaten lynx populations.

It is generally assumed by furbearer biologists that a harvest rate of 20 percent is sustainable for bobcat populations (Knick 1990), but that variability in environmental factors may confound this (Anderson and Lovallo 2003). The New Mexico bobcat harvest quota is no more than 10 percent of the estimated population (http://www.nocrueltrapsonpubliclands.info/documents last accessed on May 5, 2014). In Canada, lynx and bobcats are considered to be moderately resilient to trapping harvest depending on prey abundance (Banci and Proulx 1999); bobcats tolerate harvest up to 20 percent (Knick 1990) and lynx up to 40 percent (Bailey et al. 1986, Quinn and Thompson 1987). For example, in Ontario during a period of high hare productivity a lynx population increased despite a high annual trapping mortality of 40 percent

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[21] While fourteen lynx were reported trapped in 2013, the MDIFW believes that the annual estimate of eleven capture events is still accurate as a long-term average and that lynx captures may be higher or lower in any given year. Therefore, for the purpose of our DEA analysis we analyze the incidental take data presented in MDIFW's revised ITP.

[22] Harvestable surplus is a term used in wildlife management to indicate the number of animals that can be harvested from a population without affecting long term stability of average population size. The harvestable surplus is considered compensatory mortality, where the harvest deaths are substituted for deaths that would occur naturally. Additive mortality is harvest in addition to all the animals that would have died naturally. Some authors (e.g., Brand and Keith 1979) believe that lynx trapping was additive to natural mortality, especially at low points in the hare cycle.

(Quinn and Thompson 1987). Harvest greater than 20 percent of a Eurasian lynx population in Norway was believed to be unsustainable (Linnell et al. 2010).

The amount of sustainable trapping harvest of lynx populations varies throughout the hare cycle (Banci and Proulx 1999). Natural mortality of a lynx population may be 5 to10 percent during years of increasing or high hare abundance to 60 to70 percent during years of low hare abundance (Brand and Keith 1979, Ward and Krebs 1985, Koehler 1990, Poole 1994, Slough and Mowat 1996). Thus, mortality from lynx trapping during the 2 to 3 winters after a snowshoe hare decline may be at least partially compensatory (lynx that would have otherwise died of other sources of mortality)(Poole 1994, Slough and Mowat 1996). However, Brand and Keith (1979) and Koehler and Aubrey (1994) concluded that, because most natural mortality occurs during the summer months prior to fall/winter trapping season, trapping mortality could be additive (i.e., in addition to other sources of natural mortality).

Creel and Rotella (2010) cautioned against the assumption that human-caused sources of mortality will be offset by a decline in natural mortality (i.e., compensatory mortality). At the low point of a hare cycle-fluctuation, trapping mortality could cause lynx populations to decline at a faster rate than would have occurred without trapping (Slough and Mowat 1996). Lynx may also be more vulnerable to trapping during periods of low or declining hare density. When prey is scare and lynx densities are decreasing, lynx may increase their movements to search for food and/or become more attracted to bait than at high hare densities (Brand and Keith 1979). In the Northwest and Yukon Territories, untrapped lynx populations had annual mortality rates of 8 to11 percent and 0 to 22 percent, during hare population peaks, and mortality rates of 63 percent to 75 percent and 0 to 60 percent during hare lows, respectively (Poole 1994, Slough and Mowat 1996).

Lynx populations in Maine are currently high, and except for a recent period of hare decline, the population has exhibited relatively high reproduction, survival, and recruitment rates (Vashon et al. 2012). Thus, the population can likely withstand higher rates of trapping-related mortality at this time. Furthermore, there may be relatively high interchange (immigration and emigration) between Maine and the Gaspe region of Quebec, which currently is in a period of liberal lynx harvesting regulations. However, if the carrying capacity of Maine's habitat declines by 50 to 60 percent over the next 20 years as do lynx population (Simons 2009) or the population declines throughout the region, then the margin of allowable trapping-related mortality may be less. The proportion of lynx that survive the years of hare scarcity determines the speed and magnitude of population recovery once hare numbers rebound and kitten recruitment increases. Intense trapping during the low lynx population periods may affect future lynx recovery despite abundant hares (Poole 1994). Lynx are relatively easily trapped, and with extensive access and pressure, trapping can remove a large proportion of a population (Todd 1985; Bailey et al. 1986). On the other hand, lynx are relatively fecund and populations can increase rapidly during periods of increasing or abundant prey (Mowat et al. 2000, Slough and Mowat 1996). Lynx also have been shown to disperse great distances, and therefore have the ability to re-colonize vacant habitats.

It is unknown whether the rate that lynx are incidentally trapped is density dependent (i.e., the number of lynx trapped annually will decline as the lynx population declines) or independent (i.e., the number of lynx trapped annually will stay the same regardless of a rising or falling population). However, even if Maine's lynx population declined in the next 20 years and trapping proves to be density independent, then the level of incidental take occurring under alternative 1 or the proposed ITP (i.e., alternative 3) is likely low enough to not have significant impacts on lynx populations in Maine.

We conclude that the estimated trapping mortality under alternative 1 (0.2 lynx per year or one lynx every 5 years) is within sustainable limits of a harvested lynx population at a high point in snowshoe hare populations. The lynx mortality that is attributable to Maine trappers each year is lower than in jurisdictions where lynx trapping is legal. For a population of 750 lynx at the high point of the hare cycle,

annual trapping mortality would have to exceed 75 to 150 lynx, or 10 to 20 percent respectively, before lynx populations would be impacted. Thus, even if lethal take from trapping in Maine was magnitudes higher than anticipated by the MDIFW, it is likely to be below the threshold for population effects.

Under alternative 1, while up to 165 lynx may be incidentally captured over the next 15 years, 155 will have no or only minor injuries and up to 10 lynx may have more severe injuries. Those that may die from injuries are a very small proportion of the lynx population in Maine and will not have an effect to the overall population in the state or more broadly. Thus, the effects of alternative 1 on Canada lynx are not significant.

5.1.2 Bald and golden eagles

Maine has trapping regulations intended to protect bald and golden eagles from trapping injury and mortality. For example:

- Prior to 1976, there was no closed season on bobcat. During this time period, bobcat trapping extended into late winter and resulted in multiple cases of dead and injured eagles each winter. Incidental trapping of bald eagles was almost always involved with exposed bait. Closing bobcat trapping season before December 31 and trapper educational efforts helped to reduce this problem.
- In the 1970s, several bald eagles were trapped during Maine's spring muskrat trapping season. This season was ended in 1979 to protect both bald and golden eagles.
- Several bald eagles were caught in foothold traps set next to exposed carcasses. In 2007, MDIFW adopted regulations requiring that traps not be set within 50 yards of bait which can be seen from above. Bait at trap sites must not be visible from above.

Despite increasing bald eagle populations and distribution, the number of reported trapping incidents of eagles has diminished greatly in Maine. Trapping was once a significant source of mortality of bald and golden eagles in North America (Coon et al. 1970, Bortolotti 1984), but is now less so (Wayland et al. 2003). Since 1971, 38 bald eagles and one golden eagle have been documented incidentally trapped in Maine, nearly all occurring prior to the 2007 regulatory changes (C. Todd, MDIFW, unpublished data). Bald and golden eagles in Maine have been killed or injured in both killer-type and foothold traps (C. Todd, MDIFW, unpublished data; Todd 2000, Todd 2004). Nationwide, the frequency of trap-related deaths was 2 percent of cases examined in the 1960s and 1970s (Coon et al. 1970, Mulhem et al. 1970, Belisle 1972, Cromartie et al. 1975, Prouty et al. 1977).

The primary trapping related issue causing incidental take of bald or golden eagles, trapping near exposed carcasses, has been addressed. Several dozen bald eagles are known to die in Maine annually from human-caused sources of mortality (e.g., poisoning, contaminants, illegal shooting, electrocution, collisions), but this does significantly affect growth of the breeding population, which continues to increase at about 8 percent per year (Todd 2004). In contrast, human-caused mortality of golden eagles is much more infrequent; however, loss of individuals from a small population could be of greater conservation concern (Whitfield et al. 2004).

The MDIFW is not seeking incidental take coverage for incidental trapping of bald and golden eagles under the BGEPA because data from Maine demonstrate the risk of take is low (ITP p. 13). Since implementing statewide covered bait regulations in 2007, no eagles are known to have been taken in legally set traps in Maine. The only documented incident since 2006 was the live capture and release of an eagle in an illegal trap on March 21, 2010 in Alna (Lincoln County), Maine. The case was referred to Maine Warden Service and Service law enforcement.

For the purposes of analyzing alternative 1, we assume that no bald or golden eagles will be trapped under the MDIFW's current programs. If an eagle is incidentally trapped, the MDIFW will consider whether to seek a BGEPA permit (ITP p. 28) or amend its ESA section 10 permit to include eagles as a covered species. Therefore under alternative 1, we assume that no bald or golden eagles will be trapped and the effects of alternative 1 on eagles are not significant.

5.1.3 Other wildlife

5.1.3.1 Trapped wildlife

Maine's current harvest of trapped wildlife is summarized in the ITP (section 3.1, table 3.1.2) and an excerpt from that table of the average annual harvest of furbearer species particularly relevant to incidental trapping of lynx is provided below.

Table 5.1.3.1. Harvest of select furbearers in Maine (excerpt of ITP, table 3.1.2).

Species	Statewide harvest	Harvest in lynx WMDs 1 to11, 14, 18, and 19	Estimated statewide population
Bobcat	329	112	No population estimate. Carrying capacity based on available habitat was estimated to be 3,400 in 1986 (Morris 1986).
Coyote	2,017	785	10,000 to 12,000 in 1999 (Jakubas 1999)
Red fox	996	327	No population estimate. Carrying capacity based on available habitat was estimated to be 121,134 in 1985 (Caron 1986)
Fisher	1,280	604	No population estimate. Carrying capacity based on available habitat was estimated to be 9,230 in 1986 (Clark 1986).
Marten	2,414	2,347	No population estimate. Carrying capacity based on available habitat was estimated to be 21,730 (Ritter 1986).

Maine's harvest of furbearers is generally done under principles of sustainable harvest. Maine's fur trapping program is intended to provide recreational opportunity for trappers and sometimes to manage furbearer populations using common wildlife management principles (W. Jakubas, MDIFW, pers. Comm. 6/24/14). There are only a few species that the MDIFW is trying to manage their populations through trapping. In general, population goals are to maintain a stable or increasing population for most furbearer species. Harvest of the more valuable species is monitored by requiring trappers to have pelts tagged. Furbearer harvest seems to approximate 10 to 20 percent of the total population (table 5.1.3.1). Each species has a species assessment, goals and objectives, and management system that describe populations and habitat estimates (if available) and management decisions are made on annual harvest quotas (see http://www.maine.gov/ifw/wildlife/species/mammals/furbearers.html last accessed on July 16, 2014).

Under alternative 1, the MDIFW will continue to manage furbearer species using the aforementioned methods. As has occurred in the past, furbearer harvests will change annually (sometimes substantially), but would be expected to fluctuate within the bounds observed in the last 20 to 30 years. Furbearer harvest is affected by many factors including population changes in the furbearers or their prey, disease and parasites, trapper effort (affected by economy, gasoline and fur prices, land access and license fees,

changes in trapper numbers and distribution, and declining participation in trapping), weather (early snow may reduce access), and adjustments to trapping seasons and quotas as described above. Similar harvest levels of furbearer species are expected under alternative 1 as have occurred in the past several years. For some species, furbearer trapping may increase or decrease population levels. For example, the MDIFW has reduced the trapping season length and quotas for fisher and marten in order to increase their populations. In contrast, the MDIFW has expanded opportunities to trap and hunt coyotes and instituted a PM program to decrease their populations in some areas. While furbearer trapping as described in alternative 1 may in some cases affect populations, the MDIFW is managing the program to ensure stable, and sometimes, increasing furbearer populations over the long-term.

5.1.3.2 Migratory Birds

The numbers and types of birds incidentally trapped are summarized in sections 4.3 and 4.3.1. For this DEA, we examine effects of trapping and mitigation on gray jays. Although this is not the only species incidentally trapped, it likely represents the most frequently trapped non-furbearer species in boreal environments and thus serves as a reasonable proxy for the purposes of our analysis (Novak 1987, Barrett et al. 1989, Naylor and Novak 1994).

The MDIFW outlined efforts to avoid migratory bird take (J. Connolly, MDIFW Memorandum to the Service, August 9, 2013, appendix 2). During a trial of BMP traps in Maine 1999 to 2000, five birds were reported captured in 10,563 trap nights (1 bird per 2,113 trap nights). In 2010, and 2011, MDIFW estimated 248,391 and 224,070 trap nights respectively for foothold traps in Maine. Based on the capture rates from the BMP study, MDIFW estimates that a trapper could potentially catch 112 birds annually statewide.

Killer-type traps were tested in other Northeast states. No birds were caught in 4,060 trap nights. Given these data were collected in a scientific study, using local trappers and traps commonly used in Maine, the MDIFW believes this reflects the rate migratory birds may be caught by trappers in Maine. In addition, during 2 years of PM activities where foothold traps were set for coyotes, no migratory birds were reported caught in traps. MDIFW does not anticipate incidental take of migratory birds from the ADC program, since most activities involve cage traps set in residential settings.

MDIFW does not have records of how many gray jays are taken by fur trappers. MDIFW caught 17 gray jays in cage traps while trapping for lynx (MDIFW *Partnership for Lynx Conservation reports 1999 to 2007*), but none in foothold traps. Marten trapping studies report that 26 gray jays were captured in Ontario for 408 marten (6.4 percent of target species) taken in both killer-type and foothold traps (Naylor and Novak 1994), and in Alberta, 30 gray jays were trapped for 55 marten taken in killer-type traps (55 percent of target species) (Barrett et al. 1989). If similar ratios were applied to Maine marten harvest in recent years (2,350 to 5,529 animals), 150 to 3,015 gray jays could be incidentally trapped in northern Maine annually. Gray jay densities were 4.63 to 9.14 birds per mi^2 in La Verendrye Park, Quebec and Algonquin Park, Ontario, respectively (Strickland and Ouellet 1993). If similar densities occur in northern Maine, 47,077 to 92,839 gray jays may be present in the autumn in the 10,156 mi^2 lynx critical habitat area. It should be noted that trapping conditions and regulations in Ontario and Alberta are different than Maine. For example, incidental take of gray jays is likely reduced in Maine because of 2007 MDIFW regulations requiring that bait be covered. Ontario and Alberta allow exposed bait.

Alternative 1 is anticipated to result in minor effects to migratory birds. Take of up to 3,015 gray jays from a population of 92,839 represents 3.2 percent of the population. Mortality rates of young gray jays from fledging to mid-October is 52 to 85 percent (Strickland 1991), but annual mortality is much less for adults (15 to 18 percent and even as low as 10 percent)(Strickland and Ouellet (1993). American crows in New York had similar demography with 65 percent mortality in the first year of life and low mortality

thereafter (McGowan 2001). Comparable mortality rates in common ravens has not been documented, but they are very long-lived birds (Boarman and Heinrich 1999). Based on this information, we believe that incidental take from trapping at these rates would not have a statewide population-level effect on gray jays or other species, and would have only minor effects on local populations.

5.1.3.3 Non-target mammals

When trapping to catch target furbearer species, a number of different non-target species can also be incidentally captured. For this DEA, we examine effects of trapping on northern flying squirrels and snowshoe hares. Although these are not the only mammal species incidentally trapped, they likely represent the most frequently trapped non-furbearer species in boreal environments (Novak 1987, Barrett et al. 1989, Naylor and Novak 1994) and thus serve as reasonable proxies for the purposes of our analysis. We also examined the effects of trapping on the snowshoe hare because it is the primary food of Canada lynx.

Northern flying squirrel

The MDIFW does not have records of how many northern flying squirrels are taken by fur trappers. While a large portion of northern flying squirrel diets is fungi and staminate cones of spruce and fir, they readily consume carrion, and are vulnerable to traps baited with meat (Novak 1987, Naylor and Novak 1994). To estimate how many could possibly be taken in Maine we reviewed two marten trapping studies in Ontario (Naylor and Novak 1994) and Alberta (Barrett et al. 1989). Trapping conditions and regulations in these two jurisdictions are believed to be different than Maine, suggesting it may be somewhat speculative to apply these studies. However, it represents the only data we have to understand the effects of trapping to non-target species. In Ontario, 382 northern flying squirrels were taken for 408 marten trapped (94 percent of target species) (Naylor and Novak 1994), and in Alberta, 46 northern flying squirrels were taken for 55 marten trapped (84 percent of target species) (Barrett et al. 1989). If similar ratios were applied to the Maine marten harvest in recent years (2,350 to 5,529 animals), 1,974 to 5,197 flying squirrels could be taken in northern Maine annually. Densities of Northern flying squirrel in the Pacific Northwest ranged from 0.2 to 1.7 per acre (Smith et al. 2003, Smith and Nichols 2003). If similar densities occur in northern Maine, 1.4 million to 11.6 million northern flying squirrels may be present in the 6.8 million-acre lynx critical habitat area. Based on this information, take of flying squirrels could be as low as 0.02 percent (1,974 from a population of 11.6 million) or as high as 0.3 percent (5,197 from a population of 1.4 million) of the flying squirrel population in northern Maine and would not be expected to have population level effects.

Snowshoe hare

The MDIFW does not have records of how many snowshoe hares are taken by fur trappers. However, snowshoe hares are incidentally captured in foothold and killer-type traps (Novak 1987, Barrett et al. 1989, Proulx et al. 1989, Mowat et al. 1994, Naylor and Novak 1994). To estimate how many could possibly be taken in Maine we reviewed marten trapping studies in Ontario (Naylor and Novak 1994) and Alberta (Barrett et al. 1989). Trapping conditions and regulations in these two jurisdictions are different than Maine, suggesting it may be somewhat speculative to apply these studies. However, it represents the only data we have to get a handle of the effects of trapping to non-target species. In Alberta, no snowshoe hares were taken for 55 marten trapped (0 percent of target species) (Barrett et al. 1989) and in Ontario, 18 snowshoe hares were taken for 408 marten taken (4 percent of target species)(Naylor and Novak 1994). If similar ratios were applied to Maine marten harvest in recent years (2,350 to 5,529 animals), 0 to 244 snowshoe hares could be taken in northern Maine annually. Landscape hare densities in northern Maine currently average 0.24 hares per acre (Simon 2009, Scott 2009); therefore approximately 1.6 million snowshoe hares may be present in the 6.8 million-acre lynx critical habitat area. Based on this

information incidental trapping at most may take 0.01 percent (244 from a population of 1.6 million) of the population. Data from the MDIFW's lynx telemetry study is also useful for this analysis. The MDIFW caught 48 snowshoe hares in foothold traps set for lynx in 15,403 trap nights (0.31 hares per 100 trap nights) while trapping for lynx (MDIFW *Partnership for Lynx Conservation in Maine* reports 1999 to 2007). If Maine fur trappers average 110,000 foothold trap nights in lynx WMDs (ITP p. 46), then 342 snowshoe hares may be incidentally trapped. Using either approach, the level of potential incidental trapping of snowshoe hare will have a negligible effect on local snowshoe hare populations and would not affect the statewide population level.

5.1.4 Outdoor recreation and socioeconomic factors

Continuing Maine's trapping program as status quo, without receiving incidental take coverage, would have little impact on outdoor recreation and the socioeconomic baseline described in section 4.5. The MDIFW would continue to implement the trapping policies, statutes, and regulations developed over the last 15 years, which seem to have had little negative effect on the recreational experience of trapping. However, without a permit some uncertainty and controversy would affect the Maine trapping program. New statutes or regulations may be proposed to avoid and minimize take of lynx. Measures instituted under alternative 1 would not be expected to greatly affect other forms of outdoor recreation.

Alternative 1 is anticipated to have minimal economic effects. Trapping organizations would incur minor expenses to maintain the current level of trapper education. The MDIFW would incur expenses to increase education of trappers, develop new regulations, if needed, and enforce them. The costs of implementing alternative 1 would be similar to "ongoing activity costs" outlined in the ITP (table 6.1 p. 125) or $58,500 per year. Most of these costs ($54,000 per year) are the publication and distribution of a regulations booklet for hunting and trapping – an ongoing expense. Most other activities, like investigating incidental lynx captures, compliance monitoring by wardens, and outreach activities are included in the base salary of the MDIFW staff. Economic activity associated with trapping (e.g., purchasing trapping supplies, gas, equipment, cabin rentals) would be similar to what occurs currently. A few trappers submitted public comments saying that they, or other trappers, avoided trapping in lynx WMDs because of the liability of incidentally trapping a lynx. Nevertheless, under alternative 1 trapping activity and associated economic activity is likely to remain stable or decline slightly over the next 15 years.

There is currently no mitigation for the take of the lynx under alternative 1. Thus, effects on visitation and public use of the MDPPL Seboomook Unit would remain the same as under current conditions. Recreational and economic factors for the Seboomook Unit are discussed in Eickenberg (2007). Recreation in the North Maine Woods system has shown a declining trend since the mid-1990s. Use of the North Woods System through the 20-Mile gate, the entrance to the Seboomook Unit, has steadily declined from 59,218 in 2000 to 42,227 visitor-days in 2005 (based on monitoring use from spring through fall only). Only a small portion of these visitors may actually use the Seboomook Unit as there are many destinations in northern Maine beyond this checkpoint. Thus, we assume there will continue to be declining trends in visitor over the next 15 years.

Therefore, the effects of alternative 1 on outdoor recreation and socioeconomic factors are not anticipated to be significant.

5.1.5 Vegetation and habitat

Effects of trapping activities on vegetation and habitat are insignificant throughout the state of Maine (section 4.4). Environmental consequences are focused on the effects of the mitigation, which for some

alternatives could affect thousands of acres of vegetation. No mitigation for the take of lynx would occur with alternative 1.

The MDPPL Seboomook Unit was purchased in 2004. The area has an extensive history of timber harvesting and areas were clearcut in the 1970s and 1980s to salvage for spruce budworm damage. In the decade prior to being sold to the state, many areas were cut using heavy partial harvests. Forest management goals are to "manage the timber in accordance with standards for Sustainable Forestry Initiative and Forest Stewardship Council third party certification subject to limitations imposed by managing for wildlife riparian habitats, remote recreation, and scenic resources" (Eickenberg 2007). The most pressing need on the unit is to harvest mature aspen and many other areas could use improvement harvests and commercial thinning in 20 years to accelerate growth of stands toward mature softwood. Otherwise, no specific forestry goals or objectives are provided in the MDPPL plan for the Seboomook Unit (i.e., there is currently no written plan regarding forest products, markets, etc.). We assume a forest management plan will be developed in the future. Thus, it is difficult to document the current status and future direction of forest management and habitat protection on the Seboomook Unit.

Based on the information that is currently available, the effects of alternative 1 on vegetation and habitat are not anticipated to be significant.

5.2 Alternative 2 (No Action – Trapping Programs Discontinued in Lynx WMDs)

Under this alternative, the MDIFW would continue the statewide trapping programs, but not receive incidental take coverage for lynx. This alternative assumes that the MDIFW would therefore need to operate its trapping programs in a manner that avoids take of lynx. For the purpose of this DEA analysis we assume that the MDIFW would do that by discontinuing all upland trapping programs in lynx WMDs. This would apply to all programs –fur trapping, PM, and ADC.

5.2.1 Threatened and endangered species

5.2.1.1 Canada lynx

Under alternative 2, the MDIFW would discontinue all upland trapping programs in lynx WMDs (1 to 11, 14, 18, and 19). Aquatic trapping would continue with traps set at water depths that would be unlikely to catch lynx. It is unknown how often lynx disperse outside of the lynx WMDs into other areas of Maine where they could be trapped. However, we do know that lynx do disperse outside of lynx WMDs, as figure 4.2.1 shows several radio-tagged and non-radio-tagged lynx occurring in non-lynx WMDs. For the purpose of analyzing this alternative, we assume a small number of individual lynx may disperse outside of lynx WMDs and some of those could be exposed to trapping activities. The probability of trapping lynx in such a scenario where there are so few exposed is small, but not zero. Dispersing lynx would be expected to be males or sub-adults, therefore, no kittens would be accompanying the lynx.

We assume that the MDIFW would annually monitor lynx populations and incidental take from trapping and would immediately discontinue upland trapping programs in WMDs where lynx were detected or incidentally trapped. This would largely avoid the potential for additional incidental take. If lynx were trapped, we assume they would be most likely captured in foothold traps and released with minor injuries. Given how few lynx may be captured under this scenario, there is only a remote chance that these lynx would suffer more severe injuries or fatality.

The number of lynx anticipated to disperse out of lynx WMDs into areas where trapping could still occur under this alternative, and the be incidentally trapped, is very low. As analyzed for alternative 1, incidental take of a much larger number of lynx (e.g., 165 lynx) would not result in significant effects to

Maine's lynx population. Therefore, the potential effects to lynx from alternative 2 would have even less impact to lynx populations so as to be discountable.

5.2.2 Bald and golden eagles

Discontinuing upland trapping in lynx WMDs would likely increase upland trapping pressure in non-lynx WMDs. Some trappers may discontinue trapping, but others would shift trapping from lynx WMDs to other areas of Maine. If trappers shifted trapping efforts to southern Maine, there would be a higher density of bald eagles exposed to the activity.

Similar to alternative 1, we assume that the covered bait restrictions will be effective in preventing the incidental capture of eagles. Again, since the 2007 regulations have been in place, we are only aware of one eagle that has been incidentally captured and released and that was from an illegal trap. Therefore, for alternative 2, we assume that no bald or golden eagles would be trapped. However, even if several bald eagles (perhaps even more than anticipated in alternative 1 due to the increased risk of exposure) were incidentally trapped over the course of the 15-year permit period, that amount of take would not significantly affect Maine's eagle population. MDIFW would be out of compliance with BGEPA in that event and thus may need to seek a permit under that authority. The Service has determined a maximum allowable take of 104 bald eagles for the Northeast Region (Service 2009) from all sources of mortality. There is no level of allowable take for golden eagles.

We assume that no bald or golden eagles will be trapped and there will be no effects of alternative 2 on eagles.

5.2.3 Other wildlife

5.2.3.1 Trapped wildlife

Discontinuing upland trapping in lynx WMDs for recreational fur trapping, PM, and ADC would greatly reduce the harvest of furbearers in Maine. Harvest of furbearer species that occur mostly in northern Maine (e.g., American marten) would be most affected. The average annual harvest of some species of Maine's trapped wildlife (those requiring registration tags) is summarized in the ITP (section 3.1, table 3.1.2). Closing lynx WMDs to all forms of trapping would reduce Maine's annual bobcat harvest by 112 (34 percent), coyote by 785 (39 percent), gray fox by eight (four percent), red fox by 327 (33 percent), fisher by 604 (47 percent), and American marten by 2,347 (97 percent)(table 5.1.3.1). Harvest of non-tagged furbearers (e.g., raccoon, opossum) would likely be less affected because these upland species are not very abundant in northern Maine. Discontinuing upland trapping in lynx WMDs would likely reduce trapping of aquatic species (e.g., beaver, muskrat) in northern Maine because trappers would be less likely to travel to northern Maine if upland trapping were not available.

Few studies are available to evaluate how furbearer populations respond to trapping or lack thereof (Powell 1994, Banci and Proulx 1999). There are many examples of untrapped populations of furbearers (e.g., large national and state parks, states that have banned various forms of trapping). Slough and Mowat (1996) studied lynx in an area without trapping in the Yukon Territory. In the absence of trapping, furbearer populations (most of which are predators) would likely increase until they become naturally regulated through density-dependent mechanisms (i.e., increased intra-specific competition, reduced fitness and reproduction, increased incidence of disease and parasites, and increased dispersal). Populations would be expected to increase to an environmental carrying capacity. The age structure of a non-harvested population is skewed towards adults. In general, natural mortality of juveniles is high in untrapped populations. Adults occupy all suitable habitats and turnover is low, leaving few areas for juvenile dispersal (Krohn et al. 1994). Populations of furbearer species with high resiliency to trapping

harvest (e.g., coyotes, foxes) are likely to have similar populations in northern Maine after trapping is discontinued. Species with intermediate resiliency to trapping (e.g., marten and fisher) and low resiliency (e.g., bobcat) would likely increase their populations to environmental carrying capacity because these species are likely suppressed somewhat by trapping harvest (Banci and Proulx 1999).

The environmental consequences of eliminating trapping, a significant source of annual mortality for some furbearer species, are difficult to predict because of complex relationships between the predator species and with their prey. Some ecological effects may be anticipated. Increased predator populations would, in turn, have effect on each other (inter-specific competition), which could include increased competition of species like coyotes and bobcats with Canada lynx or increased competition between coyotes and fox. Increased fisher populations could affect Canada lynx because fisher predation is a major source of lynx mortality in Maine (ITP section 4.2). Increased predator populations could affect prey species, such as small mammals (Etcheverry et al. 2004) and snowshoe hare (Etcheverry et al. 2005). This multitude of potential effects could have other ecological effects on vegetation and other organisms within northern forest ecosystems.

Public comments received on the 2008 draft EA indicate there was particular interest in expanding Maine's PM and ADC programs and the types of traps used (e.g., snares, larger foothold traps) to kill coyotes and improve over-winter deer survival in northern Maine. Coyotes have been killed for over 37 years in Maine in efforts to reduce predation on wintering deer (Peek et al. 2012), yet deer populations have declined to all time low numbers. Some hypothesize that if trapping were discontinued in lynx WMDs coyote populations may increase and deer mortality would increase. The number of coyotes trapped by PM and ADC (about 100 per year, ITP appendices 9, 10) has not reduced coyote populations in northern Maine (an area the size of the state of Massachusetts)(Peek et al. 2012). However, proponents argue that this activity may improve deer survival in some wintering areas (Lavigne 1992). Most coyote predation on deer occurs on fawns (e.g., Ballard et al. 1999), except in northern areas where overwinter predation on adults can be problematic (Robinson et al. 2014). To date, no studies have been conducted to evaluate the effectiveness of PM/coyote control in Maine (Peek et al. 2012). The poor quality and quantity of deer wintering habitat and severe winters are the primary reasons why deer have declined in northern Maine (Harrison et al. 2013).

Therefore, the effects of alternative 2 would be a substantial reduction in furbearer harvest levels. For example, marten would not be trapped throughout nearly all of their range in Maine. Our assumption is that over time those wildlife species would reach an environmental carrying capacity and function under natural regulation. The ecological implications of not trapping furbearers are more difficult to predict; the effect pathways are complex, cascading, and difficult to fully analyze.

5.2.3.2 Migratory Birds

Discontinuing upland trapping in lynx WMDs would result in less incidental capture of migratory birds than alternative 1. For that alternative, we determined that there would not be a statewide population-level effect on gray jays and only minor effects on local populations. Under alternative 2, incidental trapping of gray jays would nearly be eliminated because the range of this species is found predominantly in northern Maine (Breeding Bird Survey, http://www.mbr-pwrc.usgs.gov/bbs/ra2012/ra04840.htm, last accessed on April, 28, 2014). Use of killer-type traps on leaning poles would be greatly reduced because there would be very little trapping for American marten. Raptors, corvids, and other species could still be incidentally trapped, primarily in foothold traps, in southern portions of the state. However, based on MDIFW's data, the overall number of birds captured statewide is very low and under this alternative that number would be substantially reduced. There is still the potential for some localized affect for some species, but we do not anticipate that level of effect would more broadly impact migratory birds in parts of Maine where upland trapping would still occur.

5.2.3.3 Non-target mammals

Discontinuing upland trapping in lynx WMDs would reduce incidental take of non-target mammals as compared to alternative 1. Discontinuing upland trapping in northern Maine would likely affect statewide trapping effort with some trappers discontinuing trapping all together and others shifting from trapping in lynx WMDs to other areas in Maine. For example, impacts of trapping to northern flying squirrels largely occur through trapping for American marten in lynx WMDs. If that was discontinued, there would be substantially less incidental trapping of flying squirrels.

Similarly, incidental trapping of snowshoe hares would be substantially less because upland trapping would be discontinued in the core range of the snowshoe hare in Maine. Although snowshoe hares occur statewide, they reach their highest landscape hare densities in northern Maine where upland trapping would no longer occur. However, it is possible that the reduced furbearer harvest in northern Maine would serve to increase predation pressure on snowshoe hares and ultimately have an even greater effect on hare populations than trapping would have otherwise caused. Etcheverry et al. (2005) examined snowshoe hare populations in trapped and protected areas in southern Quebec. Hare density was nearly twice as high in trapped areas. Hare survival and recruitment of young was higher in trapped areas (with lower predator populations) than protected areas (with high predator populations).

Therefore under alternative 2, there would be a reduction in the incidental take of non-target mammals such as northern flying squirrels and snowshoe hares in the lynx WMDs. That could be offset by increases in capture of non-target mammals in other parts of the state where trapping effort may increase. In addition, increasing furbearer populations could change predation patterns on some species (such as small mammals). Similar to the trapped wildlife, our assumption is that over time those non-target species would reach an environmental carrying capacity and function under natural regulation. The ecological implications of reduced trapping of non-target species are difficult to predict; the effect pathways are complex, cascading, and difficult to fully analyze.

5.2.4 Outdoor recreation and socioeconomic factors

Discontinuing upland trapping in lynx WMDs would have the greatest economic effect of all the alternatives because it would discontinue upland trapping over half of the state. Although aquatic trapping would continue, if an upland trapping ban persisted for more than several years, trapper participation rates and trapping license sales would decline, perhaps by as much as half. Trapping opportunities and potential trapping income would mostly affect trappers that live in northern Maine. Discontinuing upland trapping would also affect the many trappers that take vacations and travel to northern Maine to specifically trap marten, coyotes, and other species. PM trappers would no longer be paid to trap. This would affect trapping income to individual trappers and would be expected to have a substantial negative effect on camp owners, campgrounds, grocery stores and other businesses in northern Maine that provide goods and services to trappers in northern Maine. Although economic data are not available, discontinuing trapping in northern Maine would have a negative effect on northern Maine's tourism economy because trappers and hunters comprise the majority of autumn use of northern Maine sporting camps.

Discontinuing upland trapping in northern Maine would also have financial implications to the MDIFW. Fewer trappers would purchase licenses, which would reduce income to the MDIFW. The MDIFW trapping license income is approximately $93,900 annually (i.e., 2,100 residents at $35 per license, 200 juniors at $9 per license, 60 non-residents at $310 per license, and 300 complimentary licenses). Without these funds, the MDIFW may not be able to hire a furbearer biologist (who also has roles in conservation programs for rare and endangered species of mammals). The MDIFW Warden Service may experience

increased costs to enforce a trapping ban in northern Maine. An upland trapping ban would be extremely controversial to trappers and groups that represent them and the MDIFW could incur substantial outreach costs to address the controversy.

With fewer fur trappers and restrictions on ADC activities, animal damage complaints will increase. ADC costs would have to be paid for by the MDIFW and the public. Even when trapping is not intensive enough to suppress wildlife populations, trapping can still reduce wildlife damage and associated costs to society (Conover 2001). However, most of northern Maine is rural or unsettled and has relatively low ADC activity compared to more populated parts of the State. The most prevalent ADC activity in northern Maine is controlling beavers, which would not be affected by an upland trapping closure in alternative 2.

Discontinuing upland trapping could have substantial economic impacts on trappers and related economic activity in northern Maine (e.g., license sales, access fees, cabin rentals, transportation and groceries, etc.). However, relative to total economic activity in the State, trapping related activities account for a relatively small proportion.

5.2.5 Vegetation and habitat

Effects of trapping activities on vegetation and habitat are negligible throughout the state of Maine (section 4.4). Environmental consequences are focused on the effects of the mitigation. Similar to alternative 1, no mitigation for the take of lynx would occur with alternative 2. Therefore, there are no effects anticipated for alternative 2 on vegetation and habitat.

5.3 Alternative 3 (Proposed Action – Fur Trapping, PM and ADC Programs Implemented Consistent with the MDIFW's ITP)

Under this alternative, the Service would issue an incidental take permit to the MDIFW and the recreational fur trapping, PM, and ADC programs would be managed according to the MDIFW's revised 2013 ITP. In some respects the programs would be managed very similarly to what is described for alternative 1, or how things are currently managed. The reason is that many of the avoidance and minimization measures proposed in the ITP are currently being implemented under the status quo as the result of the 2007 Consent Decree. There are few other ways (except to limit trapping in lynx areas) to reduce the number of lynx incidentally captured through trapping. Therefore, most of the additional ITP measures in alternative 3 will improve how injuries are evaluated and managed, increase compliance with trapper regulations, and establish changed circumstance procedures to address uncertainties regarding some assumptions.

5.3.1 Threatened and endangered species

5.3.1.1 Canada lynx

The anticipated incidental take under alternative 3 is thoroughly described in the proposed ITP since this is the amount the MDIFW is requesting for ESA section 10(a)1(B) permit coverage. The MDIFW's requested take of up to 195 incidentally trapped lynx over a 15-year permit period is based on the maximum annual number of lynx trapped and reported in the combined fur/PM/ADC trapping programs in a single year (11 lynx in 2004 for 15 years = 165 lynx)[20]. In addition, the MDIFW is including an additional 20 percent incidental take "allowance" (two lynx per year for 15 years = 30 lynx)(ITP pp. 69 to 70) in their request to account for a number of issues that could result in minor fluctuations in the anticipated annual take over the permit period. Similar to alternative 1, the MDIFW has applied data from its 12-year telemetry and monitoring study to estimate the potential injuries and mortalities that

could result from trapping. The MDIFW examined 32 lynx caught in foothold traps by fur and PM trappers from 1999 to 2012, and determined that 19 percent had no visible injuries, 75 percent had mild injuries, and 6 percent had moderately severe to severe injuries (ITP table 4.2.2). No lynx have been reported captured or killed in legally set killer-type traps. Therefore, of the 195 lynx anticipated to be incidentally trapped in alternative 3:

- Up to three may be killed or have injuries severe enough that they cannot be fully rehabilitated and subsequently released;
- Up to nine may be severely injured but released following rehabilitation; and
- The remainder (i.e., 183 lynx) will be released with no or only minor injuries.

There are several alternative ways to potentially estimate incidental take from trapping activities (e.g., extrapolate the rate of capture by PM trappers to fur trappers, use the lynx capture rates from the telemetry study, etc.). However, each of these methods involves additional assumptions and limitations. For example, during the telemetry study, the MDIFW was targeting captures of lynx in order to establish a large enough sample size to meet the study's goals and objectives. Therefore applying those capture rates to the general trapping community may not be appropriate, since trappers are not purposefully targeting them.

Applying the PM rate of capture to the recreational fur trappers may also not be appropriate. The MDIFW provided an analysis that shows only a small difference in reporting rates between the PM and recreational fur trappers when differences in likelihood of incidental lynx capture are taken into account (J. Connolly, MDIFW Memorandum to the Service, June 11, 2014, appendix 3). In fact, the analysis indicates that the incidental lynx capture rate from fur trappers (calculated via the coyote trapping data) is slightly higher than the PM trappers in the areas that lynx capture is most likely to occur. Therefore, using either lynx capture rates from the telemetry study, or the PM and fur trappers would result in different, but not necessarily better or more accurate estimates of incidental lynx capture than what the MDIFW currently provides in the revised ITP. The Service finds that the MDIFW's take estimate in the ITP is reasonable for the purpose of this analysis. In the event that the actual take (i.e., capture, level of injury, or number of fatalities) turns out to be higher than what the MDIFW estimates in this plan, MDIFW has incorporated a changed circumstances provision that will allow modifications of the plan. In no event can the level of take exceed what is authorized on an incidental take permit without amendments to the plan and the permit.

Under alternative 3, the MDIFW proposes several significant changes to trapping programs that may affect incidental take of lynx. These include new forms of trapping: non-lethal cable restraints (ITP section 3.1, appendix 13), cage traps (ITP section 3.1), and wooden based rat traps (ITP section 3.1). The MDIFW would rescind foothold trap size restrictions in the Consent Decree (ITP section 3.1). Use of cable restraints will be phased in, initially being evaluated with the PM and ADC programs. If sufficiently protective of lynx, the MDIFW may allow the use of these in the recreational trapping program. Finally, lynx exclusion devices would be required for all killer-type traps set on the ground in all lynx WMDs except for blind set killer-type traps.

Key issues for evaluating lynx impacts

Reporting of lynx capture events: The MDIFW ITP relies on trapper self-reporting of incidental capture events that involve lynx. The MDIFW does not think that such events are under-reported to any significant extent and provides explanation for that from the 12-year telemetry study (ITP p. 20). Since 2008, trapping regulations require trappers to report any captures of lynx "as soon as possible and prior to

removing the animal from the trap" and within 24 hours if the lynx was released by the trapper. A reporting hotline was established and trappers are given commendations by the Commissioner for properly reporting. However, we are aware of instances in which lynx have been trapped and not reported. For example, in 2008, a warden found a lynx killed by a killer-type trap while investigating a trapper. To address the potential for non-reporting of incidental lynx captures, the MDIFW will conduct increased targeted compliance monitoring which will increase the incentive for reporting lynx captures. In addition, by having incidental take coverage for the program, there will be less incentive not to report these incidental captures, since the capture events will not result in ESA section 9 violations.

Leaning pole sets: The MDIFW ITP assumes that there will not be injuries or fatalities of lynx from killer-type traps, largely based on the understanding that no lynx have been captured or killed in legally set killer-type traps to date. However, the current trapping regulations and the ITP require killer-type traps on the ground to be set using exclusion devices and leaning pole sets for killer-type traps not on the ground. Blind sets for killer-type traps are an exception to these requirements. A key assumption is that leaning pole sets that elevate the trap on small diameter trees set at a steep angle are effective at excluding lynx from being captured in killer-type traps. The leaning pole set was recommended in the booklet How to Avoid Incidental Take of Lynx (IAFWA 2003b) because it "discourages lynx from climbing to investigate the elevated traps set." Leaning pole sets are commonly used by marten and fisher trappers (Naylor and Novak 2009) because the trapped furbearer (marten or fisher) hangs suspended above the ground and is not damaged by scavengers until the next time the trapper checks the trap. Leaning pole sets are a standard practice for trappers in the contiguous United States where lynx are listed. The MDIFW believes lynx rarely climb small diameter leaning pole set at a steep angle to killer-type traps (ITP appendix 4, p. 225).

Some trappers believe that although lynx may be able to climb trees, they are not behaviorally motivated to do so. In Minnesota, lynx tracks have been observed approaching baited trap sets in trees, but the lynx did not climb the tree (S. Loch, Minnesota, pers. comm., 2009). None of 74 radio-tagged lynx in Maine were caught in killer-type traps despite an estimated 209,193 trap nights for marten and fisher in the townships where lynx resided during this 10-year time period (ITP p. 49).

The leaning pole set assumption has important ramifications because if lynx are caught in killer-type traps, the injuries could be lethal. The MDIFW addresses this assumption by including a changed circumstance whereby if even one lynx is killed in a leaning pole set, the MDIFW will re-evaluate whether leaning poles are still effective avoidance measures or whether other measures might be more effective. In the event that this assumption is proven incorrect, MDIFW's changed circumstance will allow modifications of the plan.

Underscoring the importance of this changed circumstance, several pieces of information raise uncertainty about the effectiveness of leaning pole sets. Lynx are curious, easy to trap relative to other species (Mowat et al. 2000, Poole 2003), and are known to climb trees (Audubon 1847, Saunders 1963). Captive lynx trials in Maine demonstrated that a lynx (albeit we cannot confirm the species) could reach into a legally-set killer-type trap set on a leaning pole without climbing. When the trap and bait were placed higher, the captive lynx easily climbed leaning poles narrower and steeper (even vertical) than those required by Maine regulations (K. Easler, Service, unpublished report and video). We do not know whether captivity produced a different behavior than would be expected in the wild because this has not been tested in the wild. Finally, there have been several lynx fatalities in killer-type traps in Maine using the leaning pole set, but in each of the investigations of these fatalities there were issues with the trap set that rendered the set illegal. In some of these instances it appears that there were relatively minor deviations in the trap sets; it is unclear the extent to which minor deviations may reduce effectiveness of the leaning pole set as an avoidance measure.

For the purpose of our analysis in the DEA, we assume that leaning pole sets are effective and that lynx will not be incidentally captured (hence not injured or killed) by killer-type traps. In the event that this assumption is proven incorrect, MDIFW's changed circumstance will allow modifications of the plan.

Capture of lynx in Hancock or suitcase-type traps: Hancock traps are used by ADC agents to trap beavers along waterways (ITP p. 39). There is little overlap between trapping activities conducted under ADC and recreational fur trapping (ITP p. 53). ADC trappers trap for beavers statewide. Lynx could be taken in Hancock or suitcase traps, though no lynx have been reported captured in Hancock or suitcase traps in Maine (ITP p. 47). Blundell et al. (1999) caught no non-target species in Hancock traps when trapping for river otters (*Lontra canadensis*) in Alaska, but Penak and Code (1987) caught non-target species (mostly muskrat) in Ontario. We have no information from MDIFW on incidental captures of non-target species in Hancock traps in Maine. For the purpose of this DEA analysis, we assume no incidental trapping will result from the use of Hancock traps in the MDIFW's trapping programs.

Incidental trapping of lynx and subsequent survival: Trapping, chemical immobilization, and handling of wild animals have been documented to cause detrimental effects to some wildlife species (Beringer et al. 1996, Cattet et al. 2008, Williams and Thorne 1996) but not others (Delgiudice et al. 1986, Johannesen et al. 1997). Post-release effects for wildlife include decreased survival (White et al. 1972), reproduction (Ballard and Tobey 1981), abandonment of offspring (Cote et al. 1998), and increased predation on captured animals (Bro et al. 1999).

The MDIFW describes trapping related impacts on the survival of lynx in their revised ITP. They conclude that based on a 12-year telemetry study that they conducted in Maine, trapping appears to have little effect on post-release survival of lynx that had no, or only minor, injuries (ITP p. 59). Data from this study was used to estimate injury and fatality rates related to trapping (ITP p. 71). Severe injuries to lynx from trapping (which the MDIFW anticipates being relatively few) would have effects on post-release survival, which is why those circumstances are specifically addressed through minimization measures in the plan. The MDIFW's study tried to account for serious injuries by waiting a month before assessing post-release survival effects. Ultimately, based on the 12-year study the MDIFW does not believe undetected injuries are likely to affect lynx survival or reproduction after capture, since most females survived and gave birth to kittens (ITP p. 60).

The MDIFW has incorporated a number of elements into the ITP to ensure that their trapping related survival and injury information is as robust as possible. These include having adequately trained wildlife biologists respond to lynx capture events to assess the potential for injuries prior to release, developing an updated field based injury assessment system with veterinary assistance, transporting and rehabilitating lynx that have severe injuries, and having veterinarians periodically evaluate the effectiveness of injury evaluations. The ultimate evaluation of effects of the various injury rates in the ITP is how injury rates affect the survival of individual lynx. For severely injured lynx that are rehabilitated and released, the MDIFW will monitor survival related effects through radio transmitters. Finally, the MDIFW has included changed circumstances in the plan to address the potential that injury rates or fatality rates are higher than anticipated in the plan. For the purpose of this DEA, we assume that the post-capture survival rates presented by the MDIFW reflect what will occur throughout ITP implementation.

Vulnerability and survival of kittens: Not all segments of the lynx population (i.e., animals of different ages or sex) may have the same vulnerability to trapping. For example, Bailey et al. (1986) observed that juvenile lynx were five times as vulnerable to trapping as adult females in Alaska. Adult male lynx were more vulnerable than females. Young lynx typically stay with their mothers for nearly their first year of life. Kittens were less vulnerable to trapping in Maine (Vashon et al. 2012). The MDIFW found that male lynx were only slightly more vulnerable to trapping than females, and kittens (less than 1 year old) were less vulnerable than adults. Quinn and Thompson (1987) also found lower vulnerability of kittens to

trapping. The differences in vulnerability of lynx to trapping observed in Alaska (Bailey et al. 1986) and Maine may be due to differences in trapping pressure and in adult trapping mortality between the two jurisdictions. In Alaska, lynx are legally trapped and killed for their fur, and Bailey et al. (1986) reported heavy trapping pressure (80 percent of radio-tagged lynx were killed because of trapping). This heavy trapping pressure may have resulted in many juveniles being orphaned, and consequently, becoming more vulnerable to trapping.

During the MDIFW's 12-year lynx radio-telemetry study, one kitten was trapped in 122 lynx captures. The MDIFW determined the age of 36 lynx incidentally trapped by fur trappers (ITP table 4.1.3); 3 (8 percent) were kittens, 7 (20 percent) were sub-adults, and 26 (72 percent) were adults. Females that were trapped, radio-collared, and that were traveling with kittens always reunited with their kittens (Vashon et al. 2012). Similarly, kittens that were trapped and released were able to reunite with their mothers. Therefore, the MDIFW does not anticipate any kitten mortalities resulting from adult females or kittens being incidentally caught in foothold traps and subsequently released.

In addition to being directly caught in traps, kittens may indirectly die from trapping if their mother is killed in a trap or removed from the wild for veterinary treatment. Juveniles have starved after their apparent mothers had been trapped and killed (Bailey et al. 1986, Carbyn and Patriquin 1983, Parker et al. 1983). Bailey et al. (1986) suggested that the juveniles were unable to find sufficient prey after the death of the adult females and that juvenile lynx may be dependent on the hunting ability of their mother during their first winter. Kittens are generally weaned and no longer dependent on their mother by 12 weeks of age (McCord and Cardoza 1982, Tumlison 1987, Fernandez et al. 2002). However, lynx kittens generally do not disperse from their family groups until 9 to 10 months of age (Parker et al. 1983, Koehler 1990) and this appears to be an important part of their life history. Fernandez et al. (2002) observed an orphaned 3 month old lynx kitten survive until at least 11 months of age on its own. Maine's trapping season occurs when lynx kittens are anticipated to generally be between 5 and 7 months old. The ITP anticipates only a small number of lynx will be severely injured or killed (or removed from the wild due to severe injuries) and therefore an even lower number, if any at all, would be anticipated to be females with kittens. There is also uncertainty with regard to the probability that kittens would suffer death or injury as a result. Because of uncertainty as to the fate of orphaned, weaned kittens, the MDIFW may capture (to the extent that they can) kittens orphaned from trapping or hold kittens until their mother is released or they are able to fend on their own (ITP p.90).

Injury rates of incidentally trapped lynx: The extent of injuries of an animal caught in a trap depends on multiple variables – the animal species, the type of trap used, how the trap was secured, the duration of time the animal is in the trap, weather, surrounding vegetation, and attack or predation by another animal. Injuries are mostly believed to be related to the degree of struggle after capture (Powell and Proulx 2003, Proulx et al. 1994, Nocturnal Wildlife Research 2008). Compared to other animals, most lynx caught in foothold traps remain relatively calm after trapping if undisturbed (J. Vashon, MDIFW pers. comm.). MDIFW biologists and trappers released most incidentally caught lynx. Lynx released by the MDIFW were assessed for injuries with an external exam and injuries were determined to be minor. A few lynx had more severe injuries and were treated by a veterinarian. In addition, a veterinarian assisted biologists at three lynx captures in 2012 and concurred that injuries were minor (J. Vashon, pers. comm., 6/23/2014).

The MDIFW's take estimates are based on the assumption that most lynx trapped in foothold traps are released with relatively mild injuries (ITP section 4.1). The MDIFW provided data to show that injury scores of Maine lynx caught by fur trappers and examined externally were similar to injury scores observed for coyotes and bobcats caught during BMP trap testing (ITP pp. 135 to 137). The MDIFW examined 32 lynx caught in foothold traps by fur and PM trappers from 1999 to 2012, and determined that 19 percent had no visible injuries, 75 percent had mild injuries, and 6 percent had moderately severe

to severe injuries (ITP table 4.2.2). Similarly, Kolbe et al. (2003) evaluated trap-related injuries in 39 lynx caught in padded foothold traps (i.e., Victor No. 3 BMP trap). From external evaluations, they documented that 8 percent of lynx in padded foothold traps had minor injuries, 3 percent had major injuries (fractured leg), 18 percent had foot freezing, and 8 percent had swelling. For 12 lynx caught by fur trappers in non-padded foothold traps of various types, 42 percent were determined to have minor injuries, none were determined to have major injuries, 8 percent had foot freezing, and 17 percent had swelling. Trapping-related injuries (even relatively minor injury) could cause some animals released from traps to be more susceptible to predation or to other stressors and cause their deaths weeks or months after capture (Hulland 1993, Seddon et al. 1999).

For the purpose of this DEA, we assume that the injury rates presented by the MDIFW reflect what will occur throughout ITP implementation, though there is uncertainty regarding injury rates. Some of the latest information on lynx injuries from trapping comes from trials of foothold traps considered by AFWA and the Fur Institute of Canada (FIC) for best management program (BMP) certification (appendix 1). Lynx caught in foothold traps were necropsied by veterinary pathologists to document the frequency and type of injuries received. AFWA tested the Victor No. 3 coil-spring trap with standard jaws (no padding, offset jaws, or lamination) in Alaska with a trapped sample of 24 lynx. Seventy-five percent (18) of the trapped lynx had mild injuries (e.g., mild swelling or bleeding), 12.5 percent (three) had moderate injuries, and 12.5 percent (three) had severe injuries (e.g., broken legs; B. White, AFWA, unpublished report). FIC tested three foothold trap models in Quebec and found that nearly all lynx caught in the traps experienced injury. Fifty-four of 65 lynx (83 percent) necropsied did not exhibit any of the serious injuries that would affect post-release survival. Ninety-seven percent of the 65 trapped lynx had swelling or bleeding. Of the 11 lynx that did experience serious injuries that would affect survival, nine had bone fractures or joint separation above the foot, five had a severed minor tendon or ligament, five had major bone abrasions, two had severed major tendons or ligaments, one had major skeletal muscle degeneration (death of muscle tissue attributable to physical exertion), and one had compound or comminuted fracture (bone has broken into several pieces; R. Cahill, FIC, unpublished data). Other furbearers caught in foothold traps frequently experience injury, much of it minor. Varying rates of major injury (e.g., joint dislocation, major laceration, freezing, fractures, major tooth damage, maceration of muscle, amputation) have been documented in research projects using foothold traps for lynx (Mowat et al. 1994, Kolbe et al. 2003, Nybakk et al. 1996), bobcats (Earle et al. 2003), red foxes (Englund 1982), wolves (Van Ballenberg 1984, Kuehn et al. 1986), and coyotes (Olsen et al. 1988, Onderka et al. 1990, Phillips et al. 1996, Shivik et al. 2005).

Without killing and conducting post-mortem injury assessment (e.g., necropsies), it is difficult to detect some trap-related injuries (e.g., the more serious injuries such as luxation, fractures, mild freezing) in a field setting. BMP trap studies of live animals use injury scores to quantify the extent of injury incurred by a trapped animal. A standard trauma scoring system was developed by the International Organization for Standardization (ISO; Standard 10990-5:1999, www.iso.org, Harris et al. 2006). Engeman et al. (1997) found that inconsistent assessment of trap injury occurred, even among an international panel of veterinary pathologists highly experienced with trap injuries. With training and experience, wildlife biologists may be able to improve their ability to detect, diagnose, and score injuries (Engeman et al. 1997).

The MDIFW has incorporated a number of elements into the ITP to ensure that their trapping related survival and injury information is as robust as possible. These includes having adequately trained wildlife biologists respond to lynx capture events and assess the potential for injuries prior to release; developing an updated field based injury assessment system with veterinary assistance; transporting and rehabilitating lynx that have severe injuries; and having veterinarians periodically evaluate the effectiveness of injury evaluations. The ultimate evaluation of effects of the various injury rates in the MDIFW's ITP is how injury rates affect the survival of individual lynx. For severely injured lynx that are

rehabilitated and released, the MDIFW will monitor survival related effects through radio transmitters. Finally, the MDIFW has included changed circumstances in the plan to address the potential that injury rates or fatality rates are higher than they anticipated in the plan.

For the purpose of this DEA, we assume that the injury rates presented by the MDIFW reflect what will occur throughout ITP implementation. In the event that severe injuries or fatalities are higher than anticipated in the ITP, the MDIFW's changed circumstance will allow modification of the plan. This is a potential given that the MDIFW is introducing some new trapping techniques (e.g., larger foothold trap sizes, non-lethal cable restraints, etc.). However, the MDIFW has explained that they do not think these newer techniques will increase injury rates and that if they do, the techniques will be modified or discontinued.

Capture of lynx in non-lethal cable restraints: Non-lethal cable restraints employ a flexible twisted multi-stranded wire to capture animals. Non-lethal cable restraints (versus a killing snare) have a locking device to keep the loop from reopening once it begins to close, yet stops tightening and relaxes when pressure is released. Non-lethal cable restraints also have a stop to prevent the loop from closing beyond a certain diameter. Surveys have documented that the public prefers furbearer trapping that minimizes stress and injury to target animals, while avoiding capture of non-target animals including pets and endangered species (Manfredo et al. 1999). Non-lethal cable restraints may address some of these concerns.

Non-lethal cable restraints can be set to discriminate between furbearer species caught by a) the height of the loop, b) circumference of the loop, c) size of the closed loop stop, d) breakaway devices (for larger mammals), and e) habitat where they are set. Unfortunately, many of these minimization measures are unlikely to discriminate against lynx in Maine because lynx are the same size and occupy the same habitats as coyotes and red fox in northern Maine[23]. For example, the FIC BMP recommendation for snare height for coyotes and lynx are both 10 inches (http://www.fur.ca/files/Best%20Trapping%20Practices.pdf last accessed on May 19, 204).

We assume lynx will be incidentally caught in cable restraints in Maine at relatively the same rate they are caught in foothold traps. Lynx are readily caught in snares, and snares are widely used in Canada and Alaska as a legal method to trap lynx. Also, lynx are frequently (and legally) caught in snares set for other furbearer species in other jurisdictions. For example, most of the 300 to 800 lynx taken in the Gaspe fur management units in southern Quebec (adjacent to Maine) are taken incidentally in snares set for coyotes (H. Joelicoeur, Quebec furbearer biologist, pers. comm. 2005). A lynx was caught in a coyote snare in Maine in 1993, when killing snares were legal in Maine, and an adult female lynx radio-tagged in Maine dispersed into Quebec where it was caught in a coyote snare. Several lynx have been incidentally snared in Minnesota in recent years. Lynx are incidentally caught in coyote snares in New Brunswick and Nova Scotia where they are a protected species (C. Libby, New Brunswick furbearer biologist and P. Austin-Smith, Nova Scotia biologist, pers. comm. 2005).

The MDIFW did not provide estimates of the number of trappers that are likely to use non-lethal cable restraints because it will be a new component of the program and they have no data to inform such estimates. However, the MDIFW assumes the use of cable restraints will not be additive to the other trapping techniques used by existing trappers. Rather, non-lethal cable restraints would be an option that

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[23] It is uncertain whether the MDIFW will allow cable restraints to be used to trap bobcats (some states do not permit, except for incidental captures). Using cable restraints for bobcats in northern Maine could increase the likelihood of catching lynx in these devices.

would replace the use of foothold traps in some circumstances (especially for trappers targeting coyotes). However, we used information from Pennsylvania to inform our assumptions about participation. Pennsylvania is one of about seven states that have permitted the use of cable restraints for trapping upland furbearers (Vantassel et al. 2010). Cable restraints were first approved for the upland trapping in Pennsylvania 2005 trapping season. In 2005, 1,515 (6.3 percent) of 23,941 licensed trappers took the training and were certified for cable restraints. In 2006, 2,369 (8.9 percent) of 26, 589 trappers were certified. About 40 percent who were certified actually used cable restraints and they set a median of 15 devices for a median of 15 days (Pennsylvania Game Commission 2008)[24].

Under alternative 3, the MDIFW will phase in non-lethal cable restraints in an adaptive process first with PM and ADC trappers, then with recreational fur trappers (ITP appendix 9). However, for the purposes of our analysis for alternative 3, we did not evaluate the phase in period, but rather assume that fur, PM, and ADC trappers will all eventually have the ability to implement cable restraints. Note that under the phased in approach, the MDIFW will only allow more broad use if non-lethal cable restraints are resulting in the same or less impacts to lynx (including injury rates) than the existing trapping methods (e.g., foothold traps). The MDIFW will need to evaluate these factors in the pilot program and account for them if and when they expand use of cable restraints to the recreational fur trappers. The MDIFW has included a 20 percent "allowance" in their incidental take estimates for a variety of issues that may slightly increase the rate of incidental capture, which include new techniques such as non-lethal cable restraints.

For the purposes of our analysis of alternative 3, we assume that use of non-lethal cable restraints in Maine will match the rates in Pennsylvania. Thus, 53 (10 percent) of 529 recreational fur trappers that trap in lynx WMDs will become certified and 21 (40 percent) will actively use cable restraints and all active PM (currently 17) and ADC trappers (currently 20) will deploy cable restraints. Therefore, we estimate that 58 trappers will be implementing cable restraints when they would have otherwise implemented some other type of device. We assume that capture rate is largely a function of encounter rate (though it probably is somewhat more complicated) and therefore that lynx will be incidentally captured at roughly the same levels as would have been caught by these trappers in foothold traps.

While we assume that lynx incidentally-trapped in non-lethal cable restraints will not be additive to the other trapping techniques used by existing trappers, there is some level of uncertainty given that this is a new program and there is little information on what to expect. For example, cable restraints are relatively inexpensive and easy to deploy and trappers may set more cable restraints than they would have foothold traps or perhaps even set them in addition to foothold traps. Also, trappers would be expected to use cable restraints later in the season (mid-November through December) when frozen ground and snow make foothold trapping for coyotes difficult.

Cable trapping methods (e.g., foot snares and non-lethal cable restraints) are increasingly being accepted because of relatively low injury rates for canids (Vantassel et al. 2010). There are no BMP studies to evaluate injuries to lynx or bobcat in cable restraints. The MDIFW does not anticipate lethal take or severe injuries in cable restraints because of low injury scores in field trials with other furbearer species (Olson and Tischaefer 2004, Munoz-Igualada et al. 2008).

There is some data available to evaluate the injury and fatality rates associated with non-lethal cable restraints. While target animals are intended to be caught around the neck, they are sometimes caught around the leg, shoulder, and abdomen and entanglement in vegetation which can result in injuries.

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[24] Similar participation occurred in Wisconsin; 15-16 percent of trappers used cable restraints and deployed 9.8 sets/trapper (Dhuey and Olson 2013).

About 33 percent of red foxes caught in cable restraints in Spain were caught around the body, and two of 28 (7 percent) experienced major injuries (fracture of tooth and soft tissue damage)(Munoz-Igualada et al. 2008). For 379 foxes caught in cable restraints in England, 5 percent died, 4 percent were alive but with injuries, and 91 percent were alive with no apparent injuries (Short et al. 2012). In England, 15 to 25 percent of foxes caught in cable restraints were caught by the abdomen or shoulder – all alive with no apparent injury (Short et al. 2012). In BMP tests of cable restraints for coyotes in the United States (n=30), none died, 30 percent experienced moderate injuries, and 70 percent had mild injuries (Olson and Tischaefer 2004). In BMP tests of cable restraints for red fox in the United States (n=11), 9 percent had moderately-severe injuries, 9 percent experienced moderate injuries, and 82 percent had mild injuries (Olson and Tischaefer 2004). In field tests of cable restraints on coyotes in Michigan (n=25) there was 20 percent mortality (Etter and Belant 2011), but in a second Michigan study (n=21) there were no mortalities; the most common injuries were bruising and minor lacerations and the most significant was major muscle degradation (Wegan et al. 2014). In all studies, mortalities were caused by entanglement in vegetation, failed loop closure stops, and injuries obtained while struggling in the trap. Keeping areas clear of woody debris is critical to avoiding death and injury (Wegan et al. 2014) and will be required if cable restraints are permitted in Maine (ITP p. 316).

Injury rates from studies of non-lethal cable restraints appear to be variable and likely highly dependent on the captured species and the parameters used for the cable restraints (e.g., loop size, stop sizes, tending times, etc.). For example, most lynx caught in foothold traps remain relatively calm compared to other animals after being trapping, if left undisturbed (J. Vashon, MDIFW pers. comm.). This suggests that they may be less prone to injuries from cable restraints. However, Quinn and Parker 1987 explain that lynx are extremely susceptible to strangulation and must be carefully handled around the neck. We know that bobcats (and cats in general) can suffocate when wire loops are placed around their neck (R. Chipman, USDA APHIS pers. comm. 1/6/2012 and http://nwco.net/0530StepThreeNonlethalToolsAndTechniques/5-1-DirectCapture.asp last accessed May 9, 2014). Minimum loop stop diameter may prevent some injuries and allow non-target species to escape. Michigan requires a loop stop that requires the snare loop from closing smaller than 4 ¼ inches to decrease the potential lethality of snares for non-target species (AFWA 2007, http://www.fishwildlife.org/files/Summary-Trapping-Regulations-Fur-Harvesting.pdf, last accessed on May 1, 2014). In a trial of cable restraints for coyotes, capture of non-target species was reduced greatly with larger minimum loop stops (Etter and Belant 2011). The MDIFW is currently considering to use a minimum loop restriction size of 2 ½ inches (ITP appendix 9, p. 316). Under alternative 3, MDIFW will phase in cable restraints in an adaptive process in order to collect information on injury (or lack thereof) to lynx and bobcats and inform decisions on whether to proceed with broader application or how to modify cable restraints to reduce incidental take or injury.

Capture of lynx in cage traps: ADC trappers could potentially incidentally trap lynx in cage traps set for raccoons and other wildlife (ITP p. 52), although there are few raccoons in the lynx WMDs and this type of ADC activity would occur near residences where lynx are unlikely to occur (ITP p. 57). For the purposes of this analysis, we assume some of the incidental captures attributed to MDIFW's trapping programs could result from the use of cage traps. Also, under alternative 3, the MDIFW proposes to rescind current cage trap restrictions and permit the general use of cage traps by fur trappers statewide (ITP p. 36).

It is most likely that fur trappers would use cage traps set for bobcats (ITP p. 48, 61). Woolf and Nielsen (2002) reported that bobcats were twice as easy to capture in cage traps versus foothold traps. Cage traps are not used by trappers targeting red fox and coyotes, because most will not enter these traps (ITP p. 48). PM trappers would not use cage traps because they target coyotes. ADC trappers would use cage traps, for many species.

Fur, PM and ADC trappers must check cage traps (and any other type of restraining trap) every 24 hours. The MDIFW did not provide information on the number of fur or ADC trappers that may use cage traps; for example, it is unknown whether bobcat trappers would replace using foothold traps with cage traps. However, given that cage traps were permitted prior to the Consent Decree, it is unlikely that many bobcat trappers will replace foothold traps with cage traps. The MDIFW also did not provide information on the number of cage traps that may be deployed in lynx WMDs or the number of trap nights. However, we assume that fur trappers would only be permitted to deploy cage traps during the current trapping seasons. ADC trappers can deploy cage traps year-round. To account for the possibility that use of cage traps could lead to increased lynx captures overall, the MDIFW added a 20 percent incidental take buffer in the incidental take calculation (ITP section 4.2, table 4.2.1). In addition, they will monitor incidental take (ITP section 5.2) and implement contingency plans if take is higher than anticipated (ITP, section 5.3; J. Vashon, MDIFW, email dated March 21, 2014).

Kolbe et al. (2003) observed no injuries in 89 lynx captures in a cage trap design used in Montana. Similarly, Mowat et al. (1994) observed 32 percent of lynx (n=19) caught in cage traps had minor injuries (broken or split claws and superficial cuts to the nose and more rarely, to the face) and the remainder had no injuries. Cage traps had the lowest cumulative injury scores for field trials for bobcats; 96 percent had no injuries and 4 percent had mild injuries (ITP Table 7.3.3 p. 137). Way et al. (2002) trapped coyotes in Massachusetts in cage traps (n=29 captures) and few injuries were reported; minor limb damage and tooth damage. The MDIFW caught 52 lynx in cage traps (339 captures) without any injuries requiring veterinary care (ITP p. 61). Based on these studies, we assume all lynx incidentally trapped in cage traps will experience minor injuries, and none will experience moderate or severe injuries or death.

Unrestricted size of foothold traps: The Consent Decree required that foothold traps used in WMDs 1 to 6 and 8 to 11 have a jaw spread less than 5 $^{3}/_{8}$ inches. This effectively limits some BMP traps from use (table 5.3). This measure was put into place to reduce injury and the number of lynx taken because it was believed that lynx with large feet may not be caught in smaller traps. However, lynx continue to be captured in foothold traps despite the size restrictions. Under alternative 3, the MDIFW proposes to rescind the 2007 Consent decree and have unrestricted trap sizes. We therefore assume having unrestricted trap sizes will not affect the number of fur, PM, and ADC trappers and the number of foothold traps they set. However, trappers have specifically requested larger foothold traps so that they can trap longer and under frozen conditions (mid-November through December), thus trapping effort may increase.

Table 5.3. Inside jaw spread at the dog (trigger holding the pan) for AFWA BMP traps in the United States. Traps with shaded cells meet the requirements of the 2007 Consent Decree.

Type of trap	Canada lynx	Bobcat	Red fox	Eastern coyote
unmodified coil spring	5 ¼	4 ½ to 6 $^{1}/_{8}$ inches	4 ½ to 5 ¼ inches	5 to 5 ¼ inches
padded coil spring	5	4 ½ to 5 $^{3}/_{8}$ inches	4 $^{5}/_{16}$ to 5 $^{3}/_{16}$ inches	4 ½ to 5 $^{3}/_{16}$ inches
Offset laminated coil spring	5 ¼	5 $^{1}/_{16}$ to 6 $^{1}/_{16}$ inches	4 $^{7}/_{8}$ to 5 ½ inches	5 $^{1}/_{16}$ to 5 ½ inches
Unmodified longspring	None approved	5 $^{7}/_{8}$ inches	None approved	None approved

The MDIFW does not anticipate that larger traps will increase injury rates for lynx because injury rates prior to the 2007 Consent Decree, when there was no trap size restrictions, were similar to or lower than the injury rate for coyotes and bobcats caught in BMP approved traps (ITP section 7.3, p. 135 to 137,

tables 7.3.2 and 7.3.3). The MDIFW detected no or minor injuries in 30 of 32 (94 percent) lynx trapped by fur trappers prior to the 2007 Consent Decree restrictions on trap size, which is generally less than injury scores for eastern coyotes and bobcats caught in many types of BMP traps (ITP tables 7.3.2 and 7.3.3). The MDIFW also found that injury rates of these 32 lynx caught by fur trappers were less than the injuries detected in their research project where padded foothold traps were used (ITP table 4.1.1). However, injury rates from external evaluation may be underrepresented, as previously explained. Furthermore, up to 27 percent of coyotes and 10 percent of bobcats in BMP traps received severe injuries, even in BMP traps (ITP Tables 7.3.2 and 7.3.3). BMP foothold trap field studies by AFWA in Alaska and FIC in Canada also shows severe injury rates of 12.5 percent and up to 35 percent, respectively (DEA section 5.1.1.2). The FIC and AFWA BMP studies represent the best available science in North America on foothold trap injury rates to Canada lynx, although the BMP and the MDIFW studies are not directly comparable because we do not know the exact models and sizes of foothold traps tested in Canada or used in Maine (prior to the Consent Decree).

Using larger and heavier traps with a larger jaw spread could increase injury rates in incidentally captured lynx. Larger traps would be expected to have more powerful springs, thus higher impact velocity and force and higher clamping force (Earle et al. 2003, Nocturnal Wildlife Research 2008). Larger traps are also heavier, which allows animals enough leverage to incur fractures above the point of trap impact (Phillips et al. 1996, Nocturnal Wildlife Research 2008). Larger traps would be expected to catch animals higher, usually on the leg above the paw, thus increasing the risk of severe injury, including bone fractures. If larger traps are used in snow and frozen conditions later in the trapping season in Maine (mid-November to December), then freezing injuries may also increase (e.g., Mowat et al. 1994). In response to this concern, the MDIFW has incorporated a changed circumstance into the revised ITP that will be triggered if rates of severe injuries are higher than anticipated for any reason (ITP p. 120 to 121), including the use of these larger traps. The options available include rescinding the larger trap sizes, restricting the time periods the larger trap sizes could be used, and/or implementing BMP approved traps that may have lower associated injury rates.

Capture of lynx in wooden based rat traps: Fur trappers often trap for ermine (weasels) in boxes, which were not permitted to be used per the 2007 Consent Decree. The MDIFW proposes to rescind this provision of the Consent Decree and allow trapping for ermine with wooden based rate traps in boxes with a 2-inch hole. Lynx may be interested in these traps (which are baited), but will not be able to get their paw into the box. Thus for the purposes of analyzing alternative 3, we assume that no lynx will be caught in these sets.

Effects of snowmobiles on lynx: A final aspect of trapping that is important to understand is the effects of snowmobile and forest road use by trappers on lynx. As previously explained, there are roughly 2,450 trappers annually in Maine, though only a portion of these will be trappers that target activities in lynx areas. Trappers often rely on forest roads to access their trap lines and sometimes rely on snowmobiles to access more remote areas later in the winter when snow precludes other means of access. It has previously been hypothesized that snowmobiling and forest road use may potentially cause disturbance to lynx. In addition, such activities may allow lynx competitors (e.g., coyotes) into deep snow habitats where lynx forage in winter causing impacts via interspecific competition. Research in the Northern Rockies has provided little evidence supporting the contention that snow-compacted routes adversely affect lynx or their habitats (Service 2007). Squires et al. (2010) reported no evidence that lynx were sensitive to forest roads, including those used by snowmobiles in winter. Kolbe et al. (2007) found little evidence that coyotes more efficiently compete with lynx in the presence of packed snowmobile trails. Kolbe et al. (2007) also observed that snowshoe hares made up a small portion of coyote feeding sites (3 percent) in winter and that coyotes primarily depended on scavenged ungulate carrion. While we do not have information on this topic specific to lynx in Maine, the Service believes that the existing science suggests that snowmobile and forest road use by trappers is not a significant issue (with regard to

disturbance) for lynx. In addition, specific to this project, there will be a relatively low density of trappers distributed across the lynx areas further reducing the potential for disturbance related effects. Therefore, we believe that snowmobiles do not affect lynx in Maine.

Effects of authorizing incidental take to lynx in Maine

Under alternative 3, the MDIFW would be issued an incidental take permit that authorizes take of Canada lynx over a 15-year permit period. The incidental take under alternative 3 is similar to that anticipated under alternative 1, though the take request includes an additional 20 percent "allowance." The MDIFW's incidental take request is up to 195 lynx of which up to three may be killed or have injuries severe enough that they cannot be fully rehabilitated and subsequently released, up to nine may be severely injured but released following rehabilitation, and the remainder will be released with no or only minor injuries.

Similar to the analysis in alternative 1, we consider the effects of this level of take in two ways. First, the MDIFW presents data from a population model that shows that three lynx mortalities over 15 years will have little effect on Maine's lynx population (ITP pp. 72-73). Second, the estimated trapping mortality (0.2 lynx per year or one lynx every 5 years) is within sustainable limits of a harvested lynx population at a high point in snowshoe hare populations. The lynx mortality that is attributable to Maine trappers each year is lower than in jurisdictions where lynx trapping is legal. Trapping mortality for the Maine lynx population would have to exceed 75 to 150 lynx, or 10 to 20 percent respectively, before a population of 750 lynx populations would be impacted. Thus, even if lethal take from trapping in Maine was magnitudes higher than anticipated by the MDIFW, it is likely to be below the threshold for population effects. As part of the ITP, the MDIFW will monitor lynx population trends and incidental take and take action if incidental take is greater than expected (ITP section 5.4).

Therefore, under alternative 3, while up to 195 lynx may be incidentally captured over the 15-year permit period, most will have no or only minor injuries, some will have more severe injuries, and very few will be killed. Those killed are a very small proportion of the lynx population in Maine and will not have an effect to the overall population in the state or more broadly. Thus, the effects of alternative 3 on Canada lynx are not significant.

5.3.2 Bald and golden eagles

The effects of alternative 3, the MDIFW's proposed ITP, on bald and golden eagles would be the same as those in alternative 1. For the purposes of analyzing alternative 3, we assume that no bald or golden eagles will be trapped under the MDIFW's ITP. If an eagle is incidentally trapped, the MDIFW will consider whether to seek a BGEPA permit (ITP p. 28) or amend its ESA section 10 permit to include eagles as a covered species. Therefore under alternative 3, we assume that no bald or golden eagles will be trapped and the effects of alternative 3 on eagles are not significant.

5.3.3 Other wildlife

5.3.3.1 Trapped wildlife

Trapping effort may increase slightly under alternative 3 because new forms of trapping (e.g., larger foothold traps, non-lethal cable restraints) will become available to trappers. Also some trappers say they have avoided trapping in lynx WMDs because of liabilities with incidentally trapping a lynx. If a permit were issued, these trappers may return to trap in lynx WMDs. In addition, changes in furbearer populations, fur prices, economic conditions, prices of licenses and access fees, weather, and fuel prices all could affect trapper effort in the future, which in turn would affect future harvest of furbearers.

Maine's harvest of trapped wildlife is summarized in the ITP (section 3.1, table 3.1.2) and upland species in this DEA (table 5.1.3.1). We expect a moderate increase in trapped wildlife under alternative 3. In particular, coyote harvest would most likely increase because the new trap types proposed in the ITP (especially larger foothold traps and non-lethal cable restraints) were justified primarily to increase trapping effort for coyotes.

The MDIFW manages furbearer populations by establishing harvest regulations and assessing furbearer harvest. Species with mandatory pelt tagging like bobcat, marten, fisher, fox, and coyote are monitored using various management systems (table 5.1.3.1). Species assessments and management systems were written for each furbearer species by MDIFW biologists that document the current state of knowledge and describe how management decisions are made (http://www.maine.gov/ifw/wildlife/conservation/species_planning.html last accessed on May 29, 2014). Species goals and objectives are derived by public working groups (e.g., to increase or decrease populations), and management decisions are made by MDIFW biologists. The MDIFW manages most furbearer species for stable or increasing populations. Harvest levels are set within biological limits for each species, unless the public has other desired goals. For example, the public desires local coyote control in northern Maine, but otherwise wishes to allow the population to fluctuate naturally. With rare exceptions (e.g., coyotes), the MDIFW is unlikely to allow increased trapper effort to intentionally reduce populations.

Targeted weasel trapping is likely to increase after the Consent Decree is rescinded and wooden-based rat traps in boxes can be used again. The number of weasels trapped in northern Maine is unknown because pelts are not required to be tagged. Many are probably trapped incidental to traps set for marten and fisher. Unlike most other furbearers the MDIFW has no planning documents for short- and long-tailed weasels. Current (2014) in the North American fur auction averaged $3.20 each (http://www.nafa.ca/wp-content/uploads/2014/02/NAFA_2014-02-WF-USA.pdf last accessed July 18, 2014), thus there is likely low trapping effort targeting these species. Trappers could also trap red squirrels (classified as a furbearer in Maine) in these sets, but their average price was only $0.82 each. Thus, we conclude that the proposed action will result in a minor increase in trapping for these species.

Under alternative 3, the MDIFW proposes mitigation to offset lethal take of lynx by maintaining or enhancing 4,785 acres of young forest habitat to support lynx on a 10,411-acre areas in the MDPPL Seboomook Unit. This will require timber management activities that may convert some existing mature forest habitat to young softwood-dominated forest. One consequence of this mitigation project will be that American marten and other mature forest species will see a reduction in forest habitat in this area. Approximately 20 percent of the lynx habitat area is in mapped deer wintering areas (DWAs), and MDIFW indicates further mapping is needed on the Seboomook Unit (http://www.maine.gov/dacf/parks/get_involved/planning_and_acquisition/management_plans/seboomook_unit/docs/AppendicesFinal.pdf last accessed June 3, 2014). We assume DWAs will not be cut to maintain and enhance lynx habitat because this is a valuable and limited habitat in northern Maine, and it is MDPPL's goal to protect, enhance, and increase DWAs on the Seboomook Unit.

If the mitigation does not get implemented, the mitigation lands intended for lynx management will continue to grow into more mature forest conditions (ITP p. 109). Simons (2009) modeled marten habitat in a 4 million-acre area that includes the Seboomook Unit. Within this area, from 1975 to 2007, habitat declined from 3.4 million to 2.3 million acres and the model suggests that the marten population may have declined by as much as 50 percent. Habitat loss was directly attributable to heavy harvest of mature forest and associated stand fragmentation. Simons' (2009) models indicate the lynx habitat area is currently poor marten habitat. If the 4,785 acres are allowed to mature into marten habitat, it will increase habitat in this region by 0.2 percent or enough to support an addition eight to ten adult American marten.

The mitigation is consistent with regional forest management trends causing diminished marten habitat, but is a relatively insignificant amount in the northern Maine region.

In summary, under alternative 3 we anticipate a moderate increase the number of furbearer species trapped, but because of the MDIFW's trapping program, managed populations are expected to remain stable or increasing. The mitigation will have a localized effect to marten habitat, which is relatively minor at a regional scale.

5.3.3.2 Migratory Birds

We provided an analysis of the effects of the MDIFW's current trapping program on migratory birds in section 5.1.3.2. Incidental take of migratory birds would be greater in alternative 3 than in alternatives 1. Non-lethal cable restraints are unlikely to take migratory birds. However, cage traps have been documented catching small birds, gulls, corvids, and raptors (Way et al. 2002, Shivik et al. 2005), and gray jays (Mowat et al. 1994, Waldien et al. 2004). The MDIFW trapped 17 gray jays in cage traps in 9,491 trap nights. Many birds incidentally trapped in cage traps could likely be released alive. Unrestricted (i.e., larger) traps may increase trapping effort from mid-November through December, thus increasing exposure to species like hawks, owls, jays, crows, and ravens. Covered bait restrictions will be maintained under the ITP, which will help minimize the potential for these impacts. However, most birds caught in foothold traps, regardless of size of the trap, would likely be severely injured or killed. It should be noted that the MDIFW has presented data that suggests that take of migratory birds from the current furbearer trapping programs in Maine is very low and having a negligible impact on migratory bird populations (appendix 2).

The proposed action is anticipated to result in minor effects to migratory birds. For example, using the same analysis approach as presented in section 5.1.3.2, though assuming a 10 percent increase in take of gray jays to account for increased trapper effort and use of additional methods (such as cage traps), we anticipate 165 to 3,316 jays could be incidentally trapped. Take of up to 3,316 gray jays from a population of 92,839 represents 3.6 percent of the population. Mortality rates of young gray jays from fledging to mid-October were 52 to 85 percent (Strickland 1991), but annual mortality is much less for adults (15 to 18 percent and even as low as 10 percent)(Strickland and Ouellet (1993). American crows in New York had similar demography with 65 percent mortality in the first year of life and low mortality thereafter (McGowan 2001). Comparable mortality rates in common ravens has not been documented, but they are very long-lived birds (Boarman and Heinrich 1999). Based on this information, we believe that incidental take from trapping at these rates would not have a statewide population-level effect on gray jays or other species, but could have minor effects on local populations.

5.3.3.3 Non-target mammals

Baseline effects of the MDIFW's current trapping program on non-target animals are described in section 5.1.3.3. We anticipate that trapping effort will increase in northern Maine if an incidental take permit is issued, as contemplated by this alternative. Trappers that avoided trapping in northern Maine, so as to avoid catching lynx, may return. The proposed action will expand trapping opportunity to include new forms of trapping (e.g., cable and cage traps), and the ability to trap in frozen conditions with larger foothold traps. Thus, we expect incidental take of non-target mammals to be greater for alternative 3 than alternative 1 as described below.

The ability to use unrestricted (i.e., larger) foothold traps is expected to increase trapping effort from mid-November through December, thus increasing exposure to these traps for species like deer, moose, porcupines, snowshoe hares, and northern flying squirrels. Deer and moose are occasionally caught in larger foothold traps, but are able to free themselves with little struggle (Skinner and Todd 1990). We

expect negligible effects to ungulates. Many mid-sized mammals caught in larger foothold traps are furbearers (e.g., fox, bobcat, skunk, and raccoon) and can be legally harvested. Conversely, small mammals caught in foothold traps, regardless of size of the trap, would be severely injured or killed and unlikely to survive.

Baited wooden-based rat traps in boxes with a 2-inch opening set for weasels would attract to northern flying squirrels and other small mammals. Boxes of similar size and opening are used attract flying squirrels (McComb and Noble 1981) and they are attracted to bait and carrion (Weigl 2007). Thus, take of northern flying squirrels and other small mammal species (e.g., mice and squirrels) would be greater under alternative 3 than alternative 1. The MDIFW did not provide information in the ITP on how many trappers would likely use these boxes for weasels in lynx WMDs.

Cage traps are not selective and capture many non-target mammals. Small mammals, including snowshoe hare, are frequently caught in cage traps (Mowat et al. 1994, Way et al. 2002, Shivik et al. 2005). The MDIFW caught snowshoe hare and black bear cubs in cage traps (MDIFW *Partnership in Lynx Conservation in Maine* reports 1999 to 2007). Injury rates and mortality of non-target species are expected to be low. Kolbe et al. (2003) reported that birds, bobcats, and snowshoe hares were easily released unharmed from cage traps. The MDIFW caught 138 snowshoe hares in cage traps in 9,491 trap nights (1.45 hares per 100 trap nights). Flying squirrels are not likely large enough to trip the trap mechanism in cage traps. The MDIFW did not provide estimates of how many cage traps may be set in the lynx WMDs. However, we expect the number to be relatively low (i.e., fewer than 1,000) because there are relatively few bobcats in the lynx areas.

Use of non-lethal cable restraints may result in an increase in the incidental capture of non-target mammals. Cable restraints can catch deer and moose but often incorporate breakaway devices to allow deer to escape (Gardner 2010). However, these devices do not always function properly and deer (especially young deer) can be killed (Etter and Belant 2011). Olson and Tischaefer (2004) had two deer killed by coyotes while they were held in cable restraints.

Based on these changes to trapping and trapping effort:

- Incidental trapping of northern flying squirrels could increase due to larger foothold traps and wooden-based rat traps because of increased late-season trapping effort for both coyotes and marten. Even if trapping effort increases by 20 percent, using the incidental trapping estimates presented in alternative 1 (section 5.1.3.3), a corresponding increase of 20 percent would suggest that take of flying squirrels could be as low as 0.02 percent of the population (2,368 from a population of 11.6 million). It could also be as high as 0.5 percent of the population (6,236 from a population of 1.4 million) of the flying squirrels in northern Maine and still not have population level effects.
- Incidental trapping of snowshoe hares could increase due to larger foothold traps, cage traps, and cable restraints (depending on minimum loop size) because of increased late-season trapping effort and the non-selectivity of cage and cable restraints. Even if trapping effort increases by 20 percent, using the incidental trapping estimates presented in alternative 1 (section 5.1.3.3), a corresponding increase of 20 percent would suggest that 293 to 410 snowshoe hares may be trapped in the lynx WMDs. Incidental trapping at most may take 0.02 percent (445 from a population of 1.6 million) of the population.

Based on the analysis above, we conclude that the proposed action will have minor effects on non-target mammals and will have negligible effects on their populations. Most of the non-target mammal species that would likely be affected (e.g., deer, moose, northern flying squirrel, snowshoe hare) have robust

populations in Maine, and trapping related impacts (even with rates higher than currently occur) would only represent a small proportion of their population.

5.3.4 Outdoor recreation and socioeconomic factors

Under alternative 3, there would be increased trapping opportunities. The MDIFW would continue to implement many of the trapping policies, statutes, and regulations developed over the last 15 years, which seem to have had little negative effect on the recreational experience of trapping. In some instances, trapping restrictions in regulations would be relaxed after the Consent Decree is vacated. Trappers may purchase new foothold traps and non-lethal cable restraints, if phased in. More fur trappers, PM, and ADC trappers may pursue late-season trapping. Some trappers would purchase exclusion devices for killer-type traps. Some trappers that have avoided trapping in northern Maine may resume trapping there. Uncertainty about future trapping regulations and controversy would be reduced. Modest increases in trapping activity would not be expected to greatly affect other forms of outdoor recreation.

Alternative 3 would be expected to have minimal economic effects. The MDIFW would incur expenses to increase education of trappers concerning new regulations and to start cable restraint training courses. The anticipated costs of implementing alternative 3 are in the ITP (table 6.1 p. 125) or $58,500 per year. Most of these costs ($54,000 per year) involve the publication and distribution of a regulations booklet for hunting and trapping – an ongoing expense. Most other activities, like investigating incidental lynx captures, increased compliance monitoring by wardens, and outreach activities are included in the base salary of the MDIFW staff.

Economic activity associated with trapping (e.g., purchasing trapping supplies, gas, equipment, cabin rentals) would increase moderately because of the new forms of trapping and interest in trapping longer into mid-November into December.

The MDIFW proposes mitigation to offset lethal take of lynx by maintaining and enhancing 4,785 acres of young forest habitat to support lynx on a 10,411-acre areas in the MDPPL Seboomook Unit. Recreation in this area has been declining (DEA section 5.1.4). It is likely that there are fewer than 10,000 visitors to the Seboomook Unit annually, most to hunt and fish and other forms of outdoor recreation. As much of the area is already heavily cut, mitigation will not change the scenery appreciably. Although mitigation will not appreciably change the scenic nature of the Seboomook Unit, it could cause some public controversy. The MDPPL would use shelterwood harvests to maintain and enhance lynx habitat. Some members of the public may be adverse to these forms of forestry and some public comments that we received on the MDIFW's 2008 draft ITP raised concerns about using public lands for mitigation. Maine public lands are often managed for mature forest and their associated wildlife and represent some of the last remaining landscapes of mature forest in northern Maine. The public commented that logging the MDPPL Seboomook Unit to create lynx habitat would reduce the amount of publicly-owned mature forest and associated species like American marten.

The MDIFW did not provide information on the amount of mature forest that would be converted to young forest for mitigation, but did indicate that mitigation activity would prevent most of the 4,785 acres intended to be lynx habitat from reaching a mature forest condition over approximately the next 25 years. If the entire 4,785 acres requires forest management activities to achieve the mitigation, it would represent up to 0.02 percent of the 500,000 acres of forest harvested in Maine in a year. The mitigation could result in cutting several thousand acres of mature forest. The amount of mature spruce- fir (sawtimber, greater than 9 inch diameter breast height) in Maine is estimated to be 1.6 million acres (Maine Forest Inventory 2012). Therefore, if the entire mitigation area was late successional forest and subject to management under the proposed mitigation, up to 0.3 percent of Maine's mature spruce-fir forest could potentially be affected. While there may be some public controversy in cutting mature forest

to create lynx habitat on public land, the amount of forest management and the level of impact to mature forests will be negligible on a statewide basis.

Maine Department of Conservation (MDOC) will financially benefit from the sale of forest products from implementing the mitigation. For example, to enhance habitat the MDOC will likely harvest mature spruce-fir forest. Average stumpage prices for spruce-fir sawlogs was $135 per thousand board feet in Aroostook County in 2007 (www.maine.gov/doc/mfs/pubs/pdf/stumpage/07stump.pdf). An averaged stocked mature spruce-fir stand may have 9,000 board feet per acre, thus harvesting 5,000 acres would have a gross value of $6 million over a decade or more of logging activity (actual income would be less the costs of roads, logging crews, etc.). However, the MDOC likely would have harvested much of this area anyway. Mitigation to maintain and enhance lynx habitat will undoubtedly alter the frequency and timing of logging that otherwise would have been prescribed for this area. The MDOC may realize less commodity value as a result of the mitigation requirements. For example, to maintain habitat the MDOC may have to prematurely cut stands to "recycle" them back into lynx habitat. This would result in forest products of lower value (e.g. wood chips, biomass).

The revenue that the MDOC is expected to derive from the mitigation harvesting is minor compared to statewide forest revenue, which is approximately $885 million annually (Maine Forest Products Council. Maine's Forest Economy. www.maineforest.com last accessed June 2, 2014). Several logging crews would be employed for many months to complete road construction and harvests. Local mills would benefit from the wood supply. However, the expected employment is relatively small compared to annual employment of approximately 12,000 individuals in Maine's Forest Products industry (Maine Forest Products Council. Maine's Forest Economy. www.maineforest.com last accessed June 2, 2014).

We conclude that the effects of the proposed action on outdoor recreation and socioeconomic factors are relatively minor at local (i.e., MDDPL Seboomook Unit or the greater North Maine Woods region) and statewide levels.

5.3.5 Vegetation and habitat

Effects of trapping activities on vegetation and habitat are insignificant throughout the state of Maine (section 4.4). Environmental consequences are focused on the effects of the mitigation, which for some alternatives could affect thousands of acres of vegetation.

Under alternative 3, the MDIFW proposes mitigation to offset lethal take of lynx by creating (or maintaining) about 4,785 acres of young forest habitat to support lynx on a 10,411-acre areas in the MDPPL Seboomook Unit. About 3,798 acres of young conifer forest already exists in the mitigation area in the Seboomook Unit (ITP p. 105). A forest management plan will be developed within 3 years of permit issuance. This will provide the specific details on forestry prescriptions, harvest locations, and timeframes that will be implemented to achieve the goal of providing 4,785 acres of young forest habitat to support lynx within the 15-year permit period.

We assume that the forest management activities will primarily involve shelterwood harvesting. Some areas of mature forest will be cut to maintain and enhance early successional habitat, but it is not known how areas already in a young forest condition will be treated. They are generally merchantable at this stage and already provide lynx habitat. Some roads and skid trails (see previous sections) will undoubtedly need to be created and will result in limited forest clearing (section 2.3.1.2). In response to forest management treatments, the resulting plant communities could change substantially in species composition, age, and structure. Silviculture and possibly herbicide treatments may be used to favor regenerating spruce-fir. Effects on vegetation would be temporary as forested conditions eventually return after harvest activities.

Forest management activities on the Seboomook Unit to achieve the mitigation goals represent roughly 0.01 to 0.02 percent of the 500,000 acres of forest harvested in Maine in a year. The mitigation associated with the proposed action could reduce the amount of mature, softwood-dominated forest in northern Maine by several thousand acres. It will maintain and enhance up to 4,785 acres of young softwood-dominated forest, which is a very common forest type in northern Maine. However, these changes are not unusual for forestry in northern Maine, and although the effects of mitigation on vegetation are greater than in alternatives 1 and 2, mitigation associated with the proposed action will have only minor effects on the forests on Seboomook Unit or the greater northern Maine landscape.

5.4 Alternative 4 (Fur Trapping, Implemented Consistent with the MDIFW's ITP; PM and ADC Discontinued in Lynx WMDs)

Under this alternative, the Service would issue an incidental take permit to the MDIFW only for the fur trapping program and that program would be managed according to the MDIFW's revised 2013 ITP. The PM and ADC programs would not be covered by the permit and therefore the MDIFW would manage these programs in a manner that avoids incidental take of Canada lynx. For the purposes of the analysis of this alternative we assume that the MDIFW discontinues elements of the PM and ADC trapping in lynx WMDs that could take lynx (e.g., coyote and fox control). In addition, we assume that the MDIFW phases in use of non-lethal cable restraints, but outside of the lynx WMDs.

This alternative represents the proposed action that was analyzed in the Service's 2008 DEA and the MDIFW's initial draft ITP, with some modifications. However, the MDIFW's revised ITP (which is what is being analyzed in this revised DEA) includes coverage for the PM and ADC programs. Therefore, alternative 4 is designed to demonstrate the effects of including these two new programs in addition to the fur trapping program. For the purposes of the analysis of this alternative we assume that the MDIFW discontinues elements of the PM and ADC trapping in lynx WMDs that could take lynx (e.g., coyote and fox control).

5.4.1 Threatened and endangered species

5.4.1.1 Canada lynx

Under alternative 4, the MDIFW would be issued an incidental take permit only for the fur trapping program. Therefore, for this alternative we removed take of lynx associated with the PM and ADC programs from Alternative 3. The MDIFW projected that ADC and PM trappers would incidentally catch up to four lynx per year, while the recreational fur trappers would catch up to seven. We cannot assume that removal of the PM and ADC program will absolutely result in four fewer lynx per year because absent the programs, some or all of the PM trappers may return to being regular fur trappers. If they continued to catch lynx that may increase the anticipated lynx capture anticipated under the fur trapping program. However, we do not know how many PM trappers would continue to trap, and coyote fur trappers generally trap in areas that have less opportunity for incidentally catching lynx (J. Connolly, MDIFW Memorandum to the Service, June 11, 2014, appendix 3). For the purpose of this alternative we assume that the PM program has an additive effect and discontinuing it will result in a lower overall amount of incidental lynx capture. While we cannot quantify the precise magnitude of the reduction, we presume it will be up to 60 (four lynx per year over the permit term) fewer than alternatives 1 and 3, such that 135 lynx may be incidentally caught under this alternative. Applying injury rates from table 4.2.1 in the ITP (p. 70) of the 135 lynx incidentally trapped and reported we anticipate:

- Up to two lynx may be killed or have injuries severe enough that they cannot be fully rehabilitated and subsequently released;

- Up to six lynx may be severely injured but released following rehabilitation; and
- The remainder (i.e., 126 lynx) will be released with no or only minor injuries.

Based on the analysis we presented in section 5.3.1.1, the level of estimated trapping mortality (0.13 lynx per year or 1 lynx every 7.5 years) under alternative 4 is within sustainable limits of a harvested lynx population at a high point in snowshoe hare populations. The lynx mortality that is attributable to Maine trappers each year is lower than in jurisdictions where lynx trapping is legal. Trapping mortality for the Maine lynx population would have to exceed 75 to 150 lynx, or 10 to 20 percent respectively, before lynx populations would be impacted. Thus, even if lethal take from trapping in Maine was magnitudes higher than anticipated by the MDIFW, it is likely to be below the threshold for population effects. In addition, the estimated trapping mortality under alternative 4 is lower than alternatives 1 and 3. As part of the ITP, the MDIFW will monitor lynx population trends and incidental take and take action if incidental take is greater than expected (ITP section 5.4).

Therefore, under alternative 4, approximately 135 lynx may be incidentally captured over the 15-year permit period, with 126 lynx having no or only minor injuries, six lynx having more severe injuries, and two lynx potentially killed. Those killed are a very small proportion of the lynx population in Maine and will not have an effect to the overall population in the state or more broadly.

5.4.2 Bald and golden eagles

The analysis and effects of alternative 4 on bald and golden eagles would be the same as those in alternative 3, as presented in section 5.1.2. PM and ADC efforts are so low that without these programs the small likelihood of incidentally trapping an eagle will remain the same as alternative 3. Therefore for the purposes of analyzing alternative 4, we assume that no bald or golden eagles will be trapped under the MDIFW's recreational fur trapping program. If an eagle is incidentally trapped, the MDIFW will consider whether to seek a BGEPA permit (ITP p. 28) or amend its ESA section 10 permit to include eagles as a covered species. Therefore under alternative 4, we assume that no bald or golden eagles will be trapped and the effects of alternative 4 on eagles are not significant.

5.4.3 Other wildlife

5.4.3.1 Trapped wildlife

Maine's harvest of trapped wildlife across all trapping programs is summarized in the ITP (section 3.1, table 3.1.2) and analyzed in section 5.1.3.1. We found that those levels of harvest were moderate, but generally did not have population-level effects. Under alternative 4, fewer coyotes may be trapped in lynx WMDs without ADC and PM activities. Approximately 100 fewer coyotes would be trapped annually by PM agents (about a 5 percent reduction in the overall state harvest of 2,000 coyotes annually). However, PM agents would have trapped for coyotes anyway (ITP p. 54). Other PM activities (e.g., hunting coyotes with dogs, shooting over bait) would continue and may make up the difference in the number of coyotes taken by trapping in lynx WMDs. PM and ADC coyote control, including trapping, would continue outside of the lynx WMDs. There would be no effect on ADC beaver control and other ADC activities near residential areas in the lynx WMDs. Fur trapping would not be affected, and furbearer harvest for species other than coyotes would be the same as in alternative 3.

Similar to alternatives 1 and 3, we believe alternative 4 will have moderate effects on furbearer populations, but they will be managed to remain stable or increasing.

5.4.3.2 Migratory Birds

Incidental take of migratory birds would be similar in alternative 4 to alternative 3. PM and ADC trapping represents a small portion of the trapping effort in lynx WMDs. The MDIFW indicated that PM trappers reported taking no migratory birds (MDIFW email to the Service August 9, 2013; appendix 2). Since the impacts to migratory birds under alternative 4 will be the same as alternative 3, and we determined that alternative 3 was not significant, the effects of alternative 4 on migratory birds are also not significant.

5.4.3.3 Non-target mammals

We provided an analysis of the effects of alternative 3 (i.e., the MDIFW's revised ITP) on non-target animals in section 5.3.3.3. Incidental take of non-target, non-furbearing mammals in foothold traps would be less without PM and ADC trapping in lynx WMDs than alternative 3. The number of non-target, non-furbearing mammals trapped by PM and ADC trappers is unknown. The combined effort of PM and ADC trappers using foothold traps for coyotes may be 37 individuals (DEA section 5.3.1.1) or about 10 percent of the number of fur trappers in the lynx WMDs. Therefore, incidental take of non-target, non-furbearing mammals may be reduced by 10 percent in foothold traps in the lynx WMDs. If PM were discontinued, most PM trappers would return to fur trapping with foothold traps. Without PM and ADC trapping, incidental trapping of non-target, non-furbearing mammals in non-lethal cable restraints would be less than alternative 3.

Because the impacts to non-target mammals under alternative 4 will be less than Alternative 3, and because we determined that Alternative 3 was not significant, the effects of alternative 4 on non-target mammals are also not significant.

5.4.4 Outdoor recreation and socioeconomic factors

Alternative 4 would have similar effects to outdoor recreation and socioeconomic factors as Alternative 3, which is a slight increase over baseline conditions (Alternative 1). PM trappers may return to fur trapping. ADC agents currently do not use non-lethal cable restraints for coyotes, and would not have this opportunity in the future. Collectively, PM and ADC trappers represent about 10 percent of the recreational fur trappers in lynx WMDs. No PM or ADC trapping for coyotes would be controversial because of the interest in coyote control to protect deer (DEA section 5.2.3.1), however, other ADC activities would continue in the lynx WMDs.

Alternative 4 would likely have minimal economic effects, similar to alternative 3. The MDIFW would have reduced costs in implementing a PM program that only occurs outside of the lynx WMDs (but this is not an expensive program). Economic activity associated with trapping (e.g., purchasing trapping supplies, gas, equipment, cabin rentals) would be similar to alternative 3 and baseline conditions. Despite discontinuing PM and ADC coyote control in the lynx WMDs, trapping activity and associated economic activity is likely to remain stable or decline slightly over the next 15 years.

The MDIFW would receive an incidental take permit under alternative 4 and would mitigate for incidental take of lynx by creating lynx habitat. The increments of change from alternative 4 is small, and anticipated effects of the mitigation on recreation and scenic nature of mitigation lands would be similar to alternative 3.

Because the impacts to outdoor recreation and socioeconomic factors under alternative 4 will be similar to alternative 3, and because we determined that alternative 3 was not significant, the effects of alternative 4 on outdoor recreation and socioeconomic factors are also not significant.

5.4.5 Vegetation and habitat

Effects of trapping activities on vegetation and habitat are insignificant throughout the state of Maine (section 4.4). Environmental consequences are focused on the effects of the mitigation, which for some alternatives could affect thousands of acres of vegetation.

The mitigation is designed to offset the impacts of the lethal take. The analysis of the effects of the mitigation presented in section 5.3.5 is still relevant to alternative 4.

Because the impacts to vegetation and habitat under Alternative 4 will be the same or less than alternative 3, and because we determined that alternative 3 was not significant, the effects of alternative 4 on vegetation and habitat are also not significant.

5. 5 Effects on environmental justice

The Executive Order on Environmental Justice issued by President Clinton on February 11, 1994, requires all Federal agencies to assess the impacts of Federal actions with respect to environmental justice. The Executive Order states that to the extent practicable and permitted by law, neither minority nor low-income populations may receive disproportionately large and adverse impacts as a result of a proposed project.

In 2008, median household income in Aroostook County in 2008 ($36,107) and Washington County ($31,856) was substantially lower than the state median income $46,419 (U. S. Census Bureau, http://quickfacts.census.gov). Average income for trappers in the Northeast in 2004 was $50,600, which is 19 percent lower than the average income for the total Northeast population (AFWA 2005). Nationally, household incomes of trappers in 2004 were: greater than $60,000 (36 percent), $40,000 to 60,000 (25 percent), $20,000 to 40,000 (27 percent), and less than 20,000 (12 percent)(AFWA 2005). Nationally, average annual income of trappers has risen substantially. In 1992 average annual income was 20 percent lower than the national average income, whereas in 2004 it slightly exceeded the national average (AFWA 2005). Average income from trapping in the Northeast was $1,587 and expenditures were $924.

None of the alternatives require purchase of new trapping equipment. The purchase of exclusion boxes, non-lethal cable restraints, larger traps, and other trapping related items is optional. Therefore such purchases do not disproportionately affect those trappers with low annual incomes.

Alternative 2 would reduce or eliminate trapping income by discontinuing upland trapping in northern Maine. This could affect an important source of income for some low-income trappers. Thus, alternative 2 would likely have the greatest effect on low-income trappers, especially those that live in northern Maine and would not have an opportunity to trap elsewhere in Maine. Minority or low-income populations are not likely to be displaced but low-income individuals could be negatively affected by alternative 2.

All four recognized tribes in Maine, the Passamaquoddy, The Penobscot Indian Nation, the Houlton Band of Maliseets, and Aroostook Band of Micmacs have lands in lynx WMDs. Changes in trapping laws may affect trappers in Maine’s Native American communities that may trap outside of their trust lands. Maine’s Native American’s control trapping activities on trust and reservation lands, and the alternatives considered in this DEA do not pertain to these lands.

5.6 Cumulative effects

Cumulative effects as defined by the CEQ (40 CFR §1508.7) are impacts on the environment which result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individual, minor but collectively significant actions that take place over a period of time. This analysis considers reasonably foreseeable, relevant factors that could contribute to cumulative impacts on the Canada lynx, furbearer species, and other incidentally trapped wildlife and associated biological/socioeconomic environmental factors that were considered in this DEA. This cumulative effects analysis focuses on the lynx WMDs because this is where Canada lynx occur and trapping conservation measures will occur. We also take into consideration that MDIFW requests a Section 10 permit for statewide coverage with permit duration of 15 years.

The factors that will have the greatest influence on northern Maine's forest in the lynx WMDs in the next 15 years (the duration of the incidental take permit) include changing land ownership patterns, changing forest practices, energy-related development, residential and resort development, and climate change. These factors may interact to produce additive, countervailing, and/or synergistic effects with the different levels of incidental take from trapping considered in the four alternatives evaluated in this DEA.

Changing ownership patterns

Changing landownership in northern Maine is expected to continue in the reasonably foreseeable future. Frequent changes in land ownership affect the ability to conserve wildlife. Many of Maine's logging industries and large family ownerships traced their ownership back to the 1800s. Large corporations that owned paper mills, sawmills, and other wood processing facilities owned lands that supplied their mills. However, in the 1980s and 1990s, changing global markets, the inability of Maine mills to keep up with technological advances, depressed economic conditions, and environmental concerns contributed to major shifts in forest ownership. Between 1980 and 2005, approximately 23.8 million acres changed ownership in northern Maine representing a shift from industrial and family ownership to a variety of financial investors, real estate development trusts, private individuals, and conservation organizations. In 1994, forest industry owned about 60 percent (4.6 million acres) of the large tracts (greater than 5,000 acres) of timberland and investors owned about 3 percent. By May, 2005, financial investors owned about 33 percent of the large forest tracts and industry owned only 15.5 percent (1.8 million acres, mostly in a single ownership) (Hagan et al. 2005). Forest lands continue to be sold in northern Maine. One implication of the shift to investor owners is that interest in biodiversity practices has declined (Hagan et al. 2005). Most forest blocks have remained intact; however, there is a trend toward subdivision and smaller parcel sizes. New investor owners typically sell land holdings within 10 to 15 years. Furthermore, investors are looking for much higher rates of return (sometimes several times that based on the actual growth rate of the forest) than was sought by the previous generations of owners.

These trends will make it more difficult to secure long-term management agreements that could benefit lynx and other wildlife. Investor owners may not be interested in 70-year management plans (unless there are financial incentives) and likely will sell their lands before wildlife benefits can be realized. Existing management agreements may become negated when lands are sold unless there are legally-binding agreements or easements. Because of the rapid land turnover, conservation groups have purchased fee title or easements on about 2 million acres in northern Maine. Easements usually require binding commitments by the owner to a forest certification program and associated management plans, which requires planning for biodiversity and endangered species. For example, Plum Creek Timber Company, Inc. recently encumbered its lands with a 363,000-acre conservation easement held by The Nature Conservancy and the Forest Society of Maine as a precondition of the Land Use Regulation Commission's rezoning process (which is currently contingent on state rezoning decisions being upheld

in Maine courts). The Nature Conservancy also purchased 284,000 acres in northern Maine and is developing a model management system for lynx and American marten under the Healthy Forest Reserve Program.

Maine's northern forest is likely to undergo cycles of real estate sales for the foreseeable future. Continued sales of forest land are predicted to result in 1) increased parcelization, 2) increased residential development and fragmentation of forestlands, 3) heightened concerns and regulations over timber harvests and recreational use, 4) reduction in land area available for timber harvests, recreation, and tourism, 5) decreased landowner investment in forest management, 6) increased taxes, and 7) increased traffic and congestion that may affect timber hauling costs (Alig et al. 2004). For the foreseeable future, conservation groups like The Nature Conservancy, Appalachian Mountain Club, and the Forest Society of Maine are expected to continue to pursue opportunities to purchase conservation easements. If successful, this will help offset future development pressures on northern Maine forests.

Changing forest practices

In the 1970s and 1980s thousands of miles of logging roads were built to salvage large volumes of timber killed by the spruce budworm opening vast areas of previously inaccessible areas to logging and the public. Hundreds of thousands of acres of clearcuts were used to salvage diseased timber. Negative public reaction to clearcuts resulted in the Maine Forest Practices Act in 1989 and three subsequent public referenda to ban clearcutting in the 1990s. This public reaction prompted forest industry to undergo major changes, and clearcutting was replaced primarily by partial harvesting in the 1990s and early 2000s. In the 1990s increasing concern about conservation and the health and sustainability of Maine's forest prompted landowners to adopt biodiversity standards, and many landowners enrolled in sustainable forestry programs. In the last decade, mechanized logging machinery has eliminated chainsaw crews.

Clearcuts during the 1970s and 1980s in combination with herbicides to remove hardwood competition provided extensive regenerating softwood stands. This young forest created habitat that supports Maine's current lynx population (Hoving 2005). Because of the extensive, optimal habitat, lynx numbers were possibly at historic highs in the early 2000s. At their peak in the early 2000s, hare densities in regenerating Maine clearcuts averaged 0.8 to 1.0 hare per acre (Lachowski 1997, Robinson 2006), which is comparable to hare population in many areas of Canada and Alaska at the peak of the 10-year hare cycle (Poole and Graf 1996, Mowat et al. 1997, Krebs et al. 1986, Bailey et al. 1986, Hodges 2000a). Peak hare densities as high as 2.4 to 4.4 hares per acre (Keith and Windberg 1978, Sullivan 1994) occur in some parts of Canada.

Since the inception of the Maine Forest Practices Act (1989) there has been a major shift in silviculture from clearcutting to various forms of partial harvesting. To harvest the same volume of wood, twice the acreage (about 500,000 acres per year) is cut under partial harvesting-dominated systems in contrast to 250,000 acres cut annually under clearcut-dominated systems. Regenerating partial harvested stands support less than half the snowshoe hare density (0.3 hare per acre) than regenerating clearcuts (0.8 to 1.0 hare per acre)(Robinson 2006). Landscape hare densities needed to support lynx are believed to be about 0.3 hare per acre (Simons 2009, Scott 2009) to 0.4 to 0.7 hare per acre (Steury and Murray 2004). Loss of regenerating clearcuts and extensive partial harvesting will contribute to decline of lynx habitat, which could reduce lynx densities up to 65 percent by 2032 (Simons 2009). This does not take into consideration cycles or fluctuations in hare densities that may occur in the future. From 2006 to 2010 hare densities in Maine and southern Quebec dropped by 50 percent even in optimal, regenerating clearcut stands (Assels et al. 2007, Scott 2009) then began to recover in 2010 to 2011 (D. Harrison, University of Maine, unpublished data). Landscape hare densities (about 0.2 hare in partial harvested stands and 0.4 hare per acre in regenerating clearcuts) during low hare populations could be low enough to no longer support lynx in some portions of northern Maine (Scott 2009). On a study area in northern

Maine MDIFW documented a near absence of reproduction which is a likely response to the hare decline (Vashon et al. 2012).

Maine's forest products industry is part of a global industry influenced by international markets, consumer demand, labor and environmental regulations, real estate trends, distribution costs and technologies, climate, and changing forest conditions. Global demand for timber-related building and consumer products will undoubtedly increase in the future. Maine's forest may play an important role in carbon sequestration and cap-and-trade policies, and carbon credits could become a new source of income to northern Maine landowners. The nature of markets for forest products will largely determine the silvicultural systems use in future forestland management, which in turn will influence the quantity and quality of habitat for wildlife.

Energy related development

Until recently, Maine's northern forest has contributed little to regional or national energy needs. In 1920 the Great Northern Paper Company built the Ripogenus Dam to power their paper mills in Millinocket. Waters on the upper Kennebec in the Moosehead Lake region are impounded as storage for downstream power generation. At one time, the Dickey-Lincoln dam was proposed for the St. John, but was decommissioned, in part, because of the presence of the federally-endangered Furbish's lousewort. Otherwise, there is little hydroelectric development, and most of this 8 million acre forest is undeveloped and lacks electrical infrastructure.

There has been increased interest in the energy potential of the area. Maine forests supply 20 percent of the state's electrical needs, and 25 percent of overall energy (NEFA 2007). Nine biomass-fueled electricity generating plants and three wood pellet mills are located in Maine, with additional mills being planned. The U. S. Department of Agriculture Biomass Crop Assistance Program was initiated in 2010 and will spend hundreds of thousands of dollars to subsidize forest biomass energy production in the state. Biomass harvesting could greatly change silviculture of Maine's northern forest. As of 2010, at least seven wind projects have been proposed in northern Maine and two projects are in operation. Increasing power infrastructure associated with these projects could greatly change development potential and patterns in northern Maine.

Residential and resort development and mining

Maine's northern forest is unique in that there is little history of development in northwestern Maine. Several small farms and villages existed to support the logging industry and railroads in the early days of Maine's logging history, but they all vanished as logging became increasingly mechanized and road systems were created. Logging camps housing wood cutting crews persisted into the 1980s, but are almost a relic of the past now with mechanized logging. Several hundred camps and cottages permitted by the Land Use Regulation Commission occur in the region.

One implication of changing land ownership (see discussion above) in northern Maine is that some owners seek to convert forestlands to real estate development and resorts. In 2009, the Maine Land Use Regulation Commission approved the Moosehead Lake concept plan for Plum Creek, which rezoned a 400,000-acre area to potentially allow development of about 1,000 house lots and 2 resorts on 17,000 acres within the range of the lynx. This represents the largest development project in Maine's history. Irving Corporation is now considering a similar development complex in the Fish River Lakes region in northeast Maine. Both of these projects are located within lynx critical habitat.

Trends toward increased development are expected to increase in Maine's forested areas (Stein et al. 2005). Even in remote areas, forest land values rose to prices above their forest management values

(LeVert et al. 2007). "Shadow conversion" occurs when development predisposes forested areas to future forest management and is expected to magnify the effect of residential development on Maine's forest industry. Over time this is expected to affect the state's forest-based economy (Alig et al. 2004).
For the foreseeable future, development demands will be greatest around the fringes of the Maine woods where infrastructure (electricity and roads) provide easiest access to support residential development. There are currently no utilities in the interior of Maine's north woods, which greatly reduce development potential, but that could change with increasing wind and biomass power interest in the region.

Mining activity has been nonexistent in northern Maine. Irving Corporation is interested in developing a large surface mining operation west of Portage in the lynx critical habitat. The Maine Legislature is considering changes in mining rules and regulations.

Climate change

Potential effects of climate change on Canada lynx and its habitat are summarized in detail in the Service's Revised Designation of Critical Habitat for the Contiguous U. S. Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Proposed Rule (FR 78(187):59430-59474) and in the Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013).

Between 1300 and mid-1800s, the northern hemisphere experience unusually cold temperatures referred to as the "Little Ice Age" (Lamb 1979). In the Northeast, the coldest temperatures occurred during the 1770s, with gradual warming through the 1800s (Baron 1992). Snowfall duration and depth was substantially greater than in recent times (Brooks 1917). The extensive spruce-fir forest of Maine is a relatively recent phenomenon tied closely to the cool, moist climate of the Little Ice Age (Schauffler 1998, DeHayes et al. 2000).

For the past century the rate of warming in Maine has been increasing (Jacobsen et al. 2009). Today, Maine's climate is warmer and wetter than it was 30 years ago (Jacobsen et al. 2009). These changes have affected plant growing conditions. Effects of climate change on Maine's forested ecosystems are anticipated. Recently, a warming climate and selective logging for conifers has resulted in an increase in deciduous forest in northern Maine (Russell et al. 1993, Seymour 1992). Northward range shifts of birds and mammals have been observed in recent decades.

The effects of climate change on Maine's ecosystems, wildlife populations, and specifically Canada lynx are of concern. The potential magnitude for ecosystem change from climate change will interact with other stresses on northern Maine forests - ownership patterns, changing forest practices, and energy and residential development. The 2009 report *Maine's Climate Future* (Jacobsen et al. 2009) predicts significant changes in Maine's flora and fauna, increased wildfire, and changing precipitation and snow conditions that will affect ecosystems within the next 100 years.

Lynx depend on extended periods (greater than 4 months) of deep, fluffy snow. Warmer winter temperatures are reducing snow pack in all portions of the lynx DPS through a combination of higher proportion of precipitation falling as rain and higher rates of snowmelt during winter (Hamlet and Lennenmaier 1999, p. 1609; Brown 2000, p. 2347; Hoving 2001, pp. 73-75; Mote 2003, p. 3-1; Chistensen et al. 2004; Mote et al. 2005). Snow accumulation and duration are expected to decline generally in the geographic areas that contain the central and eastern portion of the lynx DPS (IPCC 2007, p. 891; Burns et al. 2009, p. 31). Due to the importance to lynx of prolonged periods of deep fluffy snow, current habitats that lose this feature would decline in value for lynx (Hoving 2001, p. 73; Carroll 2007, p. 1092; Gonzalez et al. 2007, entire). Reduced snow depth and duration may reduce lynx's competitive advantage over bobcats, which have similar ecology to lynx but are not as well-adapted to hunting hares

in deep fluffy snow (Hoving 2001, pp. 23–24; Carroll 2007, p. 1102; Interagency Lynx Biology Team 2013, p. 69, 71). Gonzales et al. 2007 estimate that up to 66 percent of potential lynx habitat could be lost in the lower 48 states by 2100. Areas of boreal forest could shift northward as much as 125 miles (200 km) by 2100.

Recent studies predict lynx distribution and habitat are likely to shift upward in elevation within its currently occupied range and recede northward as temperatures increase (Gonzalez *et al.*2007, pp. 7, 13–14, 19; Jacobson *et al.*2009, pp. 26–27, 30–31; Vashon *et al.*2012, pp. 60, 64; Interagency Lynx Biology Team 2013, p. 69). Climate modeling suggests that lynx habitat and populations are anticipated to decline accordingly (Carroll 2007, pp. 1098–1102) and may disappear completely from parts of the range of the DPS by the end of this century (Johnston *et al.* 2012, pp. 6–13). Climate change is expected to substantially reduce the amount and quality of lynx habitat in the contiguous United States, with patches of high quality habitat becoming smaller, more fragmented, and more isolated (Carroll 2007, pp. 1099–1100; Johnston *et al.*2012, p. 11). Remaining lynx populations would likely be smaller than at present and, because of small population size and increased isolation, populations would likely be more vulnerable to stochastic environmental and demographic events (Carroll 2007, pp. 1100–1103).

Given these recent studies and predictions, climate change is likely to be a significant issue of concern for the future conservation of the lynx DPS (FR 78(187):59443).

Interactions among effects

During the 15-year life of the incidental take permit, if issued, we can reasonably predict, that in northern Maine, lynx habitat will start to decline; forest land ownership will change; and demand for energy, mining, second-home, and resort development will increase. Climate change may incrementally affect snowfall and forest composition.

Following national trends, trapping is expected to decline into the future. However, demand for trapping for the most valuable fur species (e.g., beaver, marten, fisher) will likely continue. Unless carefully managed, trapping could place incremental stresses on furbearer species and incidentally-trapped species already affected by changing forest management, climate change, and development. The Canada lynx and American marten have been identified as sensitive to climate change and other environmental stresses (Jacobsen et al. 2009, Whitman et al. 2010, Gonzales et al. 2007, Carroll 2007). Boreal species that are common today (e.g., gray jays and northern flying squirrels) could become rarer in the future because of climate change.

In turn, changing land ownership and forest practices, energy, residential, and commercial development, as well as climate change will undoubtedly have a significant effect on trapping participation and effort. These stressors are likely to significantly change trapper activity, trapping seasons, season lengths, and fur conditions. Changing land ownership and residential and energy development could result in restricted access (e.g., posting for “no trespassing,” gated areas) that would limit trapping activity. The cost of fuel, carbon emission restrictions, or changing landowners could affect trapper participation. Fur may become less (or more) fashionable and practical in a warmer world. Increased development and ecotourism in northern Maine could cause conflict between trappers and other outdoor user groups. Changing forest practices and climate change could affect some furbearer populations. For example, biomass harvesting and a warmer climate could greatly diminish mature spruce-fir and reduce American marten populations, which would likely exacerbate declines in trapping participation and effort. Even without the stressors mentioned above, participation in trapping in Maine is anticipated to continue to decline in the foreseeable future.

Carroll (2005, 2007) modeled the incremental effects of habitat change, climate change, lynx population cycles, and trapping on regional lynx and marten populations in eastern Canada and Maine. Maine's population of lynx was more vulnerable to climate change than populations in New Brunswick and Gaspe, Quebec where there was greater elevation relief. Maine lynx populations were expected to decline 59 percent by 2055 because of climate change. Lynx trapping in Quebec could increase vulnerability of Maine and New Brunswick's lynx populations, even though lynx are not trapped in the latter jurisdictions. Carroll found that an increase of 10 percent lynx harvested on the Gaspe region of Quebec could exacerbate the expected declines in Maine's lynx populations from climate change and habitat changes. Lynx population cycles would further reduce the likelihood of persistence of Maine's lynx population.

Although the long-term cumulative effects from changing land ownership patterns, changing forest practices, residential and energy development and climate change may substantially influence the human environment in Maine, the incremental effects of trapping over the 15-year life under any of the alternatives analyzed in this DEA (including the proposed action) will be negligible. Furthermore, most of the effects of alternatives evaluated in this DEA, including population-level effects on wildlife, would be reversed over just a few years if a different approach is adopted at the end of the 15-year permit period.

Cumulative effects and the alternatives considered

In this final section addressing cumulative effects, we evaluate how the conservation measures in the four alternatives considered in this DEA interact with changing land ownership patterns, changing forest practices, residential and energy development and climate change to affect the human environment. Alternatives 1, 3, and 4 would likely result in the greatest incidental take of non-target wildlife species, although exposed bait provisions have likely reduced incidental take of birds in recent years. Most non-target species trapped are not rare, threatened or endangered, and populations are likely able to withstand some loss. Incidental take of boreal species from trapping (e.g., gray jays, snowshoe hares, northern flying squirrels, which are all abundant today) is not likely to affect population viability within the 15-year term of this permit.

Alternatives 1, 3, and 4 would result in the greatest incidental take of lynx. The degree to which incidental trapping of lynx would exacerbate the decline in lynx population anticipated from other stressors (e.g., hare density fluctuations, habitat declines, climate change) is unknown. In this DEA we note that lethal take of lynx is within acceptable limits of animals lost from a healthy lynx population. Trapping mortality is one of complex of factors that could have cumulative effects on Maine's lynx population, which is part of a larger metapopulation that includes northern New Brunswick and the Gaspe region of Quebec (Hoving 2001). Lethal take of lynx in traps in Maine, at the levels currently anticipated in any of the alternatives analyzed in this DEA, is unlikely to affect the trajectory (positively or negatively) of a declining lynx population.

6. Summary

The MDIFW has applied for a 15-year incidental take permit to cover the incidental take of Canada lynx associated with Maine's statewide fur trapping, PM, and ADC programs. The Service has determined that the proposed action (i.e., permit issuance and the MDIFW's implementation of the 2013 revised ITP for trapping activities) and other alternatives would have no or negligible effects on air quality, geology, soils, water quality, vegetation, threatened and endangered species (other than lynx), and cultural and economic resources (DEA section 2.3.1). As such, these resources were only briefly discussed in this DEA. Resources that would be expected to have greater effects were more fully analyzed include effects of the proposed action and alternatives on Canada lynx, furbearer species, other wildlife, outdoor

recreation and socioeconomic factors, and vegetation and habitat. A summary of the impacts to each of these resources, by alternative, is included in the following subsections.

Based on preliminary review of the factors referenced in section 1.1, the analysis in this DEA, CEQ guidance, and the MDIFW's 2013 revised ITP, the Service believes that an EA is the appropriate instrument to satisfy the NEPA requirement for this project. A summary of each of the alternatives evaluated in this DEA is provided below.

6.1 Alternative 1 (No Action – Trapping Programs as Currently Managed)

Under this alternative, the MDIFW would continue the statewide trapping program, but not receive incidental take coverage for lynx. This alternative assumes that the MDIFW would still be bound and operates under the terms of the 2007 Consent Decree. With this alternative, up to 165 lynx may be incidentally trapped in 15 years with up to 31 expected to have no visible injuries, up to 124 expected to have minor injuries that will not affect their subsequent survival, and up to 10 that may experience moderately severe to severe injuries (a couple of which may die as the result of the injuries). The amount of anticipated lethal take is a very small proportion of the lynx population in Maine and will not have an effect to the overall population in the state or more broadly. No bald or golden eagles are anticipated to be trapped under the MDIFW's current programs and thus the effects of this alternative on eagles are not significant. Furbearers are managed for long-term stable or increasing populations and the MDIFW closely monitors the harvest of the most valuable species to ensure that harvest levels of trapped wildlife will not cause populations declines. Based on an analysis of take of gray jays (species most vulnerable to incidental trapping in northern Maine), trapping could have minor effects on local populations, but would not have a statewide population-level effect. We analyzed the effects to non-target trapped wildlife, using northern flying squirrels and snowshoe hares as proxies and determined that trapping under this alternative would have a negligible effect on local and statewide populations of these species. This alternative is anticipated to have minimal effects to outdoor recreation and socioeconomic factors. Effects of trapping activities on vegetation and habitat would be insignificant throughout the state of Maine.

6.2 Alternative 2 (No Action – No Permit; Trapping Discontinued in Lynx WMDs)

Under this alternative, the MDIFW would continue the statewide trapping permits, but not receive incidental take coverage for lynx. This alternative assumes that the court may vacate the Consent Decree and that the MDIFW would therefore need to operate their trapping programs in a manner that avoids take of lynx. We assume that the MDIFW would discontinue all upland trapping programs in lynx WMDs for fur trapping, PM, and ADC programs. Because that is a substantial area within Maine where trapping occurs, this alternative has some of the greatest changes from the others analyzed in this assessment. With this alternative, we assume very few, if any, lynx would be incidentally captured or killed. No bald or golden eagles are anticipated to be trapped. The harvest of furbearer species would be greatly reduced under this alternative, which could increase their populations in northern Maine. Our assumption is that over time those wildlife species would reach an environmental carrying capacity and function under natural regulation. Under this alternative there would be less take of migratory birds and substantially reduced harvest of non-target mammals, but this could be offset by increased predation rates from the increasing furbearer populations. Discontinuing upland trapping in lynx areas would have the greatest effect of all the alternatives on outdoor recreation and socioeconomic factors and could have effects at local and regional, especially in northern Maine. Effects of trapping activities on vegetation and habitat are negligible throughout the state of Maine.

6.3 Alternative 3 (Proposed Action – Fur Trapping, PM and ADC Programs Implemented Consistent with the MDIFW's ITP)

Under this alternative, the Service would issue an incidental take permit to the MDIFW and the fur trapping, PM, and ADC programs would be managed according to the MDIFW's revised 2013 ITP. With this alternative, up to 195 lynx may be incidentally trapped in 15 years of which 181 (93 percent) would be released back into the wild with relatively minor injuries. Up to 3 may die (or may not be released) from injuries in traps. The amount of anticipated lethal take is a very small proportion of the lynx population in Maine and will not have an effect to the overall population in the state or more broadly. No bald or golden eagles are anticipated to be trapped under the MDIFW's ITP. Trapping effort may increase under this alternative, and therefore, we expect a small increase in trapped wildlife (especially coyote). This level of harvest may affect populations locally (i.e., within deer wintering areas), but will have minor statewide population-level effects. We also anticipate take of migratory birds would be greater in this alternative than alternative 1, and could have minor effects to local populations. The level of incidental harvest of non-target mammal species will increase under this alternative, though the overall level of trapping activity in the state is not high enough to come close to harvesting non-target species at a rate that would affect their populations. There would be increased trapping opportunities under this alternative, but other forms of outdoor recreation would not be affected. Economic effects would be similar to what occurs currently. Under this alternative, the MDIFW would provide mitigation to offset lethal take of lynx in the form of forest management to maintain and enhance young forest habitat to support lynx. However, the amount of mitigation will not result in significant effects to any resources. Outdoor recreation and socioeconomic impacts of this alternative will not be significant at local or statewide levels in Maine. Effects of trapping activities and mitigation on vegetation and habitat are negligible, including effects of mature forest on public lands and statewide.

6.4 Alternative 4 (Fur Trapping, Implemented Consistent with the MDIFW's ITP; PM and ADC Discontinued in Lynx WMDs)

Under this alternative, the Service would issue an incidental take permit to the MDIFW only for the fur trapping program, and that program would be managed according to the MDIFW's revised 2013 ITP. The PM and ADC programs would not be covered by the permit, and therefore, the MDIFW would manage these programs in a manner that avoids incidental take of Canada lynx. We assume that MDIFW discontinues elements of the PM and ADC trapping in lynx WMDs that could take lynx (e.g., coyote and fox control). With this alternative, up to 135 lynx may be trapped (legally and illegally) during the 15-year period of which up to 126 (93 percent) lynx will be incidentally trapped and released with no or minor injuries, six lynx will receive major injuries that require treatment but that will be released, and two lynx will be killed or not released because of their injuries. The amount of anticipated lethal legal and illegal take is a very small proportion of the lynx population in Maine and will not have an effect to the overall population in the state or more broadly. No bald or golden eagles are anticipated to be trapped. The harvest of trapped wildlife would be similar to alternative 3, except that there would likely be fewer coyotes harvested. Impacts to trapped wildlife would not be significant under this alternative. Incidental take of migratory birds would be similar to Alternative 3 and not significant. Harvest of non-target, non-furbearing mammals would be reduced though would still not occur at a level that is significant. Effects to outdoor recreation and socioeconomic factors would be similar to alternative 3, which is a slight increase over current baseline conditions. Effects of trapping activities on vegetation and habitat are insignificant throughout the state of Maine. Mitigation for the lethal take of lynx would occur in this alternative.

7. Response to Public Comment on 2011 Draft Environmental Assessment

The Service's responses to the public comments we received on our 2011 DEA are in appendix 2. Responses to any comments that we receive for this revised DEA will be addressed in the final EA which will be completed following the supplemental comment period.

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Appendix 1. Response to public comments received on the MDIFW's 2008 ITP and the Service's 2011 draft environmental assessment.

This appendix was prepared in response to public comments received by the U. S. Fish and Wildlife Service (Service) regarding public review of the *Draft Incidental Take Plan for Maine's Trapping Program* (ITP) dated August 13, 2008, and the associated draft environmental assessment (DEA), dated August 2011. These documents and associated materials can be found at http://www.fws.gov/mainefieldoffice/Canada_lynx.html last accessed on May 13, 2014. On July 29, 2013, the MDIFW submitted a revised ITP that incorporates changes responding to public and Service comments. The revised ITP includes important changes and clarifications from the 2008 draft, including adding the PM and ADC programs for permit coverage.

The Service revised this 2014 DEA to incorporate the MDIFW's revised ITP. However, a number of the issues that were raised during the initial public comment period are still relevant to the revised proposed action. Therefore, the Service has included this response to comments to explain how those issues are addressed in the MDIFW's revised ITP and the Service's revised DEA. Substantive public comments are summarized below along with the Service's response. References cited in this appendix are included in the literature cited section of this DEA.

1.1 Public Comment Process

The August 2011 DEA was released for a 60-day public comment period that began November, 2011 through January 9, 2012 and was extended to February 9, 2012. During this time the Service received about 6,300 individual comment letters and emails on the draft ITP and DEA. Among these comments was a form letter submitted by email by about 6,100 individuals. Identical copies of this form letter, including slight variations, represented about 95 percent of the comments submitted. Substantial variations from the form letters were treated as unique comments because they each contained one or more additional comments not found in the original form letters. The Service received about 285 unique letters and 129 comment cards received at public meetings held by the Service.

Each public comment letter and email was assigned an identifying number. Each letter was read, and individual topics within each letter were identified and numbered by topic. One hundred and thirty individual topics were identified from the 285 comment letters. These topics were further grouped by issue (for example, there were typically comments for and against each proposed minimization and mitigation measure). The comments reflect a wide range of concerns regarding the 2008 draft ITP and the 2011 DEA. In many cases, multiple commenters expressed similar concerns about topics. To avoid redundancy in responses to each individual comment, and to provide thorough responses that address related issues, general responses were prepared for issues that were raised multiple times in public comments. Responses to these issues are presented below under general headings of outreach, lynx handling procedures and protocols, trapping practices, enforcement, mitigation measures, monitoring measures, NEPA process, and lynx listing and recovery.

1.2 Responses to Comments

The following subsections provide the Service's response to comment on the 2011 DEA per 40 CFR 1503.4. The Service's Notice of Availability requested comments on both the DEA and the draft ITP. Some comments pertain to the DEA, some to the ITP, and some to both. Our response to comments

distinguishes between how the Service addressed the comment in the 2014 DEA and how MDIFW addressed the comment or issue in the 2013 ITP.

Many commenters provided perspectives and raised suggestions and concerns about the avoidance and minimization measures proposed in the 2008 draft ITP. The MDIFW's revised ITP incorporates a number of revisions to the avoidance and minimization measures intended to address these and additional Service concerns. In addition, the revised ITP provides more thorough explanation and rationale for the avoidance and minimization measures. The Service has not yet evaluated whether the MDIFW's revised ITP meets the Section 10(a)1(B) incidental take permit issuance criteria. The Service will conduct this evaluation in conjunction with making a permit issuance decision and will make our findings publicly available.

2.0 Responses to Comments

2.1 Outreach

2.1.1 Development of a trapping training DVD

Several comments addressed the conservation measure evaluated in the 2011 DEA that a DVD may be effective additions to the MDIFW's outreach program to avoid and minimize take of lynx. Some comments supported development of a DVD providing instruction on how to set traps in a way to minimize take and injury to lynx, how to evaluate lynx for injuries, and how to release lynx from traps would help reduce injury to lynx. Some comments suggested the DVD should be mailed to all trappers and be required to be shown at all trapper training events to ensure consistent and accurate information was being provided to trappers. Some comments were opposed to the DVD based on it being too costly, and the adequacy of information already contained in the booklet *How to avoid incidental take of lynx while trapping or hunting bobcats and other furbearers* (AFWA 2003).

In response to public and Service comments regarding a trapping DVD, the MDIFW has incorporated commitments in the 2013 revised ITP to develop and distribute a DVD within 2 years of permit issuance (ITP, p. 78, O&E 7). It will be used in trapper education courses, ADC and PM trappers will be required to view the DVD during their certification training, and the DVD will be distributed to all licensed trappers and remain on MDIFW's website.

2.1.2 Require periodic retraining of all licensed trappers

Several comments addressed the conservation measure evaluated in the 2011 DEA regarding mandatory hunter and trapper educations programs. Some comments were in opposition to such measures based on perspectives such as training is not needed, it would be difficult for the MDIFW to develop a system to monitor compliance, cost in terms of time and money, and the undue burden on trappers in lynx area. Comments also supported such measures citing that periodic retraining was the best way to ensure trapper receive consistent information on techniques to avoid or minimize take of lynx. Other comments supported the mandatory training for new trappers, but not established trappers.

Trapper education courses have been effective and cited as a means to improve public perception of trapping. In 2010, the Association of Fish and Wildlife Agencies (AFWA) launched a web-based Trapper Education Program, which among other subjects teaches best management practices for trapping. The course and associated quizzes are now available on line (http://trappered.com/ last accessed May 13, 2014).

In response to public and Service comments regarding mandatory hunter and trapper educations programs, the MDIFW has incorporated commitments in the 2013 revised ITP to continue a trapper education course for new trappers that include AFWA standards (ITP, pp. 95 to 96, OE 6). They did not require periodic training for all licensed trappers because existing trappers already receive lynx trapping information in the annual trapping laws and rule book, Trapper Information Booklet, and a letter from the Commissioner (J. Connolly, MDIFW, memo to the Service, August 9, 2013). The MDIFW also participates in regular meetings with trappers and the Maine Trapper's Association. The MDIFW will be updating the lynx avoidance brochure and developing a DVD (see response 2.1.1) and distributing to all trappers.

2.1.3 Require MDIFW staff teach lynx module of trapper training

Several comments addressed the conservation measure evaluated in the 2011 DEA requiring MDIFW staff (i.e., game wardens or biologists) with trapping expertise to teach the lynx and endangered species module at trapping classes. Some comments were in opposition to the measure because the current system of trappers teaching trappers was effective; it could be an unnecessary use of MDIFW staff time, and that there may be no improvement in the training. Fewer comments were supportive of the measure.

In response to public and Service comments regarding requirements to use MDIFW staff to teach the lynx module of trapper training, the MDIFW has explained that volunteer trapping instructors are trained, highly experienced trappers that can effectively present the MDIFW's regulations and recommendations to students (J. Connolly, MDIFW, memo to the Service, August 9, 2013). The MDIFW commits their staff biologists to an initial training for safety coordinators on how to avoid incidental capture of lynx. In turn, safety coordinators provide the volunteer trapping instructors with this information. The DVD (see response 2.1.1) will provide consistent messaging to instructors and students. MDIFW biologists are always available to answer questions from safety coordinators or trapping instructors. For this reason, the MDIFW did not incorporate additional measures in the 2013 revised ITP to address this particular issue.

2.1.4 Effectiveness of an outreach approach to minimize incidental take of lynx

Several commenters raised concerns that the rate of incidental take of lynx has not changed and that lynx were still being caught in traps despite the MDIFW existing outreach efforts. Comments included concerns that a large percentage of lynx were being released without examination by MDIFW biologists, trappers are have difficulty interpreting and implementing new regulations to protect lynx, and that there is excessive degree of non-compliance with trapping regulations. The Service does believe that there is scientific literature confirming the validity and effectiveness of outreach, but considers outreach one of many tools that should be incorporated into a conservation plan.

In response to these types of concerns, the MDIFW has incorporated a number of changes or clarifications in the 2013 revised ITP. The MDIFW provides additional context and rationale for how outreach fits into the overall plan for addressing incidental take lynx (ITP, pp. 92 to 97, OE 1 to 8). MDIFW staff will continue to respond to incidental lynx captures and the ITP establishes a goal of responding to at least 90 percent of incidentally-trapped lynx (ITP, p. 86, IM2), which will require increased outreach and cooperation from trappers. The MDIFW has incorporated a new commitment to increase warden service compliance checks to ensure that trap sets are greater than 90 percent in compliance with regulations (ITP, p. 99, PI 4) and will initially rely on increased outreach to address the situation of not meeting the target (ITP, p. 124, changed circumstance #5).

2.2 Lynx handling procedures and protocols

2.2.1 Veterinarian involvement and evaluation of the MDIFW trapping program

We received many comments addressing the conservation measure evaluated in the 2011 DEA that the MDIFW employ a standard trauma scoring system to evaluate injury to trapped lynx (International Organization for Standardization, ISO) as part of their monitoring program and require a veterinarian to review and evaluate MDIFW's lynx handling protocol, train MDIFW staff that handle trapped lynx, and evaluate several lynx in the field. The MDIFW included a comprehensive protocol for handling incidentally-trapped lynx in their 2008 draft ITP, though the Service recommended the inclusion of a number of additional measures. We received comments supporting these measures based on perspectives including that injuries are underestimated by MDIFW biologists using external examination and that MDIFW biologists and wardens may lack adequate training to detect all injuries. We also received comments opposed to these measures citing reasons that include that veterinary evaluation of lynx in the field was not needed, the measures would be too costly, veterinarians may not participate, the measures would not be practicable in the remote areas of northern Maine, lynx may be exposed to longer time in traps and greater risk of injury, lynx are already being released unharmed, the measures would not affect the number of lynx trapped, and that MDIFW biologists already have adequate knowledge.

In response to public and Service comments regarding diagnosing and dealing with incidentally captured lynx, the MDIFW has incorporated a number of new measures and commitments in the 2013 revised ITP. MDIFW staff will continue to respond to incidental lynx captures and the revised ITP establishes a goal of responding to at least 90 percent of incidentally-trapped lynx (ITP, p. 86, IM2). The MDIFW will continue to implement standard operating procedures for responding to lynx captures and will update the procedures every 3 years, in consultation with a veterinarian (ITP, p. 86, IM3). Also, within 1 year of permit issuance MDIFW, in conjunction with a veterinarian, will develop a revised injury scoring system based on live animals (ITP, p. 86, IM3). MDIFW will ensure that staff handling incidentally trapped lynx will have training at least once every 3 years (ITP, p. 89, IM6) and that a veterinarian accompanies staff on at least three incidental capture events within each 3 year period of the permit (ITP, p. 89, IM7). The MDIFW has already begun to implement some of these measures. For example, in 2012, the MDIFW established a contract with a local veterinarian and the veterinarian accompanied staff on three lynx captures to evaluate field examination procedures.

2.2.2 Lynx injury and post-trapping survival

We received a range of comments regarding lynx injury and post-trapping survival. Comments suggested that a high proportion of incidentally trapped lynx are released without examination by MDIFW staff. Some comments said that lynx injuries from the MDIFW-trapped lynx could not be compared with trapper-trapped lynx because the MDIFW used padded foothold traps and BMP measures, whereas fur trappers usually did not. Some comments pointed out that three of six lynx caught by fur trappers died within 1 month after release. Several comments suggested that some injuries, like capture myopathy, could not be detected by external evaluations of lynx by MDIFW staff.

In response to public and Service comments regarding lynx injuries, the MDIFW has incorporated additional explanation and rationale in the 2013 revised ITP. The MDIFW provides more thorough explanation of trapping related impacts on the survival of lynx in their revised ITP (ITP, pp. 58 to 69). The MDIFW's data suggest that roughly 50 percent of incidentally-trapped lynx were examined by MDIFW staff (ITP table 4.2.2). Under the revised ITP, MDIFW staff will continue to respond to incidental lynx captures, but the goal has been established to respond to at least 90 percent of incidentally-trapped lynx (ITP, p. 86, IM2). The MDIFW explains why it concludes the assessments of injury rates are accurate (ITP section 4.2). They document and use the injury rates they observed (ITP table 4.2.2) when calculating the anticipated incidental take (ITP table 4.2.1). The MDIFW acknowledges that

external examination of live lynx may not detect all injuries (ITP p. 60), but data from monitoring (i.e., their 12-year telemetry study) and AFWA's BMP trap study for lynx (AFWA 2013) indicate that any undetectable injury would not likely impact their ability to survive and reproduce after capture. The Service provides additional explanation of the anticipated effects in section 5.3.1.1 of the revised DEA.

The MDIFW also has incorporated a number of elements into the ITP to ensure that their trapping related survival and injury information is as robust as possible. These includes having adequately trained wildlife biologists respond to lynx capture events and assess the potential for injuries prior to release (ITP, p. 86 and 89, IM2 and IM6), implementing standard operating procedures for responding to lynx captures and updating the procedures every 3 years, in consultation with a veterinarian (ITP, p. 86, IM3), developing an updated field based injury assessment system with veterinary assistance (ITP, p. 86, IM3), transporting and rehabilitating lynx that have severe injuries (ITP, p. 88, IM5), and having veterinarians periodically evaluate the effectiveness of injury evaluations (ITP, p. 89, IM7). The ultimate evaluation of effects of the various injury rates in the MDIFW's ITP is how injury rates affect the survival of individual lynx. For severely injured lynx that are rehabilitated and released, the MDIFW will monitor survival related effects through radio transmitters (ITP, p. 88, IM5). Finally, the MDIFW has included changed circumstances in the plan to address the potential that injury rates or fatality rates are higher than they anticipated in the plan (ITP, p. 120, changed circumstance #2).

In response to public comments regarding post-trapping survival, we have added a review of pertinent scientific literature on this topic to section 5.3.1.1 of this DEA. Commenters were correct that three of six lynx caught by fur trappers, radio-tagged, and monitored by the MDIFW died within one month post-release. Survival for this subsample of lynx appears to be lower than the subsample caught and handled by the MDIFW. The MDIFW's prior public drafts of the ITP describe the fate of these six lynx as follows:

- Three lynx were caught in foothold traps with no or minor injuries near the MDIFW's lynx study area and radio-tagged. One lynx lived for 20 months, one lived for 17 months, and one died within one month of unconfirmed causes, although predation was suspected.

- The other three lynx were caught by fur trappers and had injuries that required veterinary care. After rehabilitation, the lynx were radio-tagged and then released and tracked. Two of these lynx were caught in killer-type traps (we note that this was before regulations were in place requiring leaning pole sets for killer-type traps) and one was caught in a foothold trap in a drag set. Both of the lynx injured in killer-type traps survived for less than a month. One survived less than 2 weeks and died of starvation and the other died while crossing a swift river. The lynx caught in the foothold trap lived more than five years.

In addition to these six lynx, a lynx caught in a foothold trap set on a drag by a fur trapper in fall, 2013 was rehabilitated, radio-tagged and released in late-winter, 2014. It is still alive as of publication of this DEA, several months after release.

Several public comments raised concerns that some injuries may not be able to be detected by external evaluations of lynx. There are several forms of capture-related injury that are difficult to diagnose in the field and some may take days to develop into recognizable pathology (Nocturnal Wildlife Research 2008). Post-release survival may be impaired even by relatively minor injuries (Seddon et al. 1999, American Veterinary Medical Association 2008). Capture myopathy can only be diagnosed by necropsy and histopathology (Spraker 1993), so researchers may be unaware that a trapped animal's survival may be compromised. Trap pressure may cause occlusion of blood flow, and the sudden return of circulation (after release) may cause necrosis of tissue over a few days – a condition called pressure necrosis (Walker 1991, Stocker 2005). Withey et al. (2001) recommended allowing several days to weeks to elapse for the

effects of capture and tagging before collecting data from radio-collared animals. The MDIFW's telemetry study (which serves as the basis for the anticipated injury and fatality rates in its ITP) allowed 30 days after capture before assessing lynx survival (ITP p. 59).

Mowat et al. 1994 noted that many serious injuries to trapped lynx, especially bone abrasions, severed tendons or ligaments, muscle degeneration, and joint luxation could escape detection and affect post-release survival. The MDIFW acknowledges that external examination can potentially miss some injuries (ITP p. 60). That is in part why they have incorporated minimization measures that include having a veterinarian assist in develop and evaluate a field-based injury rating system, provide training oversight to the MDIFW staff that are involved in injury evaluation, and have veterinarians participate in several incidental lynx capture events throughout the permit term.

2.3 Trapping practices

2.3.1 Requirement for killer-type traps be set off the ground on leaning poles or in trees and their effectiveness as exclusion devices

We received the most comments on the topic of requiring killer-type traps to be set on leaning poles and whether this trap set is effective at excluding incidental capture of lynx. We received a range of comments opposing or questioning this measure based on perspectives including that leaning poles are not effective at excluding lynx from killer-type traps, raising issues such as whether snow depth could allow lynx to more easily access traps set on leaning poles, raising issues with the trap tending time for killer-type traps, pointing out information suggesting that lynx can readily climb poles, and raising concerns about the complexity of MDIFW's regulations. We also received a number of comments supporting this measure based on perspectives such as that after hundreds of thousands of trap nights no lynx have been reported in legally set leaning pole sets, observations that lynx don't climb or are reluctant to climb poles, or opinions that no further modifications to regulations or trap sets are justified.

The Service also raised a number of questions and uncertainties with leaning pole sets, as are outlined in section 5.1.1.1 of the revised DEA. In response to public and Service comments regarding the effectiveness of leaning pole sets, the MDIFW has incorporated additional explanation and rationale in the 2013 revised ITP. MDIFW presents data in the revised ITP (p. 134) that indicates that the risk of incidental capture of lynx in leaning pole sets is extremely low. However, to address the Service's concerns, they included a changed circumstance whereby if a lynx is killed in a killer-type trap they will implement contingencies, which could include further study of the effectiveness of leaning pole sets or implementing exclusion devices (ITP, pp. 122 to 23, changed circumstance #3). A study (e.g., field trial using trail cameras) may resolve uncertainty concerning the effectiveness of the leaning poles at excluding lynx from killer-type traps. Excluding devices would be one way to prevent incidental trapping in killer-type traps, in the event that leaning pole sets are less effective than currently anticipated, and still allow trappers to catch fisher and marten (see comment 2.3.2).

The MDIFW has not explicitly incorporated any incidental take from killer-type traps into their take authorization request, though should lethal take occur it would count toward the three lethal takes for which the MDIFW has requested. This is based on their assessment that leaning poles are effective at avoiding incidental take of lynx in killer-type traps. If that assessment is incorrect, then incidental take authorized on the permit will likely be insufficient, triggering the need for further avoidance measures or amending the permit. As part of the plan, the MDIFW will increase warden service compliance checks to ensure that killer-type trap sets are compliant with regulations (ITP, p. 99, PI 4). This will also be a tool for independently evaluating that leaning pole sets are effectively preventing incidental capture of lynx.

2.3.2 Require excluding devices for all upland killer-type traps in lynx areas

Several comments addressed one of the Service's alternatives in the 2011 DEA requiring that all killer-type traps in lynx WMDs be placed in exclusion devices or boxes. Per the Consent Decree, the MDIFW currently requires exclusion devices for killer-type traps set on the ground in lynx WMDs 7, 14, 18, and 19. Use of exclusion devices thus far is infrequent (J. DePue, MDIFW, 2014, pers. comm.), presumably because the leaning pole is the most popular way for trappers to deploy killer-type traps for marten and fisher. Some comments were in opposition to the measure because commenters felt that this requirement would eliminate all trapping in northern Maine, exclusion devices are expensive and difficult to transport, exclusion devices would interfere with trapping marten and fisher, and that there was no justification for the requirement based on data showing no lynx had been reported caught in legal leaning pole sets over hundreds of thousands of trap nights. Interestingly, a number of comments generally supported the use of exclusion devices for killer-type traps set on the ground. We also received a number of comments supporting this alternative citing that exclusion devices would be the most effective means to prevent lethal take of lynx in traps, trapping in enclosed boxes may increase trapping efficiency for marten and fishers, exclusion devices would protect fisher and marten pelts from scavengers, and that exclusion devices were required with killer traps in at least six other states and thus would be practicable in Maine.

The purpose of NEPA alternatives is to analyze the effects to the human environment for a range of alternatives, including the proposed action. The proposed action for the 2011 DEA was the Service's issuance of an incidental take permit based on the MDIFW's 2008 draft ITP. Ultimately, the permit issuance decision at that time was solely whether the MDIFW's 2008 draft ITP met the ESA 10(a)1(B) issuance criteria or not. The NEPA alternatives were designed to better understand the effects of that and other alternatives, but not to assess whether a different alternative might be more appropriate for permitting or not. At present, the MDIFW has submitted a revised 2013 ITP. So, the Service is now effectively analyzing a revised proposed action in our revised DEA. Under this proposed action, the MDIFW still believes that the risk of incidental capture of lynx in leaning pole sets is extremely low. However, as explained in section 2.3.1, in response to public and Service comments regarding the effectiveness of leaning pole sets, the MDIFW has incorporated a changed circumstance whereby if a lynx is killed in a killer-type trap they will implement contingencies, which could include further study of the effectiveness of leaning pole sets or implementing exclusion devices (ITP, pp. 122 to 23, changed circumstance #3).

In the event that the changed circumstance is triggered and the MDIFW needs to implement an alternative exclusion method than leaning pole sets, the Service is confident that exclusion devices/boxes will be an effective solution. In 2011, the MDIFW tested the efficacy of exclusion devices/boxes on ground-based killer-type traps with captive lynx at their Gray Wildlife Park facility and by monitoring wild lynx behavior with cameras in northern Maine (2011 MDIFW Wildlife Division Research and Management Report). The devices were 100 percent effective at excluding captive lynx from the trap. Lynx were not able to access the trap within the device and no lynx attempted to put its paw into the opening. Therefore, it appears that properly designed exclusion devices will be an effective alternative if further information demonstrates that leaning pole sets are less effective than anticipated.

2.3.3 Blind sets

We received a number of comments (written and during the 2011 public meetings) that raised questions about what constitutes a blind set according to Maine regulations. In addition, some comments raised concerns that blind sets are indiscriminate and any animal traveling down a trail could be caught in a killer-type trap.

The MDIFW regulations allow killer-type traps with a jaw spread less than 5 inches to be set in blind sets in aquatic and upland settings. A blind set is any set designed to catch a wild animal, without the use of bait, lure or visible attractor, by intercepting the animal as it moves naturally through its habitat. The MDIFW regulations allow the use of animal scat or urine.

The MDIFW presents information that no lynx have been reported to be captured in blind sets. In the revised 2013 ITP, the MDIFW will continue to allow blind sets for killer-type traps (ITP, p. 80). In addition to the public comments on this matter, the Service has raised the concern that lynx could be attracted to scat or urine associated with blind sets, or simply encounter these traps as they travel through their habitat. To address public and Service concerns, the MDIFW included a changed circumstance whereby if a lynx is killed in a killer-type trap they will implement contingencies to avoid such circumstances thereafter (ITP, pp. 122 to 23, changed circumstance #3). The MDIFW has not explicitly incorporated any incidental take from killer-type traps into their take authorization request, though should lethal take occur it would count toward the three lethal takes for which the MDIFW has requested.

2.3.4 Limit killer-type traps to size #120 or smaller in lynx areas

We received comments addressing the conservation measure evaluated in the 2011 DEA that killer-type traps be limited to size #120 or smaller in lynx areas. All of the comments were opposed to this measure based on perspectives including the measure would remove the #160 and #220 killer-type traps which are the most popular traps used for fisher and that smaller killer type traps would not humanely kill fisher.

In the 2011 DEA we described the rationale for including such a measure. MDIFW has explained that there is no evidence that restricting killer-type trap size will lower the take of lynx (J. Connolly, MDIFW memo to the Service, August 9, 2014). Since regulatory changes on killer-type traps were put in place in 2008, the MDIFW has explained that no lynx are known to have been taken in a legally set killer-type trap. The MDIFW has further explained that without a clear benefit to lynx, limiting the use of killer-type traps to #120 or smaller would be a disincentive to trappers and would drastically change marten and fisher trapping in Maine (J. Connolly, MDIFW Memorandum to the Service, August 9, 2013). The MDIFW made no changes in the 2013 revised ITP regarding this matter.

2.3.5 Require 24-hour tending of killer-type in lynx areas

We received many comments addressing the conservation measure evaluated in the 2011 DEA that tending times for killer-type traps in lynx areas should be reduced from 5 days to 1 day. Some comments opposed the measure because tending killer-type traps more frequently in remote areas of northern Maine would not be feasible given the high gas prices, some trappers can only check traps every 5 days or on weekends, and that there is no utility in the measure since animals caught in a killer type trap likely are dead. Some comments supported the measure citing trapping ethics (i.e., no animal should have to spend more than 24 hours in a trap), that other states require 24 hour tending of all traps – foothold and killer type traps, that more frequent tending would allow trappers pull traps in the event that lynx are in the vicinity. Some comments also noted that 24-hour tending may not be necessary if exclusion devices were required for all killer-type traps.

The MDIFW has explained that imposing a 24-hour trap tending rule for killer-type traps would discourage most trappers from accessing the remote areas of Maine (J. Connolly, MDIFW Memorandum to the Service, August 9, 2013). The MDIFW presents data in the revised ITP (p. 134) that indicates that leaning pole regulations put into place in 2008 virtually eliminate the risk of lynx becoming incidentally caught in legally set killer-type traps. However, to address public and Service comments, the MDIFW has incorporated a changed circumstance whereby if a lynx is killed in a killer-type trap, they will implement contingencies to avoid such circumstances thereafter (ITP, pp. 122 to 23, changed

circumstance #3). The MDIFW has not explicitly incorporated any incidental take from killer-type traps into their take authorization request, though should lethal take occur it would count toward the 3 lethal takes for which the MDIFW has requested.

2.3.6 Prohibit killer-type traps in lynx areas

We received a few comments suggesting that killer-type traps be prohibited in lynx areas or throughout Maine, though no additional information was provided substantiating why the recommendation was necessary or appropriate. Killer-type traps are commonly used to trap marten and fisher. Many types of killer type traps have been tested for their ability to humanely kill fisher and marten (see AFWA BMP publications, http://www.fishwildlife.org/index.php?section=furbearer_management&activator=27 last accessed on May 16, 2014). It would be difficult for the MDIFW to achieve species management objectives for marten and fisher without the ability for trappers to use killer-type traps.

The MDIFW did not consider discontinuing trapping for certain species (e.g., fisher and marten) because they did not believe it is practicable to ask the public to incur a significant loss of fur trapping opportunity on the outside chance that lynx may be incidentally taken, especially when there are effective measures for avoiding incidental captures of lynx in these traps (ITP, p. 133).

Similarly, the Service did not consider NEPA alternatives that would discontinue trapping or restrict harvest of certain species of furbearers (DEA, section 3.2, p. 27). Various types of trapping prohibitions would end furbearer trapping activities in Maine, and thus avoid trapping-related incidental take of lynx; however, it would not serve the purpose and need of this DEA. For example, prohibiting all killer-type traps in lynx areas would discontinue all forms of trapping (e.g., aquatic sets for muskrat and beaver) that have little or no potential to capture or otherwise take lynx.

2.3.7 Restrict the size of foothold traps used in land sets

We received comments addressing the conservation measure evaluated in the 2011 DEA to restrict the size of foothold traps used in land sets. Some comments opposed the measure explaining that trap size does not prevent lynx from being caught in traps, that larger foothold traps are needed to effectively catch coyotes (especially in snow), and that injury to animals in foothold traps is not a function of trap size but rather other features of the trap (such as trap modifications and how the trap is set). Some comments suggested that the ITP should commit to trap size restrictions that were established by the 2007 Consent Decree, but no additional information was provided substantiating how such a measure would reduce take or injury of lynx.

There is little evidence that smaller traps exclude lynx from incidental trapping. After the 2007 Consent Decree, lynx continued to be trapped in smaller foothold traps. It is unknown just how large foothold traps may be used in Maine if the restrictions of the 2007 Consent Decree (less than $5^3/_8$-inch inside jaw spread) were lifted. Foothold traps with inside jaw spread less than $5^3/_8$ inches are adequate to catch and hold all Maine furbearers. Trappers or the MDIFW did not indicate that furbearer harvest was affected by foothold trap size restrictions in the Consent Decree (ITP table 3.1.2).

The MDIFW will rescind trap size requirements after receiving an incidental take permit (ITP table 3.0). The MDIFW does not anticipate additional lynx captures or more severe injuries by rescinding the regulations affecting trap size (J. Connolly, MDIFW memo to the Service, August 9, 2011). They did not see a difference in the rate that lynx were trapped and reported before and after the Consent Decree. The MDIFW also indicated that lynx injury rates in foothold traps were similar before and after the 2007 Consent Decree requirements. Therefore, the MDIFW does not anticipate additional lynx captures or more severe injuries by rescinding foothold trap size regulations. However, to respond to public

comments on this issue, the MDIFW has incorporated a changed circumstance to address the potential for increased injury rates from larger foothold traps (ITP, pp. 120 to 121, changed circumstance #2). For instance, if all of the severe injuries occur in larger foothold traps with no other contributing factors identified, MDIFW will restrict the size of foothold traps or take other measures to reduce injury.

2.3.8 Require all trappers phase in foothold traps meeting BMP standards for fox, coyote, and bobcat

We received many comments addressing the conservation measure evaluated in the 2011 DEA that the MDIFW require Maine trappers to use foothold traps that meet best management practices (BMP) standards for fox, coyote, and bobcat. Some comments opposed the measure expressing that converting to BMP traps would be costly, BMP traps would reduce their ability to catch coyotes, BMP features developed for one species (e.g., fox or coyote) may not necessarily reduce injury in lynx, BMP standards are always changing and regulations would have to continue to change, and trappers would have to continue to purchase new traps. Some comments supported that that BMP traps might reduce injury, but the improvements would be marginal in comparison to the cost to trappers. Comments from the Maine Trappers Association explained that aid that the MDIFW promised trappers that BMP traps would never be mandatory if they participated in BMP trap testing. Other comments supported the measure suggesting that such modifications will reduce injury to lynx, that the MDIFW employed these traps in their research and that the same standard should apply to other trappers, and that even BMP traps developed for other species (e.g., fox, coyote, bobcat) have features that would reduce injury to lynx.

The MDIFW recommends, but does not require, the use of foothold traps meeting BMP standards. A recent AFWA survey (2005) indicated that 53 percent of Northeast trappers said they currently use some BMP traps and plan to continue to use them. While AFWA BMP trapping recommendations are species specific, common trap modification for foothold traps for larger carnivores include padding attached to the jaws (“softcatch”) design, offset jaws (space between the gripping surfaces), or laminated jaws (wider jaw with greater surface area). A scientific report on the role of BMP foothold traps in reducing injury to the endangered Mexican wolf (Turnbull et al. 2011, Turnbull et al. 2013) concluded that rubber padded foothold traps consistently resulted in greatly reduced trauma scores for all species for which they were evaluated (though bobcats were a notable exception). New data, since our 2011 DEA, is available from AFWA and FIC on foothold trap BMP testing and is summarized in DEA section 5.1.1.2. These data indicate that even BMP traps cause a certain amount of injury, including severe injuries. Mandatory use of BMP traps is unlikely to affect the number of lynx taken, but BMP research and the best available science demonstrates that it these traps may reduce injury rates.

The MDIFW has explained that lynx captured in foothold traps by trappers experience about the same injury rate as bobcats and coyotes caught in BMP traps (ITP, pp. 135 to 137, section 7.3). They further believe that the trapping related injury rates described in the ITP are accurate and appropriate for evaluating the impact of take on lynx from the ITP. To address public and Service comments, the MDIFW has incorporated a changed circumstance to address the potential for increased injury rates beyond what is currently anticipated (ITP, pp. 120 to 121, changed circumstance #2). While implementation of BMP traps is not specifically mentioned as a potential solution under this changed circumstance, it will certainly be a measure to consider in the event the changed circumstance is triggered.

2.3.9 Eliminate drags and require short chains, swivels, or in-line springs for foothold traps in lynx areas

We received many comments addressing the conservation measure evaluated in the 2011 DEA that the MDIFW eliminate drags and require short chains, swivels, or in-line springs for foothold traps in lynx areas. Some comments were opposed to the measure for a variety of reasons, including that drags allow

trapped animals to hide and thus suffer less stress, drags reduce the potential for trapped animals to be shot or stolen, soils in northern Maine are not conducive to digging depressions for sets, that it is impractical to dig in traps along road edges, drags make trapping more convenient, and that eliminating drags would not reduce trap injuries. Some comments supported the measure suggesting that Maine lynx have been severely injured in drag sets. We also received a comment suggesting that there was an increased risk of injury in drag sets, but it could be ameliorated by adding shock springs and three swivels to drags to resolve problems. Still another comment quoting a the MDIFW email suggesting that trappers should anchor foothold traps with short chains and not use drags and pointing out that the booklet *How to Avoid Incidental Take of Lynx While Trapping or Hunting Bobcats and other Furbearers* advised against using drags because of the risk of injury.

The MDIFW did not provide information on what proportion of foothold traps were set in drag sets, but it seems to be a popular method of trapping. Forty-five percent of lynx trapped were in drag sets (DEA section 5.1.1.2). For those who participate in this form of trapping, it may be difficult to dig into the ground to set traps along road edges, but more importantly animals trapped at road edge attract attention. For this reason, drags allow animals to seek cover off the roads and are less stressed until the trapper returns.

The MDIFW did not observe a difference in the number or severity of injuries for lynx caught in foothold traps that were staked and chained or on drags (J. Connolly, email to the Service, April 9, 2014). Thirteen of 14 lynx caught on drags were determined to have minor injuries and one had a broken leg. However, the Service has raised concerns with drag sets and associated potential for injury. In Maine, in 2013, two of three lynx caught in foothold traps with drag sets received serious injuries (i.e., broken leg and severe laceration) that required veterinary care. To address public and Service comments, the MDIFW has incorporated a changed circumstance to address the potential for increased injury rates beyond what is currently anticipated (ITP, pp. 120 to 121, changed circumstance #2).

The MDIFW has explained that they do not have information that using multiple swivels and inline shock springs will reduce injuries to lynx caught in foothold traps (whether staked or on drags)(J. Connolly, MDIFW email to the Service, April 9, 2014). The Service has suggested these trap modifications may help reduce injuries. The MDIFW used short (9.5 inch) chains to anchor traps set for lynx for research as recommended in the *How to Avoid Incidental Take of Lynx* booklet (AFWA 2003). AFWA recommendations for red fox, lynx, and eastern coyote include two or three swivels. AFWA indicates that use of in-line shock springs on trap anchoring systems, whether they are stakes or drags, may reduce injury (http://www.dec.ny.gov/docs/wildlife_pdf/trapbmpsintro.pdf last accessed May 16, 2014). To address Service comments, the MDIFW has incorporated a changed circumstance to address the potential for increased injury rates beyond what is currently anticipated (ITP, pp. 120 to 121, changed circumstance #2). These trap modification will be among the available options if the changed circumstance is triggered.

2.3.10 Require pan tension devices on foothold traps in WMDs 1 to 11, 14, 18 and 19

We received relatively few comments addressing the conservation measure evaluated in the 2011 DEA for mandatory use of pan tensions devices on foothold traps in lynx areas. Some comments suggested that pan tension devices would exclude lynx from foothold traps. Some comments were opposed to the measure explaining that the devices would not be effective, the devices would have to be set so high to avoid take of lynx that they would preclude capture of smaller furbearers like red fox, the devices are difficult to adjust and maintain in the field, and at least one comment explained that pan tension devices cause high leg catches instead of by the toes.

In the 2011 DEA we described the rationale for including such a measure. AFWA BMPs consistently recommend use of pan tension devices as a measure to increase selectivity of foothold traps. BMPs recommend pan tension of 2 pounds for fox, 2 to 4 pounds for bobcat and lynx, and 4 pounds for eastern coyote to increase selectivity and foot placement. Pan tension devices have been successful in excluding the smaller swift and kit foxes from being caught in traps for coyotes without adversely affecting trap performance (Phillips et al. 1996). In Maine, pan tension devices would have to be set at least 8 pounds (25 percent of the weight of an average lynx) to exclude lynx but catch coyotes. This would exclude many small coyotes (and fox, bobcat), which makes them an impractical minimization measure in Maine when trapping for fox and coyotes simultaneously. At the AFWA recommended settings (i.e., 2 to 4 pounds), pan tension devices would not select against lynx, fox, bobcat or coyote, but they would reduce incidental take of migratory birds and other small non-target species.

The MDIFW explained that pan tension requirements would not reduce the incidental trapping of lynx (J. Connolly, MDIFW email to the Service, April 9, 2014). In addition, regulations concerning pan tension would be difficult to enforce. The MDIFW has no evidence to suggest that the incidental trapping of migratory birds is an issue in Maine under current regulations. Therefore, the MDIFW made no changes in the 2013 revised ITP regarding this matter.

2.3.11 Limit upland foothold trapping season to October and November

We received many comments addressing the conservation measure evaluated in the 2011 DEA to limit upland foothold trapping season to October and November. Some comments opposed shortening the trapping season explaining that the measure is unnecessarily restrictive, fur is most prime later in the trapping season, expressing concern that this would eliminate the ability to catch coyotes, explaining that animals are more prone to come to bait and traps when temperatures are colder, and indicating that only one lynx has been reported trapped in December. Other comments supported the measure and explained that the measure would reduce the likelihood of trapping in cold temperatures (less than 15 to 20 degrees F) when freezing could cause injury to lynx feet, citing Mowatt et al. (1994) and Kolbe et al. (2003) regarding effects of trapping animals in colder temperatures.

It is likely that most Maine trappers currently focus their trapping activity in October and November and it is unclear how much trapping effort occurs in lynx areas in December. The MDIFW indicated that only 2 percent of total coyote harvest and 0.5 percent of red fox harvest in WMDs 1 to 11 was taken in December (2008 ITP). In 2008, the MDIFW reduced the trapping season to just October and November to reduce trapper effort on marten and fisher. However, we are also aware that trappers have expressed interest in using larger foothold traps to specifically trap in frozen conditions later in the trapping season, extending the trapping later into the winter, and resuming snaring to trap later into the winter. In this revised 2013 ITP, the MDIFW includes non-lethal cable restraints as a covered activity, in part for the purpose of trapping later into the winter.

The MDIFW has explained that there have been no lynx reported caught in foothold traps in December (J. Connolly, email to the Service, April 9, 2014). However, we are aware that two have been reported caught in illegally set killer-type traps (ITP Table 4.1.3). The MDIFW believes limiting the foothold trapping season to October and November would not reduce take or harm to lynx. To address public and Service comments, the MDIFW has incorporated a changed circumstance to address lynx being caught in traps at a higher rate than expected (ITP, pp. 117 to 119, changed circumstance #1).

2.3.12 Close upland trapping in lynx areas

We received several comments regarding one of the Service's 2011 DEA alternatives that assessed the closure of trapping in lynx areas. The Service included this alternative in the 2011 DEA (alternative E)

and this revised DEA (alternative 2) to ensure that a full suite of alternatives was considered, per NEPA regulations. Some comments were in strong opposition citing that the alternative would be devastating to trapping as a recreational activity, would cause economic hardship, and would likely end most trapping activities. Some comments supported this alternative citing that a complete trapping closure was the only solution to avoid take of lynx and expressing opposition to any trapping activities. One commenter suggested that closing trapping should be an interim measure until the MDIFW provides an ITP that meets the ESA issuance criteria.

The purpose of NEPA alternatives is to analyze the effects to the human environment for a range of alternatives, including the proposed action. The proposed action for the 2011 DEA was the Service's issuance of an incidental take permit based on MDIFW's 2008 draft ITP. Ultimately, the permit issuance decision at that time was solely whether the MDIFW's 2008 draft ITP met the ESA 10(a)1(B) issuance criteria or not. The NEPA alternatives were designed to better understand the effects of that and other alternatives, but not to assess whether a different alternative might be more appropriate for permitting or not. At present, the MDIFW has submitted a revised 2013 ITP. So, the Service is now effectively analyzing a revised proposed action in our revised DEA.

The MDIFW did not consider a statewide trapping closure because the benefit of any reduced incidental take of lynx from this action would be relatively minor relative to other sources of human-related lynx mortality that have a greater effect on lynx populations (ITP, p. 132, section 7.1). The MDIFW indicated that if fisher trapping were eliminated, fisher predation on lynx would likely increase and have a greater effect than any incidental trapping might have on Maine's lynx population (ITP, section 4.2). Trapping cannot be replaced with an alternate activity to effectively harvest furbearing animals and provide a similar outdoor experience. Discontinuing trapping would be contrary to the Maine legislature's original directive, and therefore such an alternative would not meet the MDIFW's purpose and need for the project.

2.3.13 Prohibit use of scents, lures, bait in lynx areas

We received a comment suggesting that scents, lures, and bait be prohibited in lynx areas because they attract lynx to traps. Trappers rely on scents, lures, and bait to attract furbearers to traps. Trapping would not be feasible without scents, lures, and baits (in other words, all traps would be "blind" sets, which would be inefficient and indiscriminate). Neither the MDIFW nor the Service considered this option in their respective documents.

2.3.14 Reporting rates for incidentally trapped lynx

We received many comments regarding reporting rates for incidentally trapped lynx. Some comments were skeptical of reporting rates and suggested that capture of lynx is greatly underreported. These comments pointed to court cases or memoranda involving the MDIFW and information in trapper blogs that appear to confirm that sentiment. They also expressed that many more lethal trapping incidents occur in leaning pole sets than are reported, the anticipated take of lynx would affect the ability of the Service to recover the lynx (e.g., lethal take could be enough to reduce the population, especially if it were to decline or was already too small), and pointed out that the MDIFW has not evaluated trapper compliance with mandatory reporting requirements. Other comments were more positive about reporting rates of incidentally trapped lynx. These comments explained that it is mandatory to report capture of lynx and that reporting rates are high. They also expressed that trappers have an incentive to report to ensure that trapping can continue in Maine, and that the number of lynx taken annually is small, most are released with few or minor injuries, and any lethal take has a minimal effect on Maine's lynx population.

Since 2008, the MDIFW has required reporting of incidentally trapped lynx (ITP, p. 82, RC 2) and they believe that most incidental captures are reported (ITP p. 49). The MDIFW indicated that they do not have evidence to support the contention that many incidentally trapped lynx are not being reported (J. Connolly, MDIFW email to the Service, August 9, 2013). From 2000 to 2007, prior to a rule making it mandatory to immediately report an incidental lynx capture, 81 percent of the lynx known to be caught in traps were reported to the MDIFW by trappers. In 2009, 1 year after mandatory reporting was initiated, 23 of 24 lynx known to be captured (i.e., 96 percent) of the lynx were reported. The MDIFW indicated than none of the 74 radio-collared lynx monitored during 13 trapping seasons were known to be captured in a killer-type trap set for marten and fisher, suggesting that perhaps capture reports are not high in these traps. We do know that three non-radio collared lynx were reported caught in killer-type traps on the lynx study areas.

Maintaining a high reporting rate is of great interest to the the MDIFW and the Service as this is the primary means to monitor incidental take and respond to changed circumstances. Prompt reporting also ensures that MDIFW staff can evaluate and treat incidentally trapped lynx, gather important information (e.g., biological information on the animal, type of trap and set, injury score for animal, and other factors). The MDIFW has expressed to the Service that strong cooperation with the trapping community is a key factor in successfully implementing this ITP and that interaction between the MDIFW staff and trappers at these capture events is an important part of that effort.

To respond to public and Service comments, the MDIFW has addressed the potential for non-reporting in several ways in the revised 2013 ITP. The MDIFW incorporated provisions to increase Maine Warden Service compliance checks to ensure that trap sets are compliant with regulations (ITP, p. 99). This will also be a tool for independently monitoring incidental capture of lynx. For example, if wardens are finding a higher level of lynx captures than is reflected by the reporting rate information that may suggest a problem that the MDIFW needs to resolve. The MDIFW believes current state and Federal penalties and stepped up enforcement are sufficient to encourage reporting and if not, the issue will be addressed as a changed circumstance, which could result in increased penalties. The MDIFW will monitor compliance with mandatory reporting by tracking the number of lynx reported in a database (ITP p.82).

With regard to public comments on the population level effects of the MDIFW's requested level of non-lethal and lethal take, both the revised ITP and our revised DEA (section 5.1.1.1) include effects analyses. In addition, before issuing an incidental take permit, the Service will again independently evaluate the anticipated take of lynx on the population in our ESA section 7 biological opinion. For this revised DEA, we conclude that the anticipated lethal take of lynx under all four alternatives is within the limits of what is sustainable for a population of 750 adult lynx.

2.3.15 Permit cage traps (e.g., box traps) during the trapping season

We received comments that cage traps would be an effective means to trap some furbearers (especially bobcats). If Canada lynx were incidentally caught in cage traps, they could be released with minimal injuries. Cage traps are not effective at catching canids, such as fox and coyotes, but may be used for fisher and American marten.

If issued an incidental take permit, the MDIFW intends to rescind the 2007 Consent Decree that includes restrictions on use of cage traps. In response to public comments, the MDIFW has included the use of cage traps in lynx WMDs in the revised 2013 ITP. The MDIFW has incorporated the potential for take of lynx in cage traps in their incidental take estimates (ITP, table 4.2.1). However, they do not anticipate that these captures will result in lethal take of lynx. Take of lynx in cage traps is also considered in alternative 3 in this revised DEA (section 5.3.1.1).

2.3.16 Reinstate use of rat and snap traps in boxes for weasels

We received comments requesting that the MDIFW reinstate the use of rat and snap traps in boxes for weasel trapping. The 2007 Consent Decree prohibits the use of any killer type trap unless placed on a leaning pole set. According to the MDIFW, no lynx were reported caught in snap traps prior to the Consent Decree.

If issued an incidental take permit, the MDIFW intends to rescind the Consent Decree. In response to public comments, the MDIFW has included the use of wooden-based rat traps for weasels in boxes with a 2-inch opening in lynx WMDs in the revised 2013 ITP (ITP table 3.0). The MDIFW anticipates that use of cage traps would increase but that lynx could not access these boxes and be incidentally-trapped. Take of lynx in wooden-based rat traps in boxes was considered in alternative 3 in this revised DEA (section 5.3.1.1), and no lynx were anticipated to be trapped.

2.3.17 Limit trapper efforts in order to reduce take of lynx

We received several comments that trapper effort should be reduced to minimize take of lynx. Commenters suggested several ways to reduce trapper effort including limiting the numbers of traps each trapper can set, limiting the number of coyotes and foxes that can be taken, and limit the number of trappers that can trap in lynx areas.

The MDIFW contemplated reduced trapping effort in their draft 2008 and revised 2013 ITP. In the revised 2013 ITP, the MDIFW considers reducing trapper effort as a potential change in their minimization program in the event that lynx are being caught in traps at a higher rate than is initially anticipated and addressed (ITP, p. 120, changed circumstance #2).

We considered two alternatives in this revised DEA that reduce take of lynx. Alternative 2 would discontinue all upland trapping in lynx WMDs, and alternative 4 would discontinue PM and ADC trapping in lynx WMDs. We did not consider alternatives with other means of limiting trapper effort (e.g., reducing the number of traps, licensed trappers, or quotas on furbearers).

2.3.18 Limit any new regulations to lynx areas of the state

We received several comments that measures to reduce take and injury of lynx should be restricted to only areas of the state where lynx occur. The MDIFW currently restricts lynx trapping regulations to lynx WMDs where the species is known to occur (e.g., lynx WMDs 1 to 11, 14, 18, and 19). That would continue under implementation of the revised 2013 ITP such that trapping regulations only apply to WMDs where lynx are resident and/or breeding. The ITP incorporates a process for adding or removing lynx WMDs through lynx presence and absence surveys during the permit period (ITP, section 5.5).

2.3.19 Prohibit use of catch poles

We received several comments advocating against the use of catch poles to secure incidentally trapped lynx. The comments cite references and catch pole manufacturer materials that advise against the use of catch poles for lynx or other cats. Some comments pointed to a 2011 incident in Minnesota where a lynx and a lynx hybrid died immediately after handling by a catch pole during a trapping incident. Initially, there was speculation that improper use of catch poles contributed to the death of these animals. However, necropsy indicated that the lynx died from internal injuries consistent with struggling in the trap rather than the catch pole. The cause of the death for the hybrid lynx is unknown.

Catch poles are widely used by trappers and MDIFW staff to restrain lynx when they are being released from incidental trapping events. Lynx and bobcats are reported be susceptible to strangulation when cable loops are placed around their necks (Quinn and Parker 1987, Novak et al. 1987, R. Chipman, APHIS, pers. comm. 1.06.2012, Best Practices for nuisance wildlife control operators in New York State; http://nwco.net/0530-StepThreeNonlethalToolsAndTechniques/5-1-DirectCapture.asp last accessed on May 1, 2014). For this reason, the MDIFW advises trappers to secure lynx and bobcats around the shoulder and one leg when using catch poles (ITP p. 221).

The MDIFW documented no injuries during their 12-year radio-telemetry study after releasing 27 lynx handled with catch poles (J. Connolly, MDIFW email to the Service, August 9, 2014). In response to public comments, the MDIFW will include instructions on the proper use of catch poles in its training DVD. Also, with implementation of the revised 2013 ITP, the MDIFW's goal is to respond to 90 percent of lynx captures, so that trappers will not be handling most incidentally trapped lynx. Furthermore, the MDIFW will be tranquilizing and releasing lynx from traps, unless a biologist or warden cannot be reached in time to reduce injury to a lynx. The MDIFW will ensure that staff handling incidentally trapped lynx will have training at least once every 3 years (ITP, p. 89, IM6) and that a veterinarian accompanies staff on at least three incidental capture events within each 3 year period of the permit (ITP, p. 89, IM7).

We did not consider eliminating the use of catch poles as part of an alternative in this revised DEA because we believe that adequate measures and training are in place to address potential injuries to lynx from catch poles. We did consider sensitivity to lynx to nooses around their neck when evaluating injuries to cable restraints (DEA section 5.3.1.2).

2.3.20 Use of snaring as an acceptable trapping technique

We received a number of public comments with regard to the use of snaring as an acceptable trapping technique. Some comments were against this practice and did not want it resumed with implementation of the ITP. Such comments indicated that lynx can be caught in foot snares set for bears and advocated that the MDIFW should commit to all of the trap restriction in the 2007 Consent Decree and should prohibit the use of neck snares in state statutes. We also received comments that snaring is the most effective way to control coyotes and that snaring is necessary to restore the deer herd in northern and eastern Maine. These comments requested MDIFW resume a snaring program.

If issued an incidental take permit, the MDIFW intends to rescind the Consent Decree as described in the ITP (table 3.0). There are several more significant changes that the MDIFW included with the 2013 revision of the ITP including the phased in inclusion of non-lethal cable restraints as a covered activity. The MDIFW considers this a viable trapping alternative that may actually be more effective in capturing target species (coyotes) than traditional foothold traps and reduce injury rates of trapped animals. They will only allow use of non-lethal cable restraints if their evaluation under a phased in approach with the PM and ADC programs demonstrate that injury rates are the same or less than anticipated through other trapping techniques. The DEA fully analyzes the anticipated effects of non-lethal cable restraints under alternative 3 and 4 (DEA sections 5.3.1.1 and 5.3.1.2).

Lethal snaring in the upland for furbearers is not a covered activity under any of MDIFW's trapping programs and will not be a covered activity under the revised 2013 ITP. Lethal snares may be set under water for beaver or other aquatic furbearers (ITP, p. 11). The MDIFW regulations require that snares for set for beaver be completely under water, which are unlikely to be accessible to lynx (see further comments below in response 2.3.21).

The only other form of snaring permitted in Maine is foot snares (i.e., cable traps) for bear. Snaring for bears is covered under the big game program and regulations (as opposed to the trapping program) and is not a covered activity under the revised 2013 ITP (ITP, p. 38, section 3.1). Therefore, there will not be incidental take coverage for incidental trapping of lynx with regard to foot snares for bear. Such take, in the event it occurs, would be considered an ESA section 9 violation. The MDIFW has never had a report of a lynx captured in a foot snare set for bear.

2.3.21 Lynx capture in aquatic trap sets

We received several comments concerning the potential for capture of lynx in traps set for aquatic furbearers, especially beaver. Large killer-type traps (up to 8 inches jaw spread) and foothold traps (with greater than 5 $^{3}/_{8}$ inch jaw spread) may be used in lynx WMDs if they are fully or partially covered by water at all times. In lynx WMDs, killer-type traps must be set completely underwater, except that killer-type traps with a jaw spread of 5 inches or less can also be set partially covered by water or under overhanging stream banks or in a blind set. In general, aquatic set traps for beaver and muskrat must be completely covered with water when set, placed, and tended (see new regulations for 2014 at http://www.maine.gov/ifw/hunting_trapping/trapping/pdfs/2013-2014%20Trapping%20Booklet_10-22-13-fnl.pdf last accessed on July 17, 2014. Water levels may change after the time that traps set and before the next time it is tended (up to 5 days for killer-type traps). This could sometimes expose traps that were initially set in shallow water.

Lynx often travel in riparian corridors and could encounter beaver dams or houses during all seasons. Maine trapping regulations prohibit setting traps within 10 feet of a beaver house or within 5 feet of a beaver dam. However in some lynx WMDs (e.g., 1, 2, 4, 8, 9, and 10) there are no required setback distances from active beaver dams and in WMDs 1 to 6 there are no required setback distances from beaver houses. Also, traps may be set on abandoned beaver dams which no longer hold back water (i.e., show no evidence of beaver activity). Nevertheless, foothold and killer-type traps set for aquatic furbearers have to be set completely underwater. Regulations prohibit using meat or fish as bait in beaver traps, but beaver castor is commonly used. In unorganized towns, drowning sets with killer-type or foothold traps must be tended at least once every 5 days. Beaver trapping in lynx WMDs starts as early as mid-October and ends April 30.

In part as response to public and Service comments, the MDIFW revised trapping regulations for killer-type traps in 2013 to clarify the use of aquatic trap sets (http://www.maine.gov/ifw/hunting_trapping/trapping/ last accessed on May 16, 2014). MDIFW has never had a report of a lynx captured in a trap set for beavers and they believe that beaver traps pose little risk of incidental capture of lynx.

In alternative 4, we addressed setting aquatic traps greater than 10 inches under water as a means to avoid take of lynx in some aquatic sets. If no permit were granted for ADC trapping, ADC agents would be required to avoid take of lynx by placing all foothold and killer-type traps greater than 10 inches under water.

2.3.22 Non-target species caught in traps

We received many comments concerning non-target species caught in traps. Some comments pointed to regulations requiring reporting of incidentally killed wildlife, but cited a lack of enforcement of this regulation. Some comments expressed concern that lack of data on incidental capture of non-target species would make it impossible to quantify and analyze the environmental effects of trapping in the DEA. Other comments suggested that incidental capture of migratory birds may be a significant

environmental effect (further addressed in comment response 2.3.22) and that the ITP should require training and measures to minimize take of non-target wildlife in traps.

The MDIFW has a number of regulations in place that address when and how fatality of non-target species in traps should be reported. For example, according to the regulations, trappers must immediately release non-target species, and if the animal is dead must report the incident to a game warden as soon as possible and turn the animal over to the Department (http://www.eregulations.com/maine/hunting/trapping-rules/ last accessed on May 14, 2014). Other similar regulations include:
Coyote control trappers must report non-target species taken (§10108. Section 11.B.9, ITP p. 156).
Trappers must report Canada lynx (MDIFW Rules 09-137, Chapter 4.01(G)2, ITP p. 205).
During the early fox trapping season, trappers must report any other furbearer caught incidentally in a fox or coyote trap and found dead (MDIFW Rules 09-137, Chapter 4.01(G)2-A, ITP. p. 205)
During the early muskrat trapping season, trappers must report any other furbearer caught incidentally in a muskrat trap and found dead (MDIFW Rules 09-137, Chapter 4.01(G)2-B, ITP. p. 206)
Any marten or fisher caught in excess of the annual limit must be reported (MDIFW Rules 09-137, Chapter 4.01(G)3, ITP. p. 207, 208)

However, current trapping regulations do not require reporting of non-target captures and MDIFW does not compile or track this information. In this revised DEA we conducted a review of the scientific literature and provide the best scientific information available on the number and species of animals incidentally caught in traps (DEA, section 4.3) and further analyze the effects of take of non-target species in each of the alternatives (DEA, sections 5.1.3, 5.2.3, 5.3.3, and 5.4.3). We could not analyze effects to all birds and mammal species that could be incidentally caught. Instead, we analyzed the effects on gray jays, northern flying squirrels, and snowshoe hares which we expected are the most frequently caught non-target bird and mammal in Maine. We received no comments questioning this methodology or approach to evaluated impacts in the previous 2011 DEA.

2.3.23 Trapping related impacts on bald and golden eagles and migratory birds

Several commenters raised concerns that incidental capture of bald and golden eagles, or migratory birds in traps is not compliant with MBTA or BGEPA. These comments suggest that migratory birds and eagles are incidentally trapped and recommend that the final ITP include provisions for monitoring and reporting take of migratory birds and eagles.

Migratory birds are incidentally taken in traps, but the species composition and numbers are unknown in Maine. The MDIFW addressed migratory birds in the revised 2013 ITP (ITP, section 2.2.3). MDIFW believes there was some potential for American crows, common ravens, and gray jays to be attracted to baited traps. Regulatory changes instituted in 2007 require bait to be covered and has minimized the capture of migratory birds. Subsequently, the MDIFW provided additional information to the Service summarizing measures taken to avoid take of eagles and migratory birds (J. Connolly, MDIFW email to the Service, August 9, 2013). Reported incidental capture of eagles in traps has declined substantially despite an increasing eagle population. No eagles are known to have been taken in legally set traps in Maine since the covered bait regulations have been in place.

To respond to the public comments regarding monitoring and reporting, the MDIFW has incorporated commitments to monitor incidental take of migratory birds in the PM and ADC programs (J. Connolly, MDIFW email to the Service, August 9, 2013, appendix 2). These will also serve as a surrogate to the recreational trapping program, since the same trapping techniques are being employed, and the MDIFW has more direct access to the trappers in these programs. If monitoring these programs indicates that there is an issue with take of migratory birds through trapping, the MDIFW will explore additional measures

through trapping regulations and outreach efforts to reduce the incidental take of migratory birds. Finally, if incidental take of bald or golden eagles is occurring during implementation of the trapping programs, the MDIFW may need to pursue an eagle take permit under the BGEPA or amend its ESA section 10 permit to include eagles as a covered species.

The revised DEA provides an analysis of the effects of the proposed action on eagles (DEA, section 5.1.2) and migratory birds (DEA, section 5.1.3.2). We conclude that effects from furbearer trapping in Maine have minimal impact to bird populations.

2.3.24 Coyote control and deer populations

We received many comments that more trapping opportunities are needed to control coyote populations to help deer in northern Maine. In response to public input concerning declining deer populations in northern Maine, the MDIFW has included the use of new trapping methods in the revised 2013 ITP (e.g., larger traps and non-lethal cable restraints) to trap more coyotes. We discuss issues concerning coyote control and the ability to affect deer populations in section 5.2.3.1 of this revised DEA. The complex interaction between severe winters, quality of deer wintering habitat, hunting regulations, and predation (by bears and coyotes) is also discussed in Peek et al. (2012). The alternatives evaluate varying degrees of coyote trapping opportunity in northern Maine.

2.3.25 Require killer-type traps be set in trees

We received a few comments that killer-type traps set in trees greater than 5 or 6 feet above ground level could greatly reduce incidental capture of lynx. The commenters believe that lynx would be less likely to climb a vertical tree than a leaning pole and indicated this method is one of the most popular marten sets in the western United States. A commenter further suggested that by using this method, the tending time for traps may be extended to 7 days.

The MDIFW has no evidence to suggest that killer-type traps set in trees are more effective in excluding lynx than traps set on leaning poles. The MDIFW presents data in the revised ITP (p. 134) that indicates the risk of capture in a leaning pole is extremely low. If circumstances change, the revised 2013 ITP includes a contingency plan to reduce lethal take (ITP pp. 122 to123, changed circumstance #3). The Service does not evaluate setting traps in trees in alternatives considered in this revised DEA.

2.3.26 Prohibit live capture and hunting of hares in lynx areas

We received several comments concerned that beagle clubs can capture and transfer hares from lynx areas. They also expressed concerns that hunting of hares occurs in northern Maine and reduces the population of hares for lynx.

Targeted trapping of snowshoe hares was not considered in the revised 2013 ITP or this revised DEA (although we do assess the effect of trapping of non-target species including hares). An unknown number of people live trap hares in northern Maine, but the number is likely small. The last hunting harvest estimates were from the early 1980s when an estimated 53,000 to 63,000 hunters shot 217,000 to 300,000 hares statewide (Jakubas and Cross 2002). The last hare population estimate was 8.5 million (Cross 1985), and this DEA estimates that there may be as many as 1.8 million snowshoe hares within the know range of lynx in Maine. Most hare hunting effort occurred in southern and central Maine, and less than 1 percent of the statewide hunting effort occurred in northern Maine (Jakubas and Cross 2002). Thus, we conclude harvest of snowshoe hares (by trapping or hunting) has a negligible effect on lynx.

2.4 Enforcement measures

2.4.1 Increase penalties for non-reporting take of lynx

We received a number of comments regarding penalties for non-reporting of incidental lynx captures. Some comments suggested that penalties should be increased, include revocation of trapping privileges, and that more severe penalties would encourage higher rates of reporting. Others comments suggested there should be positive incentives to encourage reporting in addition to penalties. Some comments were opposed to such a measure and expressed that penalties would do nothing to affect the number of lynx incidentally caught and that the Federal government had no right to dictate to the state what penalties should apply.

Currently, failure to report take of a lynx is punishable as a Class E crime (12 MSRA Part 10 Chapters 701 to 811. Chapter 721 Enforcement), which carries a penalty of up to $1,000 and up to 6 months in prison.

The MDIFW indicated that they had no information to suggest that reporting rates were a problem and that increased penalties were not needed (J. Connolly, email to the Service, August 9, 2014). As explained in comment response 2.3.14, the MDIFW believes that current state and Federal penalties and stepped up enforcement are sufficient to encourage reporting. If reporting remains an issue, it will be addressed as a changed circumstance, which could result in increased penalties.

2.4.2 Recommend Maine become a participating member of the Interstate Wildlife Violator Compact

We received several comments regarding the MDIFW's participation in the Interstate Wildlife Violator Compact as a means to deter illegal actions related to incidental take of lynx. Some comments suggested that Maine should join this effort, while other thought that Maine is already a member. We also received comments that opposed Maine joining the Compact and explaining that the Federal government has no right requiring that Maine become a member.

The MDIFW's participation in the Compact was approved by their Advisory Council on May 9, 2014, and accepted by the Secretary of the State on May 16, 2014. Therefore, the agency is now a participating member. The Service's revised DEA does not evaluate the environmental effects of Maine's participation in the Compact because it is beyond the scope of the purpose and need of our NEPA analysis.

2.5 Measures to Mitigate Impacts of Taking

2.5.1 Mitigation commitments

Several commenters raised concerns about the adequacy of the mitigation plan proposed in the MDIFW's 2008 draft ITP (e.g., lack of specific details, what impacts of take are being addressed, mechanisms for implementation, assurances, etc.). The comments raised a range of issues that included sufficiency of the mitigation to offset the anticipated take of lynx; supporting and opposing the use of the mitigation area for trapping; opposing mitigation on MDPPL lands because they are the few remaining large areas of mature forest in northern Maine; and the lands are managed for multiple uses; and there would be many more options for mitigation on private lands. Some comments expressed concern about using cooperative or conservation agreements with private landowners in conjunction with mitigation and wanted clarification on what habitat management guidelines or forestry recommendations would serve as the basis for such agreements. Finally, some comments recommended that the mitigation address all forms of take (i.e., harm, capture, and wounding) in addition to lethal take and be sufficient to account for reported take and

estimated non-reported take. One commenter suggested that 10,000 acres of habitat should be provided for each female lynx taken, for every two adult males taken, for every two juveniles, and for every two kittens taken.

The MDIFW's revised 2013 ITP incorporates a number of revisions and clarifications to the mitigation plan intended to address these and Service comments (ITP, section 5.3). The MDIFW intends to mitigate for the take of lynx by maintaining and enhancing 4,785 acres of high quality hare habitat on a 10,411 acres area on the MDPPL Seboomook Unit (ITP, pp. 103 to 115, section 5.3). The amount and type of management will be described in a forest management plan, which will be completed within in 3 years of issuing an incidental take permit. Forest management will shift from pre-commercial and commercial thinning to manage for mature conifer to shelterwood harvesting to manage for young conifer habitat (ITP, p. 113). In addition, MDIFW will employ many of the guidelines in the Service's *Canada lynx habitat management guidelines for Maine* (Service 2007). Forest management would be completed within 15 years (i.e., the requested permit period) and there may be a lag time before the management activities create optimal lynx habitat. Habitat created by the mitigation proposal will be in a suitable condition to support lynx until 2052 to 2064, depending on when forest management occurs during the permit period. Trapping would be allowed on the mitigation area. The MDIFW will monitor lynx use of the area and habitat conditions. A memorandum of understanding between the MDIFW and the MDPPL is included in the revised 2013ITP.

The Service recommendation in *Canada lynx habitat management guidelines for Maine* is to maintain 20 to 27 percent (6,912 to 9,331 acres) within a 1½ township-sized lynx habitat management unit as high quality hare habitat (Service 2007). These recommendations are similar to conservation recommendations in Simons-Legaard et al. (2013) and the Lynx Conservation Assessment Strategy (LCAS)(Interagency Lynx Biology Team 2013). These guidelines are based on expanding and contracting home range sizes of adult male and female lynx during different phases in the hare cycle and the landscape hare densities needed to support lynx. In the revised 2013 ITP, the MDIFW provides an alternative habitat analysis based on 13 of their 74 radio-collared lynx that only needed 1,595 acres of high quality hare habitat per lynx, therefore suggesting that 4,785 acres of lynx habitat should be sufficient to mitigate for the three mortalities included in their incidental take request (ITP, section 5.3).

The Service has not yet evaluated whether the MDIFW's revised ITP meets the Section 10(a)1(B) incidental take permit issuance criteria. The Service will conduct this evaluation in conjunction with making a permit issuance decision and will make our findings publically available. Specific to this comment, the issuance criteria is that the conservation plan demonstrates that "the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking."

In the 2011 DEA, we evaluated the environmental consequences of two habitat mitigation commitments – creating 10,000 acres of lynx habitat on Maine public land with binding agreements and creating at least 7,000 acres of lynx habitat on private forest lands accompanying binding agreements. We believed these scenarios would cover the extent of mitigation and ownerships (public or private) that the MDIFW might consider in the final ITP. In this revised DEA, we evaluated the environmental consequences of the MDIFW's mitigation in alternatives 3 and 4.

2.5.2 Fisher and coyote trapping to offset take of lynx

We received many comments that fisher and coyote trapping should be liberalized in northern Maine as a form of mitigation because these animals are predators of lynx. Many cited the MDIFW data from their telemetry study documenting that fisher are predators of lynx in Maine. Some also said coyotes kill lynx (although this was not documented by MDIFW research), and they compete with lynx for snowshoe hare. Others said predator management is used to help other threatened and endangered species like piping

plovers and roseate terns. Many were concerned that any further restrictions on trapping as a result of the ITP process will reduce fisher and coyote harvest, which in turn would increase predation and diminish the lynx population. Some argued that there should be year-round coyote control. Others said there should be more research on competition between lynx, bobcat, coyote, and fisher. Many of these sentiments were raised and public information meetings.

The MDIFW evaluated the possible effects of fisher trapping on Maine's lynx population (ITP pp. 73 to 74) and believe that benefits of trapping fisher to lynx likely outweigh the negative effects of incidental trapping (J. Connolly, MDIFW email to the Service, August 9, 2014). The MDIFW cites their own research and from the Yukon (O'Donoghue et al. 1997, 1998; 2001) that indicates coyotes may have little detrimental effect on lynx populations. It would be very difficult to sustain the removal rate of coyotes needed to have any effect on the lynx population in Maine. Thus, the MDIFW did not propose increased fisher and coyote removal as a mitigation measure.

We did not evaluate liberalized fisher and coyote trapping as a form of mitigation in this revised DEA. It is not reasonable or practicable to rely on overharvesting a valuable furbearer (i.e., fisher) that is already at low densities at the northern edge of their range. Also, it would be difficult to document and monitor the outcomes of such a measure.

2.6 Monitoring Measures

2.6.1 Monitoring commitments

Several commenters raised concerns about the adequacy of the monitoring commitments proposed in the MDIFW's 2008 draft ITP (e.g., lack of compliance and effectiveness monitoring, identification of desired monitoring results/targets).

To address these and Service comments, the MDIFW's revised ITP (MDIFW 2013) incorporates compliance and effectiveness monitoring as well as reporting commitments specific to each of the conservation plan (i.e., minimization and mitigation) measures. The MDIFW describes minimization measures (ITP, section 5.2.1) and how progress for each commitment will be monitored. Compliance for some measures has already been achieved (e.g., RC 2 mandatory reporting, p. 82), but the MDIFW will report to the Service when other commitments are completed (e.g., RC 4 rescind size restrictions of foothold traps). Table 5.2.3 provides a timeline for monitoring and reporting. The MDIFW will monitor compliance with leaning pole regulations (ITP, p. 124, changed circumstance #5). The MDIFW will monitor mitigation including lynx surveys of the area, forest management activities, and habitat (ITP, p. 114, section 5.3). The MDIFW provides monitoring and thresholds/triggers and responses for several changed circumstances (ITP, section 5.4). For example, if one or more lynx are caught in a legally-set killer-type trap the MDIFW will investigate, identify and correct problems, including alternative minimization measures or seek a permit amendment (ITP, pp. 122 to 123, changed circumstance #3). Monitoring costs are presented in the ITP (section 6.3, table 6.2.1). The MDIFW will monitor the lynx population and extend lynx avoidance and minimization measures to new areas occupied by lynx (ITP, appendix 5).

The Service has not yet evaluated whether the MDIFW's revised ITP meets the Section 10(a)1(B) incidental take permit issuance criteria. The Service will conduct this evaluation in conjunction with making a permit issuance decision and will make our findings publicly available. As explained in the Service's 5-Point Policy (Service 2000), monitoring is a mandatory element of all HCPs and should assess implementation compliance, confirm the effects of the permitted action, determine the effectiveness of the operating conservation program, and verify progress toward the biological goals and objectives.

2.6.2 Adaptive management commitments

Several commenters suggested the need for adaptive management in the MDIFW's 2008 draft ITP to address circumstances such as exceeding take thresholds, changes in lynx populations, changes in trapper effort, compliance with regulations, and actions that will be taken if thresholds are exceeded. Several areas of uncertainty were raised in public comments: reporting rates and the number of lynx incidentally trapped (see comment response 2.3.14), injury rates (see comment response 2.3.8), effectiveness of the leaning pole at excluding lynx from killer-type traps (see comment response 2.3.1), effectiveness of the mitigation (see comment response 2.5.1, 2.5.2), take of migratory birds and other non-target species (see comment response 2.3.21, 2.3.22), among others. As explained in the Service's 5-Point Policy (Service 2000), adaptive management is a tool recommended to address uncertainty in the conservation of a species covered by a habitat conservation plan. The Policy explains that when adaptive management is used, the HCP must outline the agreed-upon future changes to the operating conservation program.

To respond to the public and Service comments regarding adaptive management, the MDIFW's revised ITP (MDIFW 2013) incorporates a changed circumstance section that describes various contingencies. The revised ITP also explains the MDIFW's rationale for using changed circumstances rather than adaptive management to address these contingencies (ITP, pp. 115 to 116). The Service's 5-Point Policy (Service 2000) explains that changed circumstances are an appropriate tool to incorporate flexibility into a habitat conservation plan other than just through adaptive management. Changed circumstances are circumstances that can be reasonably anticipated, and the HCP can incorporate measures to be implemented if the circumstances occur. Adaptive management strategies often trigger changed circumstances and changed circumstances often incorporate adaptive management. The bottom-line is that the MDIFW's revised ITP identifies contingencies (such as exceeding various thresholds) and the proposed approaches that the MDIFW will implement in response to those circumstances.

The Service has not yet evaluated whether the MDIFW's revised ITP meets the Section 10(a)1(B) incidental take permit issuance criteria. The Service will conduct this evaluation in conjunction with making a permit issuance decision and will make our findings publically available.

2.7 Other comments

2.7.1 Incidental take permit duration

We received comments regarding the appropriateness of the 15-year permit duration requested by the MDIFW based on uncertainties, adequacy of conservation plan commitments and assurances, lack of adaptive management, and potential changes in lynx populations due to habitat and prey base changes. A number of comments suggested the permit duration should be shorter.

As explained in the Service's 5-Point Policy (Service 2000), a number of factors should be considered by an applicant and the Service in determining appropriate permit duration. These include such issues as the duration of the applicant's proposed activities, expected positive and negative effects on covered species, extent to which the operating conservation program will increase the long-term survivability of the listed species and/or enhance its habitat, and the time required for the mitigation to become effective.

The MDIFW's revised ITP (MDIFW 2013) incorporates a number of changes that include new or additional conservation plan commitments, improved explanation and rationale for the conservation plan, and contingencies addressing various changed circumstances. These changes address a number of the specific issues raised by these permit duration comments and other comments provided by the public. The MDIFW is requesting a 15-year permit duration because they review the status of Maine's wildlife

and seek public goals and objectives approximately every 15 years (ITP, p. 12, section 1.2). MDIFW acknowledges that lynx habitat is expected to decline during this period (ITP, p. 109). The ITP commitments will be implemented during the 15-year permit period, though the MDIFW and the Service anticipate the benefit of the mitigation actions will occur within 25 to 30 years of issuing a permit (ITP section 5.3).

The Service has not yet evaluated the appropriateness of the MDIFW's 15-year permit duration request; however, we will do so in conjunction with making a permit issuance decision and will make our findings publically available. The Service did not develop an alternative to specifically address permit duration in this revised DEA, as we did not think that it would contribute additional information to the evaluation of the effects of the proposed action.

2.7.2 Best available science

We received many comments about the scientific information in the ITP. Some comments explained that new information about lynx in Maine (especially new science from the University of Maine) was not included in the ITP or DEA, since they were written in 2008 and 2011 respectively. Others commented that there was no scientific evidence presented concerning the effectiveness of the leaning pole at excluding lynx from killer-type traps. Some comments expressed that the ITP included unsupported assumptions that there is no effect of trapping lynx on subsequent survival. Several comments addressed the lack of a reliable estimate on the size of Maine's lynx population. Finally, some comments suggested that the MDIFW's ITP was biased towards trapping and did not cite important publications in the scientific literature related to lynx and trapping.

In response to public and Service comments, the MDIFW submitted a revised 2013 ITP that seeks to address many of these concerns. Since submitting the 2008 draft ITP, the MDIFW published a *Canada Lynx Assessment* that summarizes the scientific literature on lynx and previously unpublished information from Maine's 12-year lynx radio-telemetry (Vashon et al. 2012). The *Canada Lynx Assessment* and revised 2013 ITP cite and incorporate recent studies of lynx in North America, including the most recent research from the University of Maine. The MDIFW provided a rationale and data (ITP, p. 134) for why they believe the leaning pole is effective in preventing lynx from accessing killer-type traps set for marten and fisher (ITP, pp. 61, 80 to 83, 99 to 100, 134 to 135). The MDIFW presented information on the post-release survival of trapped lynx (ITP, p. 56, 59) and commits to radio-tagging rehabilitated lynx (ITP, p. 88, IM 5). They do not believe further telemetry studies of lynx are warranted (as part of this ITP effort) because post-release monitoring of 57 radio-collared lynx demonstrate the majority of lynx caught in foothold traps survive and reproduce (J. Connolly, MDIFW email to the Service, August 9, 2014). The MDIFW's revised ITP incorporates information from Vashon et al. 2012 on the estimated size of Maine's lynx population.

The Service used the best available science in developing this revised DEA. We conducted literature searches, reviewed hundreds of scientific documents, and cited over 270 scientific documents.

2.7.3 The public was not able to participate in developing the ITP

Several commenters raised questions regarding the opportunity or lack thereof for public involvement during the development of the MDIFW's ITP. While the Service's 5-Point Policy (Service 2000) and HCP handbook (Service 1996) recommend public participation, there is no requirement for an applicant to incorporate such an effort into the development process. The MDIFW relied on agency staff to develop the ITP. They also met periodically with various constituents over the time the draft and revised ITP were developed.

Federal regulations require the Service to announce the receipt of an application of an incidental take permit. In addition, the issuance of an incidental take permit by the Service is a Federal action that triggers NEPA. Therefore, the Service must make the NEPA document, in this case an environmental assessment, available for a public comment period. In doing so, we are also making the revised ITP available for public review. This will be a 30-day supplemental comment period and will provide the public an opportunity to review and provide comments on the revised ITP and the Service's revised environmental assessment. The Service will provide a response to any substantive comments that we receive in the final environmental assessment.

2.7.4 Public review of the Service's ESA section 7 biological opinion

We received several comments that the public should have an opportunity to review and comment on the Service's biological opinion related to the issuance of an incidental take permit to the MDIFW for trapping activities.

The Service is currently engaged in the NEPA process to evaluate the effects of issuing a permit for the MDIFW's revised 2013 ITP on the human environment. If the Service determines that the MDIFW's incidental take permit application and revised ITP meet the ESA Section 10(a)1(B) permit issuance criteria, we will develop a findings document explaining our decision and complete an intra-service ESA section 7 analysis prior to issuing the permit. This generally happens outside of the NEPA process and after any NEPA related public comment periods have been completed. One reason for this is that the MDIFW's proposed ITP may change in response to comments, and the Service's biological opinion (BO) will be based on the MDIFW's final plan. Conclusion of the ESA section 7 process (i.e., development of the BO) is near to the last step in the Service's process for determining whether a permit can be issued. Therefore, while the BO will be publically available at the time of the permit issuance decision, it will not be produced at a time in the process that allows for public review and comment. This follows the typical HCP process and there are no Federal regulations that require the Service to make drafts of the biological opinion available for public comment or review.

2.7.5 Funding assurances

Several commenters raised concerns about the adequacy of the funding assurances proposed in the MDIFW's 2008 draft ITP (e.g., lack of specific details, lack of commitments/assurances). The MDIFW's revised ITP (MDIFW 2013) incorporates revisions to the funding section intended to address these and additional Service concerns. The Service has not yet evaluated whether the MDIFW's revised ITP meets the Section 10(a)1(B) incidental take permit issuance criteria. Specific to this comment, the issuance criteria is that the conservation plan demonstrates "the applicant will ensure adequate funding for the plan will be provided."

Funding assurances for applicants that are State agencies or local municipalities can sometimes be challenging when program budgets depend on annual or biannual legislative approval. In these circumstances, the conservation plans generally describe the process that will be followed and then specify the contingency that will be implemented in the event the legislative body does not authorize sufficient implementation funding at any point during the permit duration.

2.7.6 Threats from illegal trade in feline pelts

We received several comments expressing that the DEA does not consider threats from illegal trade in feline pelts. These comments are outside the scope of the proposed action of issuing an incidental take permit to the MDIFW. That being said, we provide the following information.

Illegal trade, by definition is undetected and unreported; therefore it is not possible to know the actual volume or dynamics of the global illegal trade in lynx. Cooper and Shadbolt (2007) summarized the illegal trade in Lynx species in a report for the Service. They concluded the documented volume of illegal trade in Lynx species worldwide has been low enough that it likely has not affected the conservation of these species. The average number of legal Lynx items traded each year between 1980 and 2004 was 56,998 and illegal items were only 143. About 87 percent of the illegally traded items were bobcat. The illegal trade in Canada lynx was only 6 percent of all illegal Lynx species. The Service is aware of this issue, and our law enforcement agents, including those who work in Maine, will investigate illegal activity. Although several arrests have occurred in Maine for illegally killing and transporting Canada lynx, illegal trade in lynx pelts is unknown.

2.7.7 Effects of climate change

Several commenters suggested the DEA should address climate change. In response to these comments, our revised DEA addresses climate change as a factor affecting the environment (DEA, section 2.3.1.3), a threat to lynx (DEA, section 4.2.1), and in cumulative effects to lynx (DEA, section 5.6).

2.7.8 Effects of energy and residential development

Several commenters suggested that the DEA should address effects of energy and residential development on lynx. In response to these comments, our revised DEA addresses energy and residential development as factors affecting the environment (DEA, section 2.3.1.3), a threat to lynx (DEA, section 4.2.1), and in cumulative effects to lynx (DEA, section 5.6).

2.7.9 Effects of incidental take of wolves

We received several comments that the DEA does not adequately address wolves. In response to these comments, our revised DEA addresses the effects of the four alternatives on wolves (section 4.2.3). We acknowledge the possibility that a wolf could be incidentally trapped in Maine. The MDIFW addresses this possibility in the revised 2013 ITP (ITP, pp. 26 to 27, section 2.2.2). The MDIFW is not seeking incidental take coverage for wolves because they do not currently exist in the state. The MDIFW outlines steps they would take if wolves were to become established in Maine.

2.7.10 Trapping and lynx recovery

We received comments with contrasting opinions about whether trapping represents a threat to lynx in the coterminous United States. Trapping is discussed as one of a number of threats in our listing documents (2000) and remand (2003)(both documents can be found at http://www.fws.gov/mountain-prairie/species/mammals/lynx/listing.htm last accessed on May 16, 2014). In this revised DEA we discuss trapping-related threats and impacts to lynx (DEA, section 4.2.1).

2.8 Public comments relating to the NEPA

2.8.1 Environmental assessment for NEPA

Several commenters raised questions regarding the appropriateness of an environmental assessment (EA) for NEPA, suggesting that an environmental impact statement (EIS) might be required to comprehensively evaluate the direct, indirect and cumulative effects of trapping and impacts to lynx, hare, habitat, and non-target wildlife. The purpose of an EA is to determine if significant environmental impacts are associated with a proposed Federal action that would require the preparation of an EIS and to evaluate the impacts associated with alternative means to achieve the agency's purpose and need. If after

completing an EA, the Service determines the proposed action (i.e., issuance of a permit) does not have significant impacts, then a finding of no significant impacts (FONSI) will be issued. If the Service determines that the proposed action is likely to have a significant impact then a notice of intent to prepare an EIS will be issued. An EIS involves a more detailed evaluation of the effects of the proposed Federal action and alternatives and mitigation measures proposed to minimize or avoid these effects.

The proposed action being evaluated by this EA is the issuance of an incidental take permit and MDIFW's implementation of the revised 2013 ITP for recreational fur trapping, PM, and ADC programs in Maine. The revised draft EA thoroughly describes the environmental effects, including the cumulative effects, to a number of resource areas in order to evaluate whether significant effects are anticipated. The Service will base our determination of whether a FONSI or an EIS is most appropriate based on the outcomes of this evaluation. During the public comment period we encourage substantive comments regarding the effects of the proposed action to the human environment.

2.8.2 Effects of recreational activities

We received a comment that the Service's 2011 DEA did not address the effects of recreational activities on lynx (e.g. snowmobiling). The purpose of the Service's EA is to evaluate the effects of issuing a permit for the MDIFW's revised ITP on the human environment. Therefore, recreational activities are outside the scope of the proposed action of issuing an incidental take permit to MDIFW. For a complete review on the effects of recreational activities on lynx see the LCAS (Lynx Biology Team 2013, pp. 80 to 83). However, the component of this comment that raised a question about the effects of snowmobile or forest road use on lynx is within the scope of the NEPA analysis since both are activities that trappers will engage in as part of pursuing trapping related activities. Therefore, our revised DEA addresses this issue in section 4.5 of the DEA.

The commenter is correct that it has previously been thought that snowmobiling and forest road use could cause disturbance to lynx. In addition, such activities could allow lynx competitors (e.g., coyotes) into deep snow habitats where lynx forage in winter causing impacts via interspecific competition. Research in the Northern Rockies has provided little evidence supporting snow-compacted routes adversely affect lynx or their habitats (Service 2007). Squires et al. (2010) reported no evidence that lynx were sensitive to forest roads, including those used by snowmobiles in winter. Kolbe et al. (2007) found little evidence that coyotes more efficiently compete with lynx in the presence of packed snowmobile trails. Kolbe et al. (2007) also observed that snowshoe hares made up a small portion of coyote feeding sites (3 percent) in winter and that coyotes primarily depended on scavenged ungulate carrion. We do not have information on this topic specific to lynx in Maine.

2.9 Public comments relating to Federal listing of the Canada lynx and recovery plans

2.9.1 Canada lynx listing under the Federal Endangered Species Act

Commenters raised concerns that Canada lynx should not be listed, suggesting that lynx populations are abundant and increasing in Maine. Some said lynx were trapped and snared in Quebec just across the Maine border. Others indicated lynx have always been in Maine, but come and go with the snowshoe hare. Populations in Maine seem to be at historic highs, and there is no need for protection. This sentiment was repeated often at public meetings in November, 2011.

Since 2000, Canada lynx have been listed as threatened under the ESA throughout their range in the contiguous United States. Public comments on this issue are outside the scope of the proposed action of issuing an incidental take permit to MDIFW.

2.9.2 Applicability of a Federal Endangered Species Act 4(d) rule for trapping

Comments related to development of a 4(d) rule for trapping are outside the scope of the proposed action of issuing an incidental take permit to the MDIFW. That being said, at the time of listing, the Service considered developing a section 4d rule to exempt the incidental take of Canada lynx resulting from state-regulated trapping. Section 4(d) of the ESA allows the Service to establish special regulations for threatened (not endangered) species, subspecies, and distinct population segments. 4(d) rules take the place of the normal protections of the ESA and may either increase or decrease the ESA's normal protections. The ESA specifies that 4(d) rules must be "necessary and advisable to provide for the conservation of such species." The effort was discontinued due to the difficulty in identifying common standards for state trapping programs that would be adequately protective and appropriate for all state-regulated trapping within the range of the Canada lynx. The wide variation in trapping methods and target species across the states makes individual permitting of incidental take of Canada lynx under section 10 of the ESA a better means of providing ESA compliance for state trapping programs.

2.9.3 Development of a recovery plan for Canada lynx

Comments related to development of a Canada lynx recovery plan are outside the scope of the proposed action of issuing an incidental take permit to the MDIFW. That being said, the Service has a 2005 recovery outline for Canada lynx (http://www.fws.gov/mountain-prairie/species/mammals/lynx/final%20lynx%20recoveryoutline9-05.pdf last accessed on May 15, 2014). Recovery outlines are intended to provide interim guidance on recovery until a formal recovery plan is developed. Development of a formal recovery plan has been delayed due to limited resources and litigation related to the species listing and critical habitat decisions. However, the Service continues to work with Federal agencies, state agencies, tribes, and other partners to undertake lynx conservation activities. A recovery plan is expected to be finalized by 2018 and a draft will be made available for public review and comment before then.

Appendix 2. Memo from the MDIFW on incidental take of migratory birds in traps.

Memorandum
To: Lowell Whitney
From: James Connolly
Date: August 9, 2013
Subject: Migratory Birds and Eagle Take

Over the last 18 months, the Maine Department of Inland Fisheries and Wildlife (IFW) in consultation with the US Fish and Wildlife Service (USFWS) has been revising IFW's application for a permit to cover the incidental take of lynx from lawful trapping activities in Maine. During that consultation, the USFWS requested that we provide information on the incidental take of migratory birds and eagles in a separate memorandum. Below, we describe regulatory and outreach and education efforts that reduce incidental take of migratory birds and eagles in Maine.

Federal Laws

The Migratory Bird Treaty Act of 1918 has provisions that make it a Federal crime to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention…for the protection of migratory birds…or any part, nest, or egg of any such bird." (16 U.S.C. 703). Through regulation, the USFWS can permit the take of migratory birds for a variety of purposes, such as rehabilitation, scientific collection, raptor propagation, falconry, and depredation. USFWS has no explicit regulatory mechanism to authorize the incidental take of migratory birds. In Maine, except for ADC activities that can operate year round, trapping is limited to the fall and winter months when most breeding migratory birds are not present. Although there was some potential for American crows (*Corvus brachyhynchos*), common ravens (*Corvus corax*), and gray jays (*Perisoreus canadensis*) to be attracted to baited traps, regulatory changes instituted in 2007 in Maine that require bait to be covered has minimized the incidental capture of migratory birds.

Bald and golden eagles are also protected under the Federal Bald and Golden Eagle Protection Act (BGEPA, 16 U.S.C. 668-668c). This act prohibits the "taking" of bald or golden eagles, including body parts, nests, or eggs. The Act's definition of "take" is similar to the ESA but not the same. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb". Similar to the ESA, the BGEPA allows a limited number of eagles to be incidentally taken through a similar permitting process. Historically through 2006, a total of 37 bald eagles are known to have been trapped, injured, or killed as a result of licensed trapping activities. However, since implementing statewide covered bait regulations in 2007, no eagles are known to have been taken in legally set traps in Maine. The only documented incident since 2006 was the live capture and release of an eagle in an illegal trap on March 21, 2010. The case was referred to Maine Warden Service and USFWS law enforcement.

Maine's Efforts to Avoid Eagle Take

Historically, the incidental take of eagles in legal trapping sets has been low in Maine. Since the passage of several regulations[25] that further restricted the use of attractors and bait during the fur trapping season (Title 12 Ch. 4.01 2A, G, K), take has been further reduced to only one eagle released from an illegal set. These rules include requiring bait that is within 50 yards of a foothold or killer-type traps be covered in such a way as to withstand wind action and other normal environmental conditions, prohibiting the use of bait or visible lures during the early fox and coyote season, prohibiting the use of visible bait or attractants while trapping for muskrats, and prohibiting the use of fish or meat as bait when beaver trapping. Bait is defined as animal matter including live or dead fish, meat, skin, bones, feathers, hair or any other solid substance that used to be part of an animal. The exclusion of feathers and hair as bait prevents the use of these materials as visual attractants within 50 yards of a trap[26]. Maine's rules on the use of bait and attractants for trapping are some of the most restrictive of any state that currently allows fur trapping.

Maine's Trappers Education Course has long emphasized the importance of avoiding incidental catch, including eagles. Trappers are reminded each year in Maine's Trapper Information Booklet to notify IFW anytime an eagle is caught in a trap, and to let a warden or biologist evaluate the eagle for injuries before it is released into the wild.

The decrease in incidental eagle captures (i.e., 36 eagles from 1971 to 2006, and 1 eagle from 2006 to 2012) occurred when the probability that an eagle might be caught in a trap was expected to increase given that: 1) the resident bald eagle population increased from approximately 29 nesting pairs in 1969 to at least 630 nesting pairs in 2013, 2) the range of eagles expanded into more interior portions of the state where there is greater exposure to upland trapping, and 3) transient and non-breeding eagle populations have increased. This decrease in the incidental catch of eagles is a testament to the efforts of Maine trappers and IFW to minimize the incidental catch of bald eagles. IFW feels that it has successfully addressed the problem of eagle incidental captures and chooses not to pursue a permit for the incidental take of eagles at this time. If IFW detects an issue with take of bald or golden eagles, IFW can pursue a permit under the BGEPA.

Maine's Efforts to Avoid Migratory Bird Take

In Maine, except for ADC activities that can operate year round, trapping is limited to the fall and winter months when most breeding species are not present. There is some potential for some migratory birds, American crows (*Corvus brachyhynchos*), common ravens (*Corvus corax*), and gray jays (*Perisoreus canadensis*) to be attracted to baited traps.

Many of the efforts IFW has taken to avoid the take of eagles also are effective for other migratory birds, especially scavengers (e.g., jays, crows, and ravens). Maine's trapper education course has long emphasized avoiding incidental captures. In addition, a bird incidentally captured in a trap means that a furbearer cannot be caught in that trap, thus it is in the trapper's best interest to avoid incidental catches. Fortunately, simple measures such as Maine's covering bait regulation can eliminate the vast majority of incidental bird catches.

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[25] In 2007, IFW promulgated a rule prohibiting the use of visible bait within 50 yards of a foothold or killer type traps. This rule was passed to further protect eagles and other migratory birds. IFW's former recommendation was that traps should be set back 50 feet from bait or a carcass that was visible from above.

[26] Sometimes, visual attractors are used to attract predators to traps by suspending a feather or other attractor by a piece of string or placing it near a trap. Common visual attractors (feathers, animal skins, meat, and bones) are defined as bait in Maine and cannot be used during the early coyote and fox season and cannot be used during the general land trapping season unless it is placed more than 50 yards from a foothold or killer-type trap.

IFW contends that data collected in Maine when IFW participated in the International Association of Fish and Wildlife Agencies (IAFWA[27]) Best Management Practices (BMP) trap research program (1999 to 2000), demonstrates that the number of birds incidentally caught by trappers is low and is therefore not likely harming bird populations in Maine.

IFW participated in the BMP foothold trap testing program for fox and coyotes in 1999 and 2000. Although IFW had not yet restricted the use of bait, visibility of bait was restricted during BMP trap testing. In this program, data on the number of non-target animals caught were recorded by observers when traps were checked. In Maine, only 5 birds were captured over 10,563 trap nights, yielding a capture rate of 1 bird every 2,113 trap nights. In 2010 and 2011, we estimated 248,319 and 224,070 trap nights for foothold type traps in Maine. Based on the incidental capture rate of 1 bird per 2,113 trap nights, IFW estimates that trappers could potentially catch 112 birds annually statewide[28]. The non-target birds that were caught were not reported by species, but were likely ravens or crows. Although, Maine was not selected to test killer-type traps, other states in the Northeast tested killer-type traps. In over 4,060 nights, no birds were caught in killer-type traps that were tested in the Northeast (Personal communication, Bryant White, AFWA). Given that these data were collected in a scientific study, using local trappers, and traps commonly used in the area, IFW believes that this accurately represents the rate migratory birds may be caught by trappers in Maine. In addition, during 2 years of predator management activities where foothold traps were set for coyotes, no migratory birds were incidentally captured in traps.

IFW does not anticipate incidental take of migratory birds from Maine's ADC program, since most activities involve cage traps set around homes for home and garden pests (e.g. small mammals, raccoons, and skunk) or traps set for aquatic furbearers (primarily beaver) causing damage. From 2008 to 2012, 61 percent of ADC activities involved beaver, 28 percent involved medium size mammals (skunks, raccoons, opossum, porcupine, and woodchucks), 9 percent involved small mammals (squirrels, chipmunks, mice, bats), 2 percent involved other home and garden pests (e.g. pigeons, starlings, deer, bear, fox). The few birds captured by ADC agents are not protected by the Migratory Bird Treaty Act (e.g. European starlings (n=5), pigeons (n=24), house sparrows (n=6)) and the majority were causing the conflict and targeted for removal by ADC agents; only one was lethally removed. In addition, ADC trappers are required to follow Maine's trapping regulations, therefore visible bait restrictions should further reduce potential take when foothold or killer-type traps are set.

In 2013, the Partners in Flight Science Committee developed a database to track population estimates for migratory birds in North America (Available at http://rmbo.org/pifpopestimates). Current estimates indicate there are 17 million American crows, 4 million gray jays, and 1.7 million ravens in the United States.

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[27] The name of the International Association of Fish and Wildlife Agencies was shortened in 2005 to the Association of Fish and Wildlife Agencies.

[28] The estimate was derived from 2010 and 2011 harvest and trapper effort data to estimate the number of trap nights for coyotes in Maine (2010=248,319 trap nights and 2011=224,070 trap nights) that was then dived by the incidental capture rate for birds (e.g., 248,319 trap nights/2,113 = 118 birds, and 224,070 trap nights/2,113 = 106 birds, average = 112 birds annually). The estimate of 112 birds annually taken in traps is likely an overestimate because we estimated the number of coyote trappers from harvest data that does not differentiate between trapped and hunted coyotes.

These data collectively demonstrate that the take of migratory birds from furbearer trapping in Maine is low and having minimal impact to migratory birds. IFW will monitor the level of incidental take of migratory birds in Maine's ADC and predator management programs. If take of migratory birds becomes an issue, IFW will explore additional measures through trapping regulations and outreach efforts to reduce the incidental take of migratory birds.

Appendix 3. Memo from the MDIFW on lynx capture rates for predator management and recreational fur trappers

Memorandum
To: Lowell Whitney
From: James Connolly
Date: June 11, 2014
Subject: Rate of lynx capture by PMP vs. trappers not enrolled in the PMP

Between 2011 and 2013, the Maine Department of Inland Fisheries and Wildlife (IFW) hired trappers to capture coyotes in and around deer wintering areas during the fall trapping season as part of IFW's predator management program (PM). However, during the fall trapping effort, deer have not yet entered the winter yard. Thus, PM trappers are not restricted to setting traps in the deer wintering area (DWA) and have been advised to trap the surrounding area that includes a mix of forested habitat. Between 2011 and 2013, trappers enrolled in the PM program captured 7of 30 lynx incidentally trapped by Maine coyote trappers.

To address the question of whether trappers in MDIFW's PM program that are targeting coyotes in and around DWA incidentally capture lynx in foothold traps at a different rate than coyote trappers not in the PM program (referred to as coyote trappers throughout this memorandum), we examined the following data:

1. Where lynx are in the State of Maine,
2. Where lynx are incidentally caught by trappers,
3. Where and how many coyotes are caught by trappers in the State of Maine
4. Where and how many coyotes are captured by PM trappers.
5. We used the number of coyotes caught by coyote and PM trappers as an index to trapping effort.

Where lynx are in the State of Maine (green diamonds in attached maps) is based on systematic winter snow-track surveys by IFW (2003 to 2008) and incidental sightings of lynx or lynx tracks verified by IFW between 2000 and 2013. These data indicated lynx are found primarily in unorganized township of northern and western Maine (WMDs 1 to 6, 8 to 10) see Figure 1 –green diamonds.

Where lynx are incidentally caught by trappers was generated from reports of incidentally captured lynx in foothold traps set by coyote trappers in Maine between 2000 and 2013 that includes PM trappers (Figure 1; red squares).

Where and how many trappers are capturing coyotes was generated from 2011 and 2012 fur tagging data in Maine. We identified coyote trappers as any trapper that registered 1 or more coyotes during the 2011 & 2012 fall trapping seasons (Figure 2). We tallied the number of coyotes harvested in each township as an index to effort (Figure 3).

Where and how many PM trappers are capturing coyotes was generated from PM report forms submitted to MDIFW by PM trappers that provides the number of coyotes captured in each town they trapped near their assigned priority DWA.

Rate of lynx capture by PM trappers vs. trappers not enrolled in the PM (coyote trappers):

MDIFW's Incidental Take Plan (Plan) requests state-wide coverage for Maine's approximately 2,000 fur trappers, PM trappers, and ADC trappers. The probability of incidentally capturing a lynx is influenced by

where traps are set and the furbearer targeted. Therefore, when we estimated trapping effort for the Plan (see page 46), we focused on trappers targeting coyote, fox, bobcat and marten and fisher trappers in lynx WMDs where trapping regulations are restricted to minimize the incidental capture of lynx (WMD 1 to 11, 14, 18 and 19). However, within these WMDs, the probability of capture of lynx also varies. Thus, to compare rates of incidental lynx capture between Predator Management Program trappers targeting coyotes with foothold traps and trappers not enrolled in the PM program, we looked at the coyote harvest data from 2012. Most coyote trappers in Maine do not trap in areas where lynx reside; therefore the probability of catching a lynx is very low (Figures 2 and 3). However, most of the PM trappers are deployed to trap coyotes in lynx range in Maine (Figure 4). Although IFW has trapping regulations in place in WMDs 1 to 11, 14, 18 and19 to avoid lynx captures, IFW defines the lynx core area in Maine as WMDs 1 to 6 and 8 to 10 based on lynx sighting data (Figure1). To make the most accurate comparison of incidental lynx capture rate, we only included data from coyote trappers and PM trappers in this analysis who trapped in the lynx core area (WMDs 1 to 6 and 8 to 10). We compared 2012 coyote harvest by PM trappers to 2012 coyote harvest by coyote trappers. We summarized the 2012 PM data, since this was the first full year of the program and the 2013 fur tagging data is not finalized.

In 2012, 45 trappers including PM trappers tagged at least 1 coyote in the lynx core areas.

In 2012, 30 coyote trappers trapped 106 coyotes in WMDs 1 to 6 and 8 to 10 and incidentally caught 5 lynx. In 2012, 15 PM trappers trapped 75 coyotes in WMDs 1 to 6 and 8 to10 and incidentally caught 3 lynx. Therefore, PM trappers caught 25 coyotes for every 1 lynx and coyote trappers caught 21 coyotes for every 1 lynx. These data indicate that coyote trappers actually have a slightly higher incidental capture rate of lynx than PM trappers, and that there are very few coyote trappers that trap coyotes in the lynx core area (WMDs 1 to 6 and 8 to 10).

This analysis indicates that coyote trappers and PM trappers are both reporting the incidental capture of lynx as required by Maine laws and that the take requested in the plan is adequate.

Figure 1. Between 2000 and 2013, MDIFW systematic snow-track surveys and incidental sightings of lynx or lynx tracks verified by IFW (green diamonds) indicate that lynx primarily are found in unorganized townships of northern and western Maine (WMDs 1 to 6, 8 to 10). During that same period (2000 to 2013), coyote trappers incidentally captured lynx in those same areas.

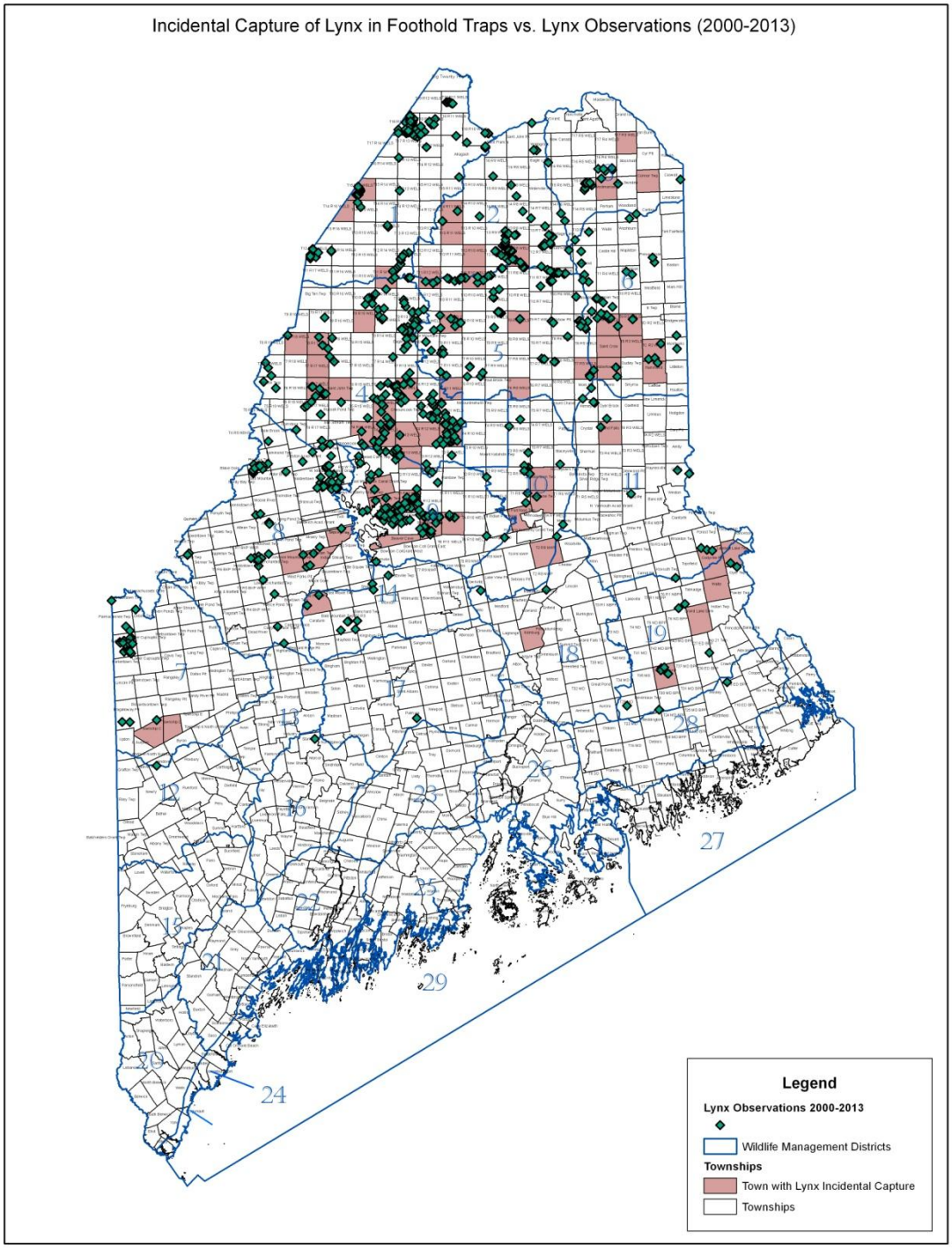

Figure 2. The majority of coyote trappers are trapping (darker shades of blue) outside areas where lynx occur (green diamonds). Coyote trappers were identified as trappers that tagged 1 or more coyotes during the 2011& 2012 fall trapping season. The number of trappers in each town is the average from 2011 & 2012 fur data.

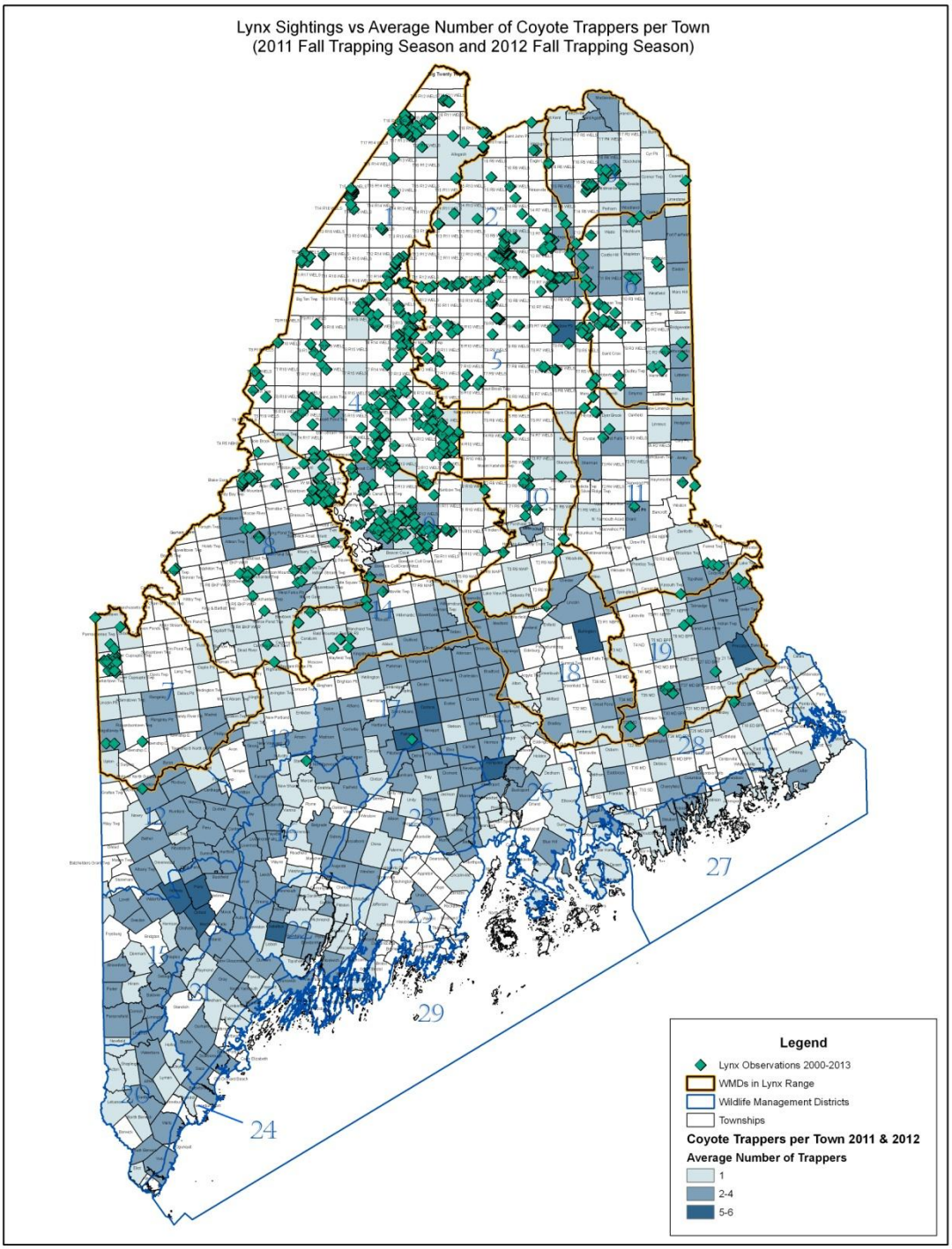

Figure 3. We used coyote harvest as an index to trapping effort by coyote trappers, which shows the majority of coyotes caught in foothold traps (darker shades of brown) are outside the core lynx area (green diamonds).

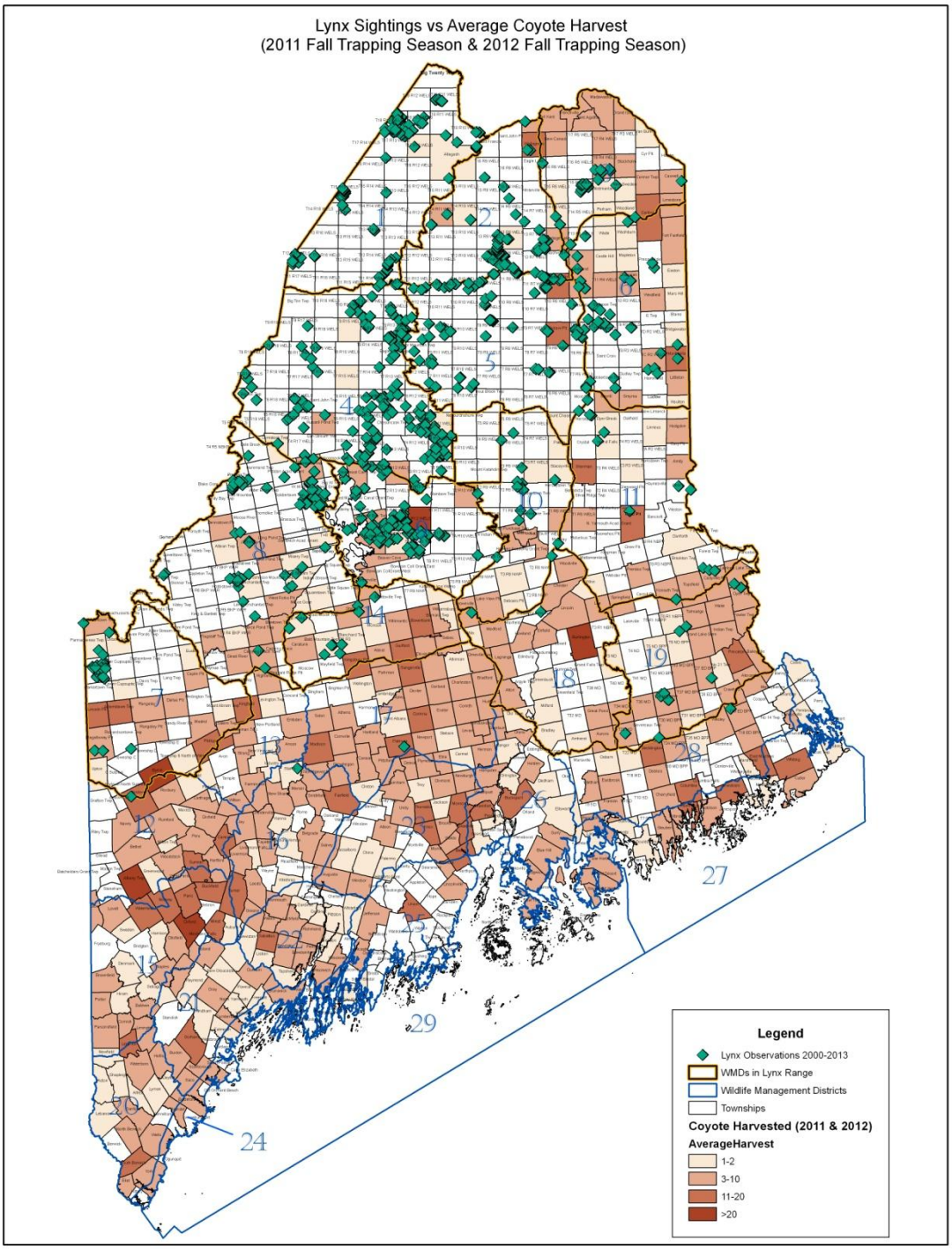

Figure 4. PM trappers set traps for coyotes near deer wintering areas often associated with Maine's industrial forest where lynx sightings are also the greatest. Conversely, only a small segment of coyote trappers set traps in these core areas (i.e., WMD 1 to 6 and 8 to 10).

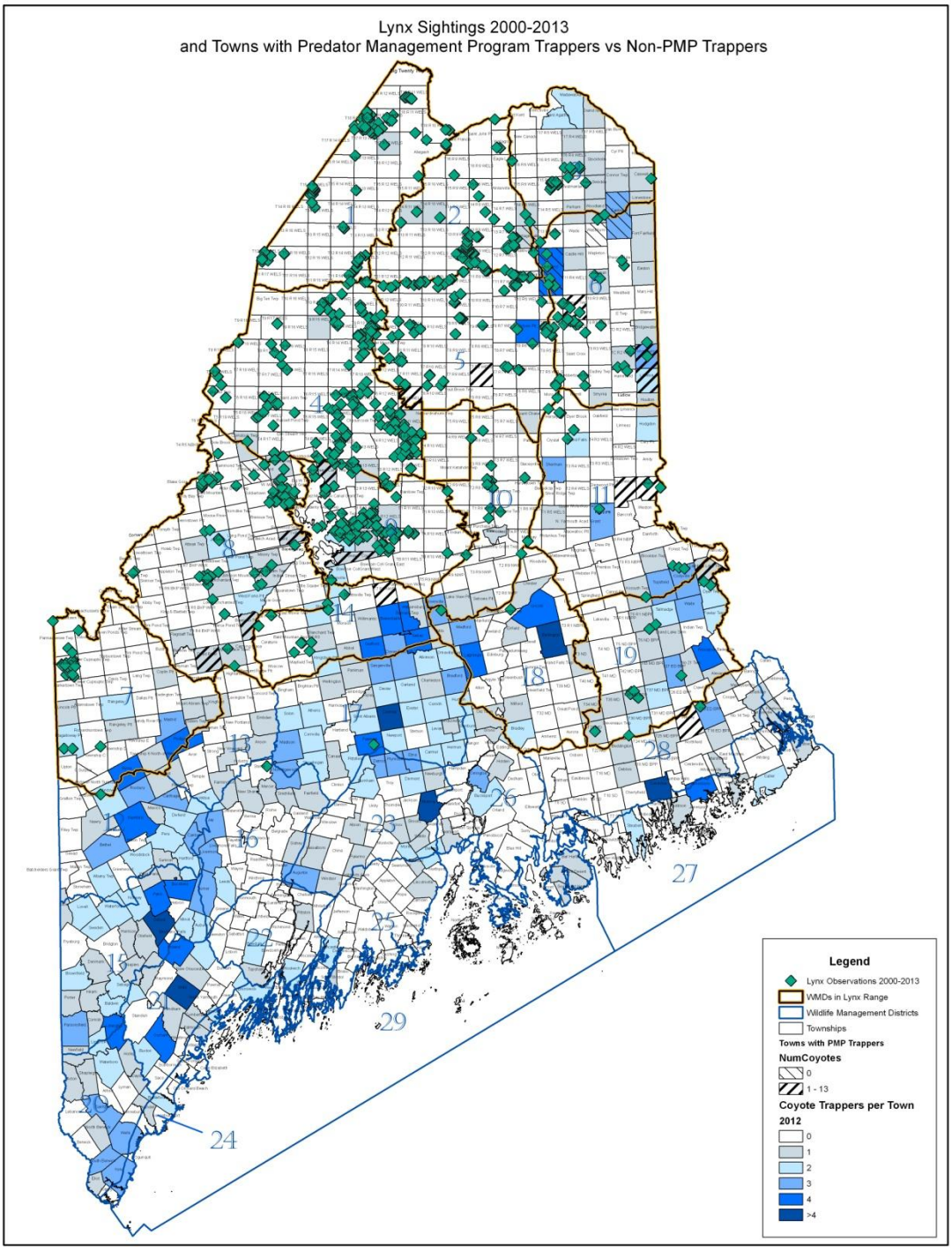
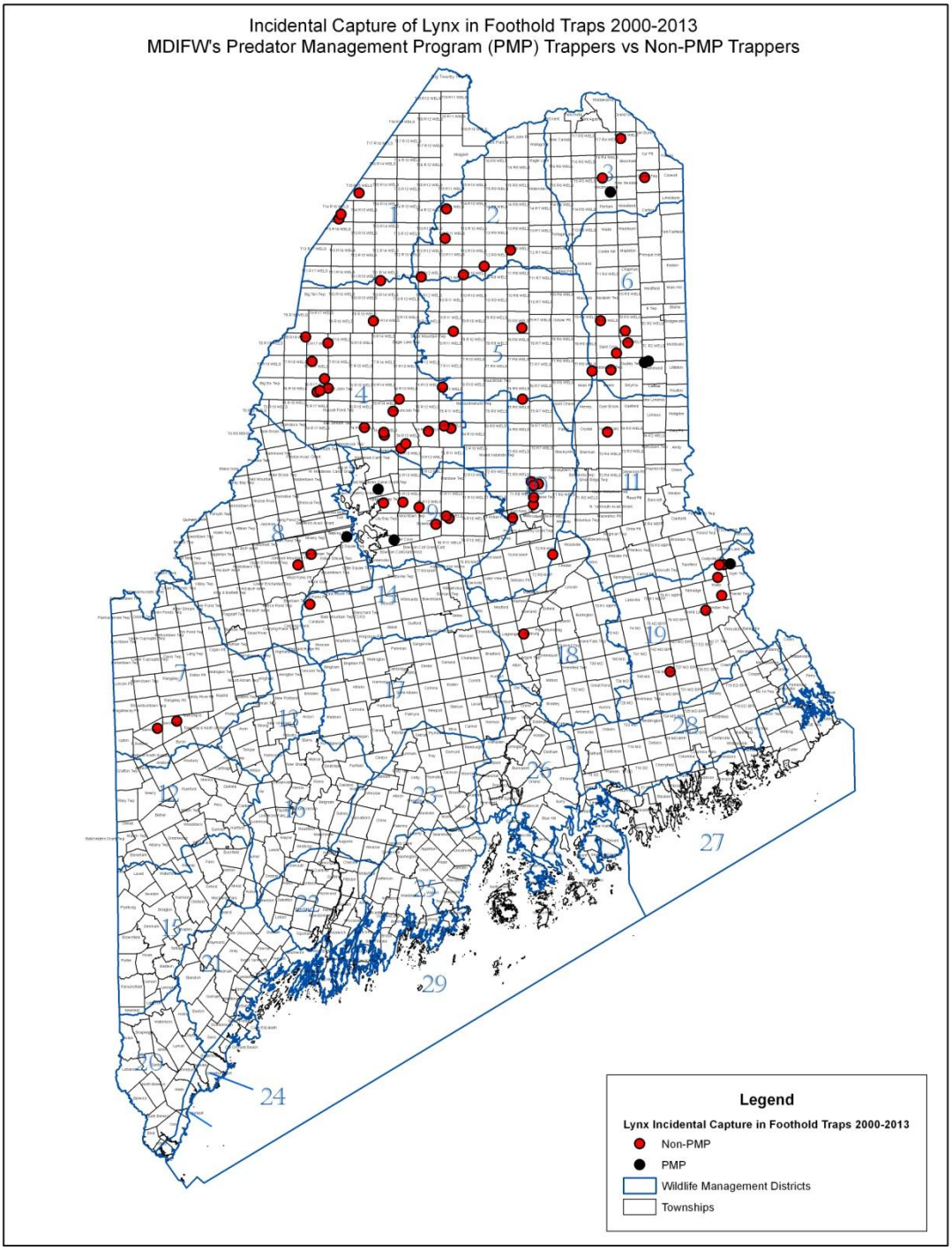
Figure 5. Lynx caught in foothold traps in Maine between 2000 and 2013 shows that PM trappers incidentally caught lynx in the same area as trappers not enrolled in the program (i.e., coyote trappers). In fact, 3 of the 5 PM trappers that captured lynx in 2012 and 2013 had previously captured lynx in traps set for coyotes before the PM program was initiated.