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FINAL ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE CANADA LYNX

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prepared for:

U.S. Fish and Wildlife Service

4401 N. Fairfax Drive

Arlington, VA 22203

prepared by:

Industrial Economics, Incorporated

2067 Massachusetts Avenue

Cambridge, MA 02140

INDUSTRIAL ECONOMICS, INCORPORATED

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

Act	Endangered Species Act
AUMs	Animal Unit Months
BLM	U.S. Bureau of Land Management
BMPs	Best Management Practices
CEQA	California Environmental Quality Act
DOI	U.S. Department of the Interior
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Association
FHWA	Federal Highways Administration
GIS	Geographic Information Systems
HCP	Habitat Conservation Plan
HRP	Habitat Restoration Plan
IF&W	Maine's Department of Inland Fisheries and Wildlife
ITP	Incidental Take Permit
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment Strategy
LMZ	Lynx Management Zone
LURC	Maine's Land Use Regulatory Commission
MBF	Thousand Board Feet
MFPC	Maine Forest Products Council
MHFRP	Maine Healthy Forest Reserve Program
MMBF	Million Board Feet
MN DNR	Minnesota Department of Natural Resources
MN DOT	Minnesota Department of Transportation
MRS	Maine Revenue Service

MT DNRC	Montana Department of Natural Resources and Conservation
MT FWP	Montana Fish, Wildlife and Parks
NGO	Non-governmental Organization
NPS	National Park Service
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NRLMD	Northern Rockies Lynx Management Decision
OMB	U.S. Office of Management and Budget
PGMs	Platinum Group Metals
RFA	Regulatory Flexibility Act
RPS	Renewable Portfolio Standards
SBREFA	Small Business Regulatory Enforcement and Fairness Act
Service	U.S. Fish and Wildlife Service
TNC	The Nature Conservancy
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
WA DFW	Washington State Department of Fish and Wildlife
WA DNR	Washington State Department of Natural Resources
WCA	Washington Cattleman's Association
WSSA	Washington State Snowmobiling Association
WTP	Willingness to Pay
WUI	Wildland Urban Interface
WY GFC	Wyoming Game and Fish Commission

EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the designation of critical habitat for the United States distinct population segment of the Canada lynx (*Lynx canadensis*) (hereafter, "lynx"). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

2. This final economic analysis analyzes the proposed designation as described in the proposed rule. This analysis does not reflect changes to the proposed critical habitat designation made in the final rule. Consequently, description of the habitat designation in the final rule may differ from maps and figures presented in this analysis.[1]

3. The lynx was listed as a threatened species on March 24, 2000;[2] critical habitat was designated for the species on November 9, 2006 on 1,841 square miles (approximately 1.18 million acres) in Minnesota, Montana, and Washington.[3] On July 20, 2007, the Service announced it would review the 2006 critical habitat rule, and subsequently determined that it was necessary to reconsider the critical habitat designation.[4] On February 28, 2008, the Service published a revised proposal for critical habitat designation for the lynx.[5] The revised proposed rule includes lands proposed for designation and considered for exclusion from the designation (collectively referred to in this analysis as the "study area"). The study area includes 42,753 square miles (approximately 27.4 million acres) of land in Maine, Minnesota, Montana, Wyoming, Idaho, and Washington; of this, roughly 505 square miles (approximately 323,000 acres) of Tribal lands are being considered for exclusion from critical habitat in Maine, Minnesota, and Montana.

4. The study area is divided into five units characterized by remote, high-elevation, primarily undeveloped lands, 75 percent of which is currently managed for timber purposes. The majority of the proposed critical habitat is Federal lands (58 percent); the remainder includes 29 percent private, nine percent State, three percent local public ownership, and one percent Tribal ownership. A graphical depiction of the study area is provided in Exhibits ES-10 through ES-14.

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1 For a detailed discussion of public comments on the draft economic analysis and associated responses, refer to the responses to public comment section of the Final Rule.

2 65 FR 16052.

3 71 FR 66007.

4 For a description of the species, its risk factors, habitat description, and regulatory history, see 73 FR 10860.

5 73 FR 10860 – 10896.

5. This analysis considers economic impacts of lynx conservation efforts associated with the following land uses: 1) timber management, 2) development, 3) recreation, 4) mining, 5) oil and gas activities, 6) fire management, 7) wind energy developments, 8) transportation and utilities projects, 9) livestock grazing, and 10) species research and active management. Forecast impacts are organized into two categories according to "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the lynx, for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated economic impacts are those expected to occur specifically because of the designation of critical habitat for the lynx.

6. The following bullet points distill the salient issues and conclusions of this report:

- **Relatively low level of incremental impacts:** Total forecast baseline impacts of lynx conservation are $123 million to $135 million over the next 20 years (assuming a seven percent discount rate). The majority of these impacts are associated with a single, large-scale development project in Unit 1, as described in Chapter 5. The remainder of the baseline impacts are associated with ongoing conservation efforts for the lynx and its habitat, for example, as directed in the standards and guidelines of the many existing lynx management plans (these plans are described in Chapter 3). Land use activities across approximately 60 percent of the study area are already being managed according to these lynx management plans. Because of the broad scope and scale of the existing lynx conservation efforts according to these plans, incremental impacts of critical habitat designation are forecast to be relatively minor and administrative, totaling approximately $1.49 million. All forecast incremental impacts in this analysis stem from additional administrative effort in section 7 consultation.

- **Majority of baseline and incremental impacts are associated with public lands.** Units forecast to experience impacts of lynx conservation (both baseline and incremental) are primarily Federal and State lands implementing existing lynx management plans. Of the 53 subunits, only 26 are expected to experience baseline impacts of lynx conservation, and 23 are expected to bear incremental impacts of critical habitat designation. This is explained by the ongoing focus of lynx conservation on Federal lands. The 2000 listing rule for the lynx describes the reason for the listing as the inadequacy of lynx management on Federal lands. Since then, the focus on lynx conservation has been on the development and implementation of lynx conservation plans and strategies for public lands. Thus, many of the private landowners across the study area have not implemented, and are not forecast to implement, lynx conservation efforts. Many activities on private land lack a Federal nexus causing consideration of lynx conservation through section 7, and review of the consultation history indicates that the

majority of past consultations involving private landowners have not resulted in project modification for the lynx.

- **Majority of total baseline impacts are associated with a single project.** Approximately 74 percent of the forecast baseline impacts are associated with a single, large-scale land use plan at Moosehead Lake, Maine in Unit 1, as described in Chapter 5 of this report. Plum Creek Timber Company's proposed development at Moosehead Lake is anticipated to incorporate lynx conservation, primarily in the form of conservation easements as recommended by the permitting agency in Maine (Maine Land Use Regulatory Commission (LURC)) and the Service. While development activities across the study area have not been modified by lynx conservation efforts in the past, the broad geographic scale of this project sets it apart. Importantly, the conservation efforts benefitting the lynx that are quantified in this report were recommended by LURC and the Service as a result of multiple issues, including species other than the lynx, environmental factors, and public sentiment. These impacts are therefore considered baseline as they are the joint result of multiple issues, and are expected to be implemented regardless of the critical habitat designation.
- **Dynamic lynx conservation recommendations.** As highlighted in Chapter 1, significant uncertainty surrounds the impacts described in this analysis. Chief among these uncertainties is the potential for private timberland owners in Maine and Montana to adopt lynx conservation strategies. Discussions are ongoing between the Service and private timberland owners in Maine and Montana regarding the appropriate approach to managing their lands for the lynx (as detailed in Chapter 4); these landowners have not historically modified their land use practices for the lynx. Whether and how private landowners may structure lynx conservation on their lands is therefore speculative at this time. In addition, uncertainty exists regarding whether particular activities may be risk factors for the lynx, including snowmobiling and livestock grazing. This analysis quantifies compliance with existing lynx management plans regarding these activities (which differs across lynx management plans) but notes that, in the case that these activities are determined not to be risk factors for the species or habitats, this analysis may overstate impacts.

7. Exhibit ES-1, Exhibit ES-2, and the Key Findings text box summarize the results of the economic analysis. Detail regarding the baseline and incremental impacts by subunit and land use activity are provided in the following text and tables.

EXHIBIT ES-1 SUMMARY OF POTENTIAL POST-DESIGNATION BASELINE IMPACTS (2009 - 2028)

IMPACT	7% DISCOUNT RATE		3% DISCOUNT RATE	
AREAS PROPOSED FOR DESIGNATION				
	LOW	HIGH	LOW	HIGH
Present Value Impacts	$123,000,000	$135,000,000	$139,000,000	$153,000,000
Annualized Impacts	$11,600,000	$12,800,000	$9,380,000	$10,300,000
AREAS CONSIDERED FOR EXCLUSION				
	LOW	HIGH	LOW	HIGH
Present Value Impacts	$146,000	$146,000	$161,000	$161,000
Annualized Impacts	$13,700	$13,700	$10,900	$10,900
TOTAL PRESENT VALUE	**$123,000,000**	**$135,000,000**	**$140,000,000**	**$153,000,000**
TOTAL ANNUALIZED	**$11,600,000**	**$12,800,000**	**$9,390,000**	**$10,300,000**

EXHIBIT ES-2 SUMMARY OF POTENTIAL POST-DESIGNATION INCREMENTAL IMPACTS (2009 - 2028)

IMPACT	7% DISCOUNT RATE	3% DISCOUNT RATE
AREAS PROPOSED FOR DESIGNATION		
Present Value Impacts	$1,480,000	$2,090,000
Annualized Impacts	$140,000	$141,000
AREAS CONSIDERED FOR EXCLUSION		
Present Value Impacts	$9,230	$13,000
Annualized Impacts	$871	$871
TOTAL PRESENT VALUE	**$1,490,000**	**$2,11,000**
TOTAL ANNUALIZED	**$141,000**	**$142,000**

KEY FINDINGS

Potential Baseline Impacts: Present value baseline impacts associated with conservation efforts for the Canada lynx in the study area are forecast to be between $123 million to $135 million ($11.6 million to $12.8 million annualized). The majority (74 percent) of these impacts are associated with a single, large-scale development project in Unit 1, as described in Chapter 5. The remainder of the baseline impacts are associated with ongoing conservation efforts for the lynx and its habitat, for example, as directed in the standards and guidelines of the many existing lynx management plans (these plans are described in Chapter 3) and administrative effort for forecast consultations.

Potential Incremental Impacts: The only incremental impacts forecast in this analysis result from additional administrative effort in conducting section 7 consultations. Forecast incremental impacts are $1.49 million ($141,000 annualized).

Quantified Impacts by Activity: Development-related impacts comprise the greatest percentage, 74 percent, of the total forecast present value baseline impacts in areas proposed for critical habitat designation. Forest management impacts comprise 10 percent of forecast present value baseline impacts. In contrast, the majority (56 percent) of present value incremental impacts are associated with "other activities," a category including fire management, wind energy development, livestock grazing, transportation, and species research activities. While "other activities" are forecast to bear relatively low impacts associated with lynx conservation efforts in the baseline, they are subject to more frequent section 7 consultation and therefore greater incremental administrative costs of consultation than the development, forest management, recreation, and mining.

The following forecast impacts by activity are includes areas proposed for designation and those Tribal lands considered for exclusion from critical habitat as described in the 2008 proposed rule:

Activity	Potential High-End Baseline Impacts (Annualized)	Potential High-End Incremental Impacts (Annualized)
Costs of Developing Lynx Management Plans	$990,000 ($93,400)	$12,300 ($1,160)
Timber management	$13.5 million ($1.28 million)	$233,000 ($22,300)
Development	$101 million ($9.49 million)	$8,130 ($767)
Recreation	$5.58 million ($518,000)	$285,000 ($26,900)
Mining	$1.43 million ($135,000)	$115,000 ($10,900)
Other Activities	$13.3 million ($1.26 million)	$838,000 ($79,000)

Critical Habitat Subunit with Highest Impacts: The subunit with the greatest projected baseline impacts is private timberlands in Unit 1, Maine. Impacts in this subunit constitute approximately 74.3 percent of the total estimated baseline impacts in the 50 subunits proposed for designation. Of the forecast impacts in this subunit, 91 percent are associated with impacts to the proposed development at Moosehead Lake. Greatest potential incremental impacts are forecast to be associated with the designation of U.S. Forest Service lands in Unit 3.

Areas considered for exclusion: Total baseline impacts to the Tribal lands considered for exclusion in Units 1, 2, and 3 are $146,000 ($13,700 annualized). Approximately 91 percent (or $133,000) of these impacts are attributable to the Tribal lands in Unit 1. Incremental costs are projected to be $9,230 ($871 annualized) over the next 20 years. These impacts are a subset of those provided in the above table.

Note: Unless otherwise specified, all impacts discussed above represent high-end, post-designation impacts discounted at seven percent.

8. In addition to the post-designation impacts described above, this analysis provides information on the potential regional economic impacts associated with the restrictions on pre-commercial thinning. Exhibit ES-3 describes the baseline income and employment effects of restricting pre-commercial thinning for the purposes of lynx conservation. These impacts were generated using the IMPLAN regional economic modeling tool and a

U.S. Forest Service (USFS) economic analysis of the Northern Rockies Lynx Management Decision, as described in Chapter 4. Regional economic impacts described in this table are not summed with the total present value welfare impacts described in the remainder of this Executive Summary, and are therefore not accounted for in the other exhibits summarizing impacts.

9. Private timberland owners in Maine and Montana (Plum Creek Timber Company and F.H. Stoltze Land and Lumber Company) provided comments on both the proposed rule and the draft economic analysis, which indicated that baseline impacts to timber management and development projects may be greater than the impacts estimated in this analysis. Plum Creek further noted that there may be additional incremental impacts, in the form of foregone benefits associated with draft conservation agreements for the lynx in Maine and Montana, and the Moosehead Lake Land Use Concept Plan. Specifically, Plum Creek asserts that, if the areas covered by these agreements and this plan are designated as critical habitat, the agreements and plan will be abandoned and all lynx conservation benefits foregone. Information is not available to quantify the potential economic impacts of these scenarios. These comments are discussed in detail in Section 4.3.7, and 4.3.4, and 5.5.1, respectively.

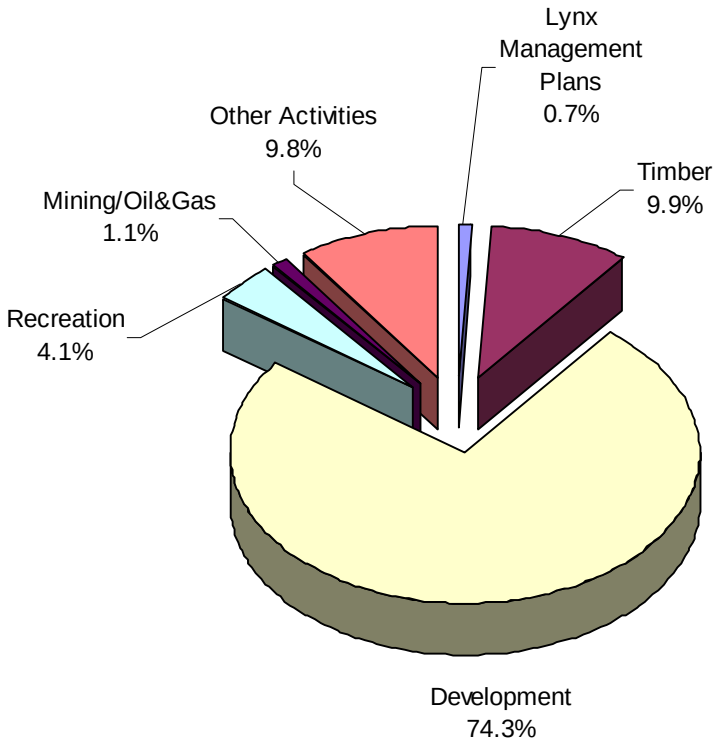
EXHIBIT ES-3 POTENTIAL REGIONAL ECONOMIC IMPACTS OF PRECLUDING PRE-COMMERCIAL THINNING BY SUBUNIT ($2008)

SUBUNIT	INCOME LOSSES	JOB LOSSES
UNIT 3: NORTHERN ROCKIES		
U.S. Forest Service*	$583,000	65
U.S. Bureau of Land Management	$297,000	12
Montana Dept. of Natural Resources	$219,000	9
UNIT 4: NORTH CASCADES		
U.S. Forest Service	$1,170,000	38
U.S. Bureau of Land Management	$2,450	0
WA Dept. of Natural Resources	$2,430,000	104
UNIT 5:		
U.S. Forest Service*	$176,000	15
Wyoming Game and Fish Commission	$19,600	0

* Income and employment impacts for USFS lands in Units 3 and 5 are from: USDA Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

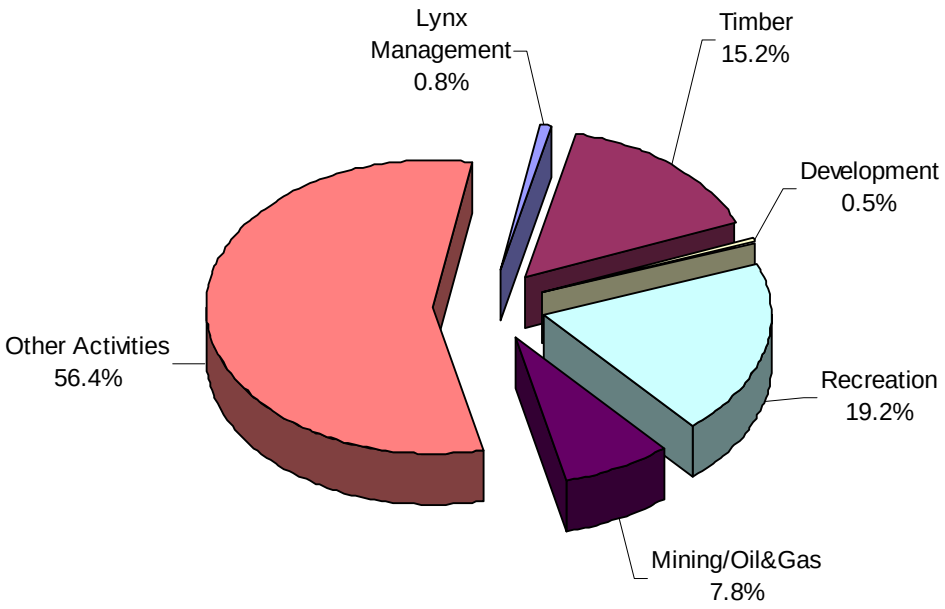
10. Exhibits ES-4 and ES-5 highlight post-designation baseline and incremental impacts by activity in areas proposed for critical habitat designation. As highlighted, while changes in development and timber activities account for the majority of present value baseline impacts (together generating 84 percent of total baseline impacts), "other activities" and recreation account for the majority (56 percent) of total incremental impacts. The reason for this is that while development and timber activities incur baseline impacts associated with lynx conservation efforts, incremental impacts are driven by the administrative costs of consultation. The land use categories of "other activities" and recreation are forecast to result in the most future section 7 consultations.

EXHIBIT ES-4 DISTRIBUTION OF POTENTIAL POST-DESIGNATION BASELINE IMPACTS BY ACTIVITY TYPE[6]



[6] The distribution of impacts by activity type is presented at seven percent discount rate.

EXHIBIT ES-5 DISTRIBUTION OF POTENTIAL POST-DESIGNATION INCREMENTAL IMPACTS BY ACTIVITY TYPE[7]



11. Exhibits ES-6 and ES-7 rank the subunits in order of level of expected impact; Exhibit ES-6 describes the ranked subunits according to baseline impacts, and ES-7 according to incremental impacts. The impact rankings of some subunits vary slightly depending on the discount rate assumption, as described in Appendix B. More detailed information describing estimated impacts by subunit and activity is provided in Appendices B and C. Total present value pre-designation and post-designation economic impacts by subunit are provided in Exhibits ES-8 and ES-9, respectively.

[7] *Ibid.*

EXHIBIT ES-6 SUBUNITS RANKED BY LEVEL OF POTENITAL BASELINE IMPACTS (HIGH END, DISCOUNTED AT SEVEN PERCENT)

SUBUNIT	ESTIMATED HIGH END BASELINE IMPACTS	PERCENT OF TOTAL HIGH END IMPACTS
Unit 1: Private Timber Lands	$110,000,000	81.3%
Unit 4: WA Dept. of Natural Resources	$11,300,000	8.3%
Unit 2: Minnesota Dept. of Natural Resources	$3,590,000	2.7%
Unit 2: Superior National Forest	$3,010,000	2.2%
Unit 3: U.S. Forest Service	$1,510,000	1.1%
Unit 2: Other Private Landowners	$1,380,000	1.0%
Unit 2: Private Mining Lands	$1,290,000	1.0%
Unit 4: U.S. Forest Service	$959,000	0.7%
Unit 5: National Park Service	$622,000	0.5%
Unit 5: U.S. Forest Service	$604,000	0.4%
Unit 5: U.S. Bureau of Land Management	$251,000	0.2%
Unit 3: U.S. Bureau of Land Management	$149,000	0.1%
Unit 5: Private Mining Lands	$135,000	0.1%
Unit 1: Tribal lands*	$133,000	0.1%
Unit 3: Montana Dept. of Natural Resources	$116,000	0.1%
Unit 4: U.S. Bureau of Land Management	$75,300	0.1%
Unit 1: Maine Dept of Conservation	$44,500	0.0%
Unit 3: Private Timber Lands	$30,700	0.0%
Unit 2: Voyageurs National Park	$27,400	0.0%
Unit 4: WA Dept. of Fish and Wildlife	$26,200	0.0%
Unit 3: Glacier National Park	$26,000	0.0%
Unit 1: National Park Service	$13,100	0.0%
Unit 3: Tribal Lands*	$8,390	0.0%
Unit 2: Tribal Lands*	$4,720	0.0%
Unit 3: Montana Fish, Wildlife, and Parks	$4,240	0.0%
Unit 1: Other Private Landowners	$1,320	0.0%
Subtotal Proposed for Designation	**$135,000,000**	**-**
***Subtotal Considered for Exclusion**	**$146,000**	**-**
TOTAL	**$135,000,000**	**100%**

Note:
Subunits not listed above are not forecast to experience baseline economic impacts of lynx conservation.

EXHIBIT ES-7 SUBUNITS RANKED BY LEVEL OF POTENITAL INCREMENTAL IMPACT (HIGH END, DISCOUNTED AT SEVEN PERCENT)

SUBUNIT	ESTIMATED HIGH END INCREMENTAL IMPACTS	PERCENT OF TOTAL HIGH END IMPACTS
Unit 3: U.S. Forest Service	$301,000	20.2%
Unit 4: U.S. Forest Service	$289,000	19.4%
Unit 5: National Park Service	$183,000	12.2%
Unit 2: Superior National Forest	$149,000	10.0%
Unit 2: Private Mining Lands	$94,600	6.3%
Unit 5: U.S. Forest Service	$91,100	6.1%
Unit 5: U.S. Bureau of Land Management	$82,400	5.5%
Unit 2: Minnesota Dept. of Natural Resources	$68,800	4.6%
Unit 3: U.S. Bureau of Land Management	$49,600	3.3%
Unit 2: Other Private Landowners	$46,500	3.1%
Unit 1: Private Timber Lands	$40,700	2.7%
Unit 4: U.S. Bureau of Land Management	$25,100	1.7%
Unit 5: Private Mining Lands	$18,500	1.2%
Unit 3: Private Timber Lands	$10,200	0.7%
Unit 3: Glacier National Park	$8,690	0.6%
Unit 1: Maine Dept of Conservation	$8,650	0.6%
Unit 4: WA Dept. of Natural Resources	$6,040	0.4%
Unit 2: Voyageurs National Park	$5,600	0.4%
Unit 1: Tribal lands*	$4,860	0.3%
Unit 1: National Park Service	$4,380	0.3%
Unit 3: Tribal Lands*	$2,800	0.2%
Unit 2: Tribal Lands*	$1,570	0.1%
Unit 1: Other Private Landowners	$441	0.0%
Subtotal Proposed for Designation	**$1,480,000**	**-**
***Subtotal Considered for Exclusion**	**$9,230**	**-**
TOTAL	**$1,490,000**	**100%**

Note:
Subunits not listed above are not forecast to experience incremental economic impacts of critical habitat designation.

EXHIBIT ES-8 PRE-DESIGNATION IMPACTS TO ALL ACTIVITIES BY SUBUNIT

UNIT/SUBUNIT	BASLINE PRESENT VALUE 3%		BASELINE PRESENT VALUE 7%	
	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
National Park Service	$13,400	$13,400	$17,200	$17,200
U.S. Fish and Wildlife Service	-	-	-	-
Maine Dept of Conservation	$3,380	$3,380	$3,380	$3,380
Baxter State Park Authority	$5,150	$5,150	$5,360	$5,360
Conservation NGO	$271,000	$271,000	$281,000	$281,000
Private Timber Lands	$4,120,000	$4,120,000	$4,740,000	$4,740,000
Other Private Landowners	$1,130	$1,130	$1,130	$1,130
Subtotal Unit 1	*$4,410,000*	*$4,410,000*	*$5,050,000*	*$5,050,000*
UNIT 2: MINNESOTA				
Superior National Forest	$902,000	$902,000	$1,030,000	$1,030,000
Voyageurs National Park	$159,000	$159,000	$178,000	$178,000
U.S. Bureau of Land Management	-	-	-	-
Minnesota Dept. of Natural Resources	$425,000	$516,000	$459,000	$563,000
University of Minnesota	-	-	-	-
Local Public Ownership	-	-	-	-
Private Timber Lands	-	-	-	-
Private Mining Lands	$385,000	$385,000	$449,000	$449,000
Other Private Landowners	$83,900	$83,900	$104,000	$104,000
Subtotal Unit 2	*$1,950,000*	*$2,040,000*	*$2,220,000*	*$2,320,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$876,000	$876,000	$1,080,000	$1,080,000
U.S. Fish and Wildlife Service	-	-	-	-
U.S. Bureau of Reclamation	-	-	-	-
U.S. Bureau of Land Management	$181,000	$181,000	$220,000	$220,000
U.S. Department of Defense	$7,560	$7,560	$8,160	$8,160
Glacier National Park	$1,820,000	$1,820,000	$2,100,000	$2,100,000
Montana Dept. of Natural Resources	$1,330,000	$1,330,000	$1,450,000	$1,450,000
Montana Dept. of Transportation	-	-	-	-
Montana Fish, Wildlife, and Parks	$2,590	$2,590	$2,860	$2,860
Montana University System	-	-	-	-
Local Public Landowners	-	-	-	-
Conservation NGO	-	-	-	-
Private Timber Lands	$26,100	$26,100	$26,100	$26,100
Other Private Landowners	$42,300	$42,300	$53,000	$53,000
Subtotal Unit 3	*$4,290,000*	*$4,290,000*	*$4,940,000*	*$4,940,000*
UNIT 4: NORTH CASCADES				
National Park Service	$164,000	$164,000	$192,000	$192,000
U.S. Bureau of Land Management	$68,300	$68,300	$86,300	$86,300
U.S. Fish and Wildlife Service	$8,060	$8,060	$9,540	$9,540
U.S. Forest Service	$908,000	$908,000	$1,080,000	$1,080,000
WA Dept. of Natural Resources	$12,200,000	$12,200,000	$14,400,000	$14,400,000
WA Dept. of Fish and Wildlife	$102,000	$102,000	$120,000	$120,000
Private Landowners	$80,200	$80,200	$106,000	$106,000
Subtotal Unit 4	*$13,500,000*	*$13,500,000*	*$16,000,000*	*$16,000,000*
UNIT 5: GREATER YELLOWSTONE				
U.S. Bureau of Land Management	$294,000	$294,000	$357,000	$357,000
U.S. Bureau of Reclamation	-	-	-	-
Federal Highway Administration	-	-	-	-
National Park Service	$380,000	$380,000	$467,000	$467,000
U.S. Fish and Wildlife Service	-	-	-	-
U.S. Forest Service	$298,000	$298,000	$352,000	$352,000
Montana State Highway Commission	-	-	-	-
Montana Fish, Wildlife, and Parks	-	-	-	-
Wyoming Game and Fish Commission	$64,600	$64,600	$71,100	$71,100
Wyoming Dept. of Transportation	-	-	-	-
Local Public Landowners	-	-	-	-
Private Mining Lands	-	-	-	-
Other Private Landowners	$8,770	$8,770	$11,400	$11,400
Subtotal Unit 5	*$1,050,000*	*$1,050,000*	*$1,260,000*	*$1,260,000*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	*$25,200,000*	*$25,300,000*	*$29,500,000*	*$29,600,000*

UNIT/SUBUNIT	BASLINE PRESENT VALUE 3%		BASELINE PRESENT VALUE 7%	
	LOW	HIGH	LOW	HIGH
Areas Considered for Exclusion				
UNIT 1: MAINE				
Tribal lands	$348,000	$348,000	$394,000	$394,000
Subtotal Unit 1	*$348,000*	*$348,000*	*$394,000*	*$394,000*
UNIT 2: MINNESOTA				
Tribal Lands	$43,300	$43,300	$46,600	$46,600
Subtotal Unit 2	*$43,300*	*$43,300*	*$46,600*	*$46,600*
UNIT 3: NORTHERN ROCKY MOUNTAINS				
Tribal Lands	$9,030	$9,030	$12,200	$12,200
Subtotal Unit 3	*$9,030*	*$9,030*	*$12,200*	*$12,200*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	*$401,000*	*$401,000*	*$453,000*	*$453,000*
TOTAL	*$25,600,000*	*$25,700,000*	*$30,000,000*	*$31,000,000*

EXHIBIT ES-9 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO ALL ACTIVITIES BY SUBUNIT

UNIT/SUBUNIT	BASELINE								INCREMENTAL			
	PRESENT VALUE 3%		PRESENT VALUE 7%		ANNUALIZED 3%		ANNUALIZED 7%		PRESENT VALUE 3%	PRESENT VALUE 7%	ANNUALIZED 3%	ANNUALIZED 7%
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH				
Proposed Critical Habitat												
UNIT 1: MAINE												
National Park Service	$18,400	$18,400	$13,100	$13,100	$1,240	$1,240	$1,240	$1,240	$6,150	$4,380	$413	$413
U.S. Fish and Wildlife Service	-	-	-	-	-	-	-	-	-	-	-	-
Maine Dept of Conservation	$57,400	$57,400	$44,500	$44,500	$3,860	$3,860	$4,200	$4,200	$10,400	$8,650	$701	$816
Baxter State Park Authority	-	-	-	-	-	-	-	-	-	-	-	-
Conservation NGO	-	-	-	-	-	-	-	-	-	-	-	-
Private Timber Lands	$107,000,000	$118,000,000	$1,050,000	$110,000,000	$7,180,000	$7,900,000	$9,430,000	$10,400,000	$49,000	$40,700	$3,300	$3,840
Other Private Landowners	$1,860	$1,860	$1,320	$1,320	$125	$125	$125	$125	$620	$441	$42	$42
Subtotal Unit 1	*$107,000,000*	*$118,000,000*	*$100,000,000*	*$110,000,000*	*$7,190,000*	*$7,910,000*	*$9,430,000*	*$10,400,000*	*$66,200*	*$54,200*	*$4,450*	*$5,110*
UNIT 2: MINNESOTA												
Superior National Forest	$3,400,000	$4,420,000	$2,350,000	$3,010,000	$229,000	$297,000	$221,000	$284,000	$215,000	$149,000	$14,400	$14,100
Voyageurs National Park	$38,500	$38,500	$27,400	$27,400	$2,580	$2,580	$2,580	$2,580	$7,870	$5,600	$529	$529
U.S. Bureau of Land Management	-	-	-	-	-	-	-	-	-	-	-	-
Minnesota Dept. of Natural Resources	$4,350,000	$5,180,000	$3,040,000	$3,590,000	$292,000	$348,000	$287,000	$339,000	$98,600	$68,800	$6,630	$6,500
University of Minnesota	-	-	-	-	-	-	-	-	-	-	-	-
Local Public Ownership	-	-	-	-	-	-	-	-	-	-	-	-
Private Timber Lands	-	-	-	-	-	-	-	-	-	-	-	-
Private Mining Lands	$1,790,000	$1,790,000	$1,290,000	$1,290,000	$121,000	$121,000	$122,000	$122,000	$131,000	$94,600	$8,810	$8,930
Other Private Landowners	$1,170,000	$2,080,000	$773,000	$1,380,000	$78,300	$140,000	$73,000	$130,000	$69,100	$46,500	$4,640	$4,390
Subtotal Unit 2	*$10,700,000*	*$13,500,000*	*$7,480,000*	*$9,300,000*	*$722,000*	*$908,000*	*$706,000*	*$878,000*	*$521,000*	*$364,000*	*$35,000*	*$34,400*
UNIT 3: NORTHERN ROCKY MOUNTAINS												
U.S. Forest Service	$2,000,000	$2,000,000	$1,510,000	$1,510,000	$134,000	$134,000	$133,000	$133,000	$423,000	$301,000	$28,400	$28,400
U.S. Fish and Wildlife Service	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Bureau of Reclamation	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Bureau of Land Management	$209,000	$209,000	$149,000	$149,000	$14,000	$14,000	$14,000	$14,000	$69,700	$49,600	$4,680	$4,680
U.S. Department of Defense	-	-	-	-	-	-	-	-	-	-	-	-

UNIT/SUBUNIT	BASELINE								INCREMENTAL			
	PRESENT VALUE 3%		PRESENT VALUE 7%		ANNUALIZED 3%		ANNUALIZED 7%		PRESENT VALUE 3%	PRESENT VALUE 7%	ANNUALIZED 3%	ANNUALIZED 7%
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH				
Glacier National Park	$36,600	$36,600	$26,000	$26,000	$2,460	$2,460	$2,460	$2,460	$12,200	$8,690	$820	$820
Montana Dept. of Natural Resources	$240,000	$240,000	$116,000	$116,000	$16,100	$16,100	$10,900	$10,900	-	-	-	-
Montana Dept. of Transportation	-	-	-	-	-	-	-	-	-	-	-	-
Montana Fish, Wildlife, and Parks	$5,950	$5,950	$4,240	$4,240	$400	$400	$400	$400	-	-	-	-
Montana University System	-	-	-	-	-	-	-	-	-	-	-	-
Local Public Landowners	-	-	-	-	-	-	-	-	-	-	-	-
Conservation NGO	-	-	-	-	-	-	-	-	-	-	-	-
Private Timber Lands	$43,100	$43,100	$30,700	$30,700	$2,900	$2,900	$2,900	$2,900	$14,400	$10,200	$967	$967
Other Private Landowners	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Unit 3	*$2,530,000*	*$2,530,000*	*$1,840,000*	*$1,840,000*	*$170,000*	*$170,000*	*$164,000*	*$164,000*	*$519,000*	*$370,000*	*$34,900*	*$34,900*
UNIT 4: NORTH CASCADES												
National Park Service	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Bureau of Land Management	$106,000	$106,000	$75,300	$75,300	$7,110	$7,110	$7,110	$7,110	$35,300	$25,100	$2,370	$2,370
U.S. Fish and Wildllife Service	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Forest Service	$1,220,000	$1,360,000	$866,000	$959,000	$81,700	$91,100	$81,700	$90,600	$406,000	$289,000	$27,300	$27,300
WA Dept. of Natural Resources	$15,800,000	$15,800,000	$11,300,000	$11,300,000	$1,060,000	$1,060,000	$1,060,000	$1,060,000	$8,490	$6,040	$571	$571
WA Dept. of Fish and Wildlife	$28,300	$28,300	$26,200	$26,200	$1,900	$1,900	$2,480	$2,480	-	-	-	-
Private Landowners	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Unit 4	*$17,100,000*	*$17,300,000*	*$12,200,000*	*$12,300,000*	*$1,150,000*	*$1,160,000*	*$1,150,000*	*$1,160,000*	*$449,000*	*$320,000*	*$30,200*	*$30,200*
UNIT 5: GREATER YELLOWSTONE												
U.S. Bureau of Land Management	$343,000	$343,000	$251,000	$251,000	$23,100	$23,100	$23,700	$23,700	$114,000	$82,400	$7,690	$7,780
U.S. Bureau of Reclamation	-	-	-	-	-	-	-	-	-	-	-	-
Federal Highway Administration	-	-	-	-	-	-	-	-	-	-	-	-
National Park Service	$867,000	$867,000	$622,000	$622,000	$58,200	$58,200	$58,700	$58,700	$265,000	$183,000	$17,800	$17,200
U.S. Fish and Wildlife Service	-	-	-	-	-	-	-	-	-	-	-	-
U.S. Forest Service	$784,000	$784,000	$604,000	$604,000	$52,700	$52,700	$57,000	$57,000	$131,000	$91,100	$8,830	$8,600
Montana State Highway Commission	-	-	-	-	-	-	-	-	-	-	-	-
Montana Fish, Wildlife, and Parks	-	-	-	-	-	-	-	-	-	-	-	-
Wyoming Game and Fish Commission	-	-	-	-	-	-	-	-	-	-	-	-

UNIT/SUBUNIT	BASELINE								INCREMENTAL			
	PRESENT VALUE 3%		PRESENT VALUE 7%		ANNUALIZED 3%		ANNUALIZED 7%		PRESENT VALUE 3%	PRESENT VALUE 7%	ANNUALIZED 3%	ANNUALIZED 7%
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH				
Wyoming Dept. of Transportation	-	-	-	-	-	-	-	-	-	-	-	-
Local Public Landowners	-	-	-	-	-	-	-	-	-	-	-	-
Private Mining Lands	$163,000	$163,000	$135,000	$135,000	$10,900	$10,900	$12,700	$12,700	$25,700	$18,500	$1,730	$1,750
Other Private Landowners	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Unit 5	*$2,160,000*	*$2,160,000*	*$1,610,000*	*$1,610,000*	*$145,000*	*$145,000*	*$152,000*	*$152,000*	*$536,000*	*$375,000*	*$36,100*	*$35,400*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	*$139,000,000*	*$153,000,000*	*$123,000,000*	*$135,000,000*	*$9,380,000*	*$10,300,000*	*$11,600,000*	*$12,800,000*	*$2,090,000*	*$1,480,000*	*$141,000*	*$140,000*
Areas Considered for Exclusion												
UNIT 1: MAINE												
Tribal lands	$143,000	$143,000	$133,000	$133,000	$9,610	$9,610	$12,500	$12,500	$6,820	$4,860	$458	$458
Subtotal Unit 1	*$143,000*	*$143,000*	*$133,000*	*$133,000*	*$9,610*	*$9,610*	*$12,500*	*$12,500*	*$6,820*	*$4,860*	*$458*	*$458*
UNIT 2: MINNESOTA												
Tribal Lands	$6,630	$6,630	$4,720	$4,720	$446	$446	$446	$446	$2,210	$1,570	$149	$149
Subtotal Unit 2	*$6,630*	*$6,630*	*$4,720*	*$4,720*	*$446*	*$446*	*$446*	*$446*	*$2,210*	*$1,570*	*$149*	*$149*
UNIT 3: NORTHERN ROCKY MOUNTAINS												
Tribal Lands	$11,800	$11,800	$8,390	$8,390	$792	$792	$792	$792	$3,930	$2,800	$264	$264
Subtotal Unit 3	*$11,800*	*$11,800*	*$8,390*	*$8,390*	*$792*	*$792*	*$792*	*$792*	*$3,930*	*$2,800*	*$264*	*$264*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	*$161,000*	*$161,000*	*$146,000*	*$146,000*	*$10,900*	*$10,900*	*$13,700*	*$13,700*	*$13,000*	*$9,230*	*$871*	*$871*
TOTAL	**$140,000,000**	**$153,000,000**	**$123,000,000**	**$135,000,000**	**$9,390,000**	**$10,300,000**	**$11,600,000**	**$12,800,000**	**$2,110,000**	**$1,490,000**	**$142,000**	**$141,000**

EXHIBIT ES-10 POTENTIAL IMPACTS TO UNIT 1: MAINE (HIGH END, DISCOUNTED AT SEVEN PERCENT)

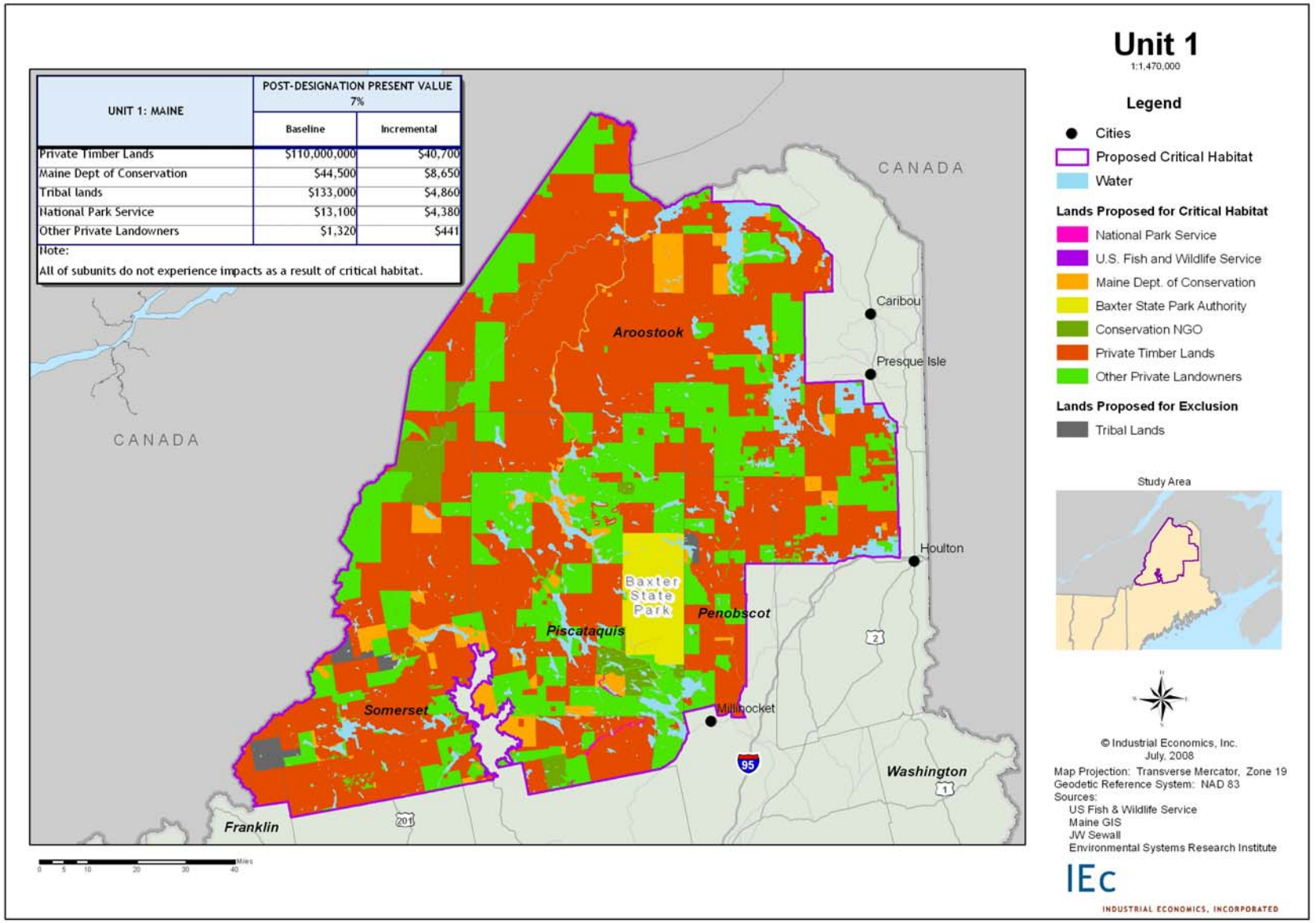
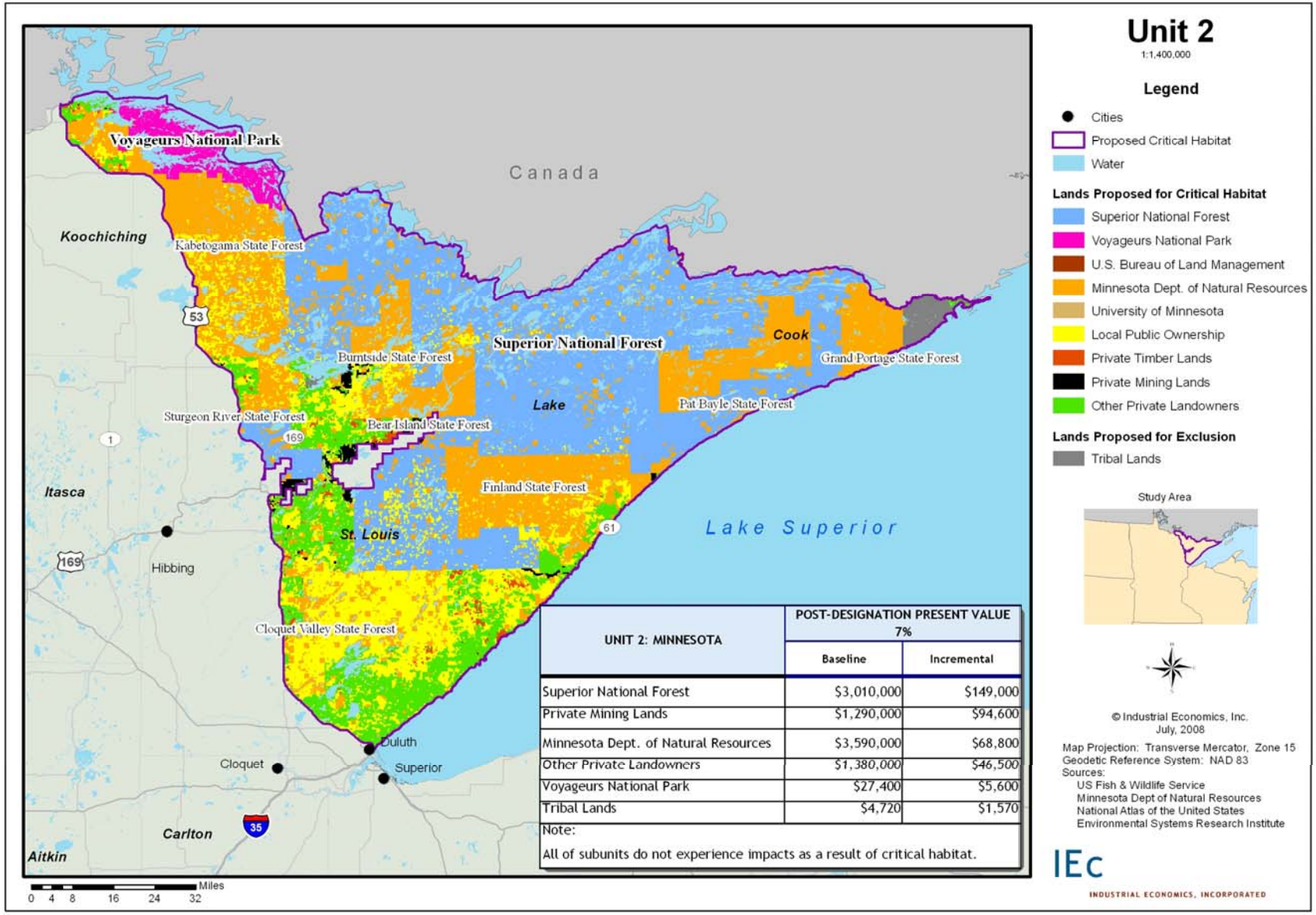


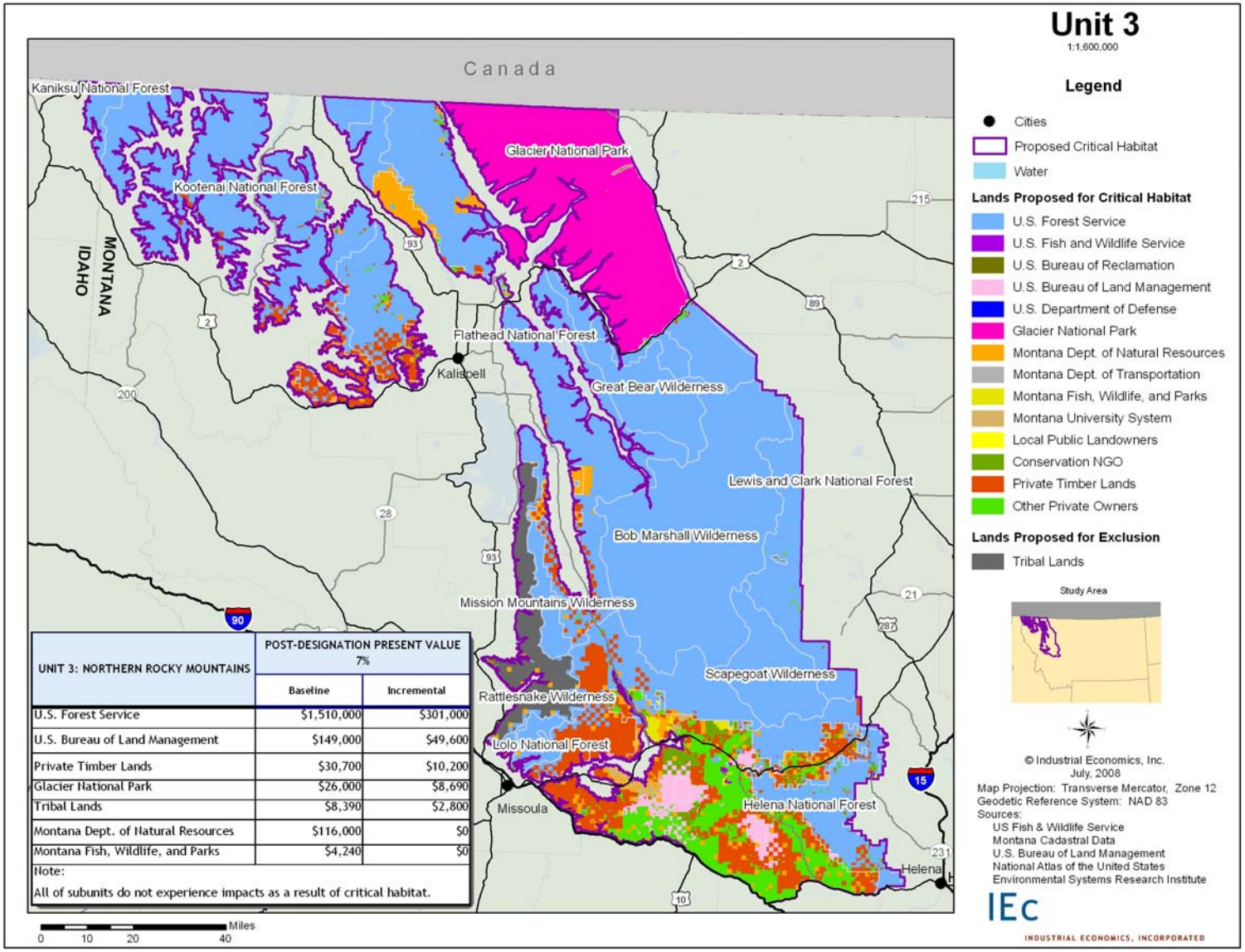
EXHIBIT ES-11 POTENTIAL IMPACTS TO UNIT 2: MINNESOTA (HIGH END, DISCOUNTED AT SEVEN PERCENT)



UNIT 2: MINNESOTA	POST-DESIGNATION PRESENT VALUE 7%	
	Baseline	Incremental
Superior National Forest	$3,010,000	$149,000
Private Mining Lands	$1,290,000	$94,600
Minnesota Dept. of Natural Resources	$3,590,000	$68,800
Other Private Landowners	$1,380,000	$46,500
Voyageurs National Park	$27,400	$5,600
Tribal Lands	$4,720	$1,570

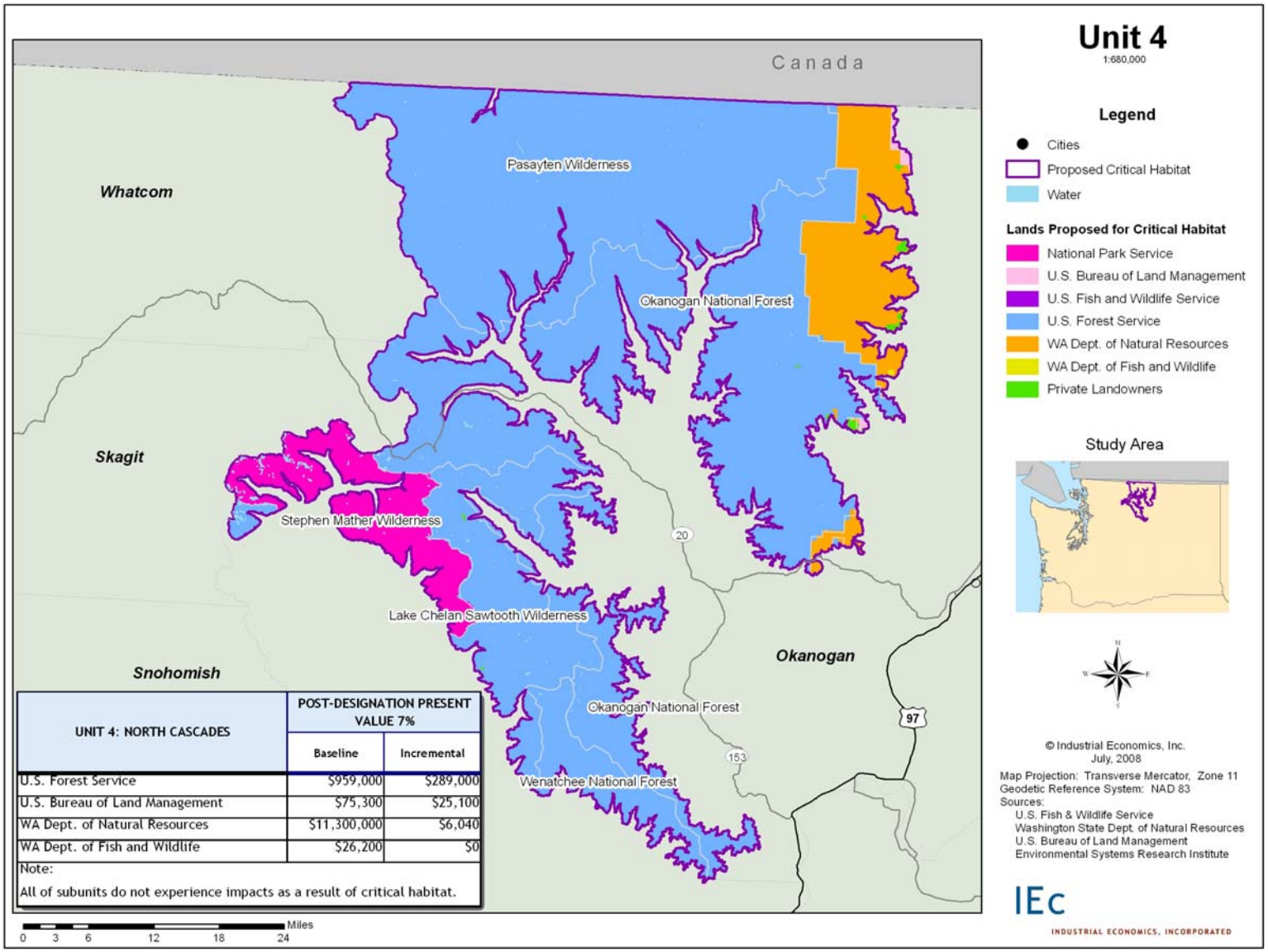
Note:
All of subunits do not experience impacts as a result of critical habitat.

EXHIBIT ES-12 POTENTIAL IMPACTS TO UNIT 3: NORTHERN ROCKY MOUNTAINS (HIGH END, DISCOUNTED AT SEVEN PERCENT)



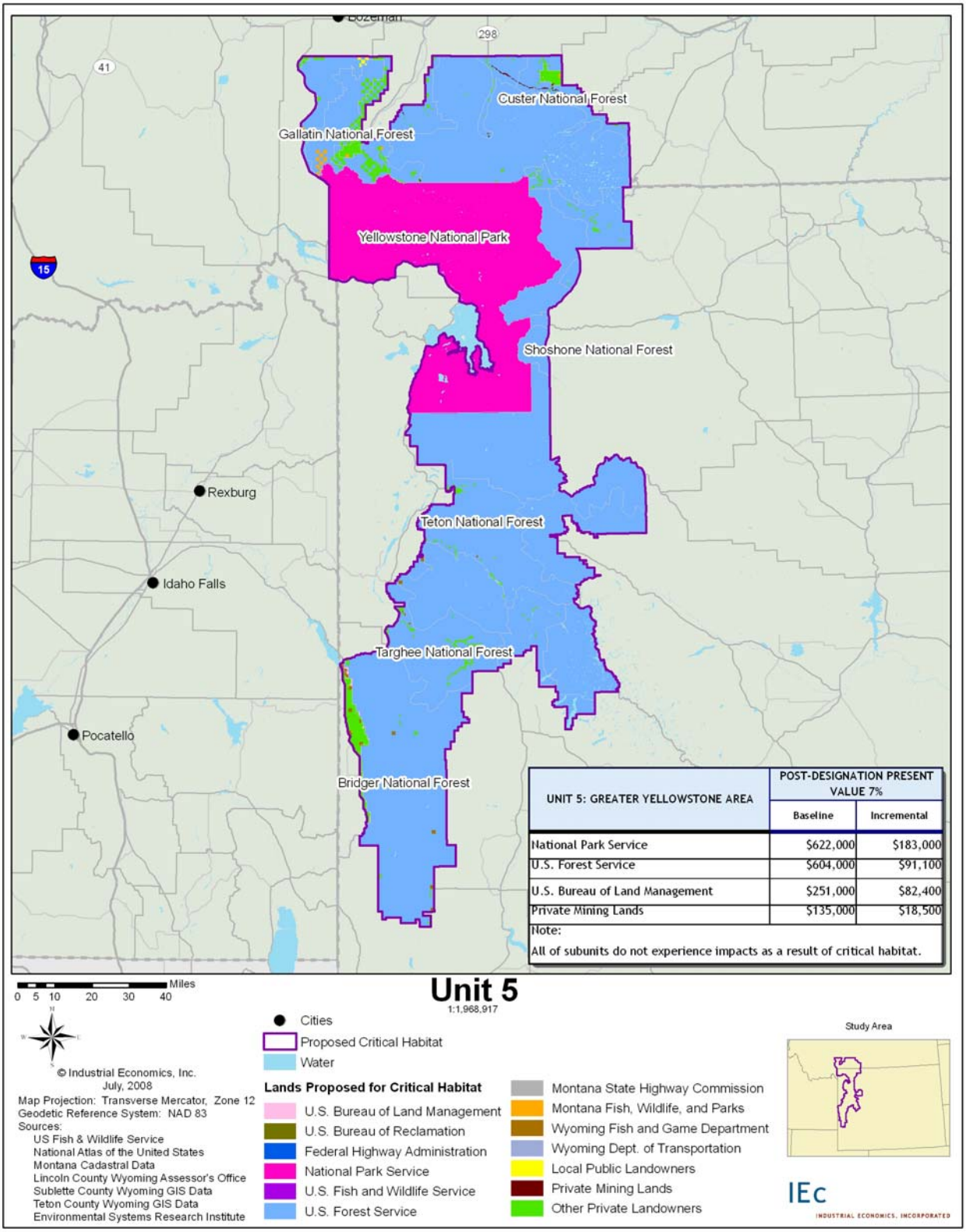
UNIT 3: NORTHERN ROCKY MOUNTAINS	POST-DESIGNATION PRESENT VALUE 7%	
	Baseline	Incremental
U.S. Forest Service	$1,510,000	$301,000
U.S. Bureau of Land Management	$149,000	$49,600
Private Timber Lands	$30,700	$10,200
Glacier National Park	$26,000	$8,690
Tribal Lands	$8,390	$2,800
Montana Dept. of Natural Resources	$116,000	$0
Montana Fish, Wildlife, and Parks	$4,240	$0
Note: All of subunits do not experience impacts as a result of critical habitat.		

EXHIBIT ES-13 POTENTIAL IMPACTS TO UNIT 4: NORTH CASCADES (HIGH END, DISCOUNTED AT SEVEN PERCENT)



UNIT 4: NORTH CASCADES	POST-DESIGNATION PRESENT VALUE 7%	
	Baseline	Incremental
U.S. Forest Service	$959,000	$289,000
U.S. Bureau of Land Management	$75,300	$25,100
WA Dept. of Natural Resources	$11,300,000	$6,040
WA Dept. of Fish and Wildlife	$26,200	$0
Note: All of subunits do not experience impacts as a result of critical habitat.		

EXHIBIT ES-14 POTENTIAL IMPACTS TO UNIT 5: GREATER YELLOWSTONE AREA (HIGH END, DISCOUNTED AT SEVEN PERCENT)



UNIT 5: GREATER YELLOWSTONE AREA	POST-DESIGNATION PRESENT VALUE 7%	
	Baseline	Incremental
National Park Service	$622,000	$183,000
U.S. Forest Service	$604,000	$91,100
U.S. Bureau of Land Management	$251,000	$82,400
Private Mining Lands	$135,000	$18,500

Note:
All of subunits do not experience impacts as a result of critical habitat.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1. This report describes the economic impacts of conservation efforts for the federally-listed Canada lynx (*Lynx canadensis)* and its habitat within the areas being considered for critical habitat for the species. The Canada lynx are medium-sized cats that occupy boreal forest habitat and are highly specialized predators of snowshoe hare. The 2008 proposed rule provides detailed information on the species.[1] This chapter describes the geographic scope of this analysis and the regional land use activities that may be risk factors for the lynx.

2. This final economic analysis analyzes the proposed designation as described in the proposed rule. This analysis does not reflect changes to the proposed critical habitat designation made in the final rule. Consequently, description of the habitat designation in the final rule may differ from maps and figures presented in this analysis.[2]

3. The lynx was listed as a threatened species on March 24, 2000;[3] critical habitat was designated for the species on November 9, 2006 on 1,841 square miles (approximately 1.18 million acres) in Minnesota, Montana, and Washington.[4] On July 20, 2007, the U.S. Fish and Wildlife Service (Service) announced it would review the 2006 critical habitat rule, and subsequently determined that it was necessary to reconsider the critical habitat designation.[5] In February 2008, the Service proposed to revise existing critical habitat, identifying approximately 42,753 square miles (approximately 27.4 million acres) comprising five "units" proposed for critical habitat designation; of this, roughly 505 square miles (approximately 323,000 acres) of Tribal lands are being considered for exclusion from critical habitat. This entire area, including the lands being considered for exclusion, is the "study area" for this analysis.

4. In 2006, the Service prepared an economic analysis of critical habitat designation (2006 DEA) for the lynx following the 2005 proposed critical habitat rule.[6] The current analysis of the 2008 proposed rule differs from the 2006 DEA in that it engages updated data and information, considers the revised geographic scope and associated risk factors,

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[1] U.S. Fish and Wildlife Service, 73 Federal Register (FR) 10860, February 28, 2008.

[2] For a detailed discussion of public comments on the draft economic analysis and associated responses, refer to the responses to public comment section of the Final Rule.

[3] 65 FR 16052.

[4] 71 FR 66007.

[5] For a description of the species, its risk factors, habitat description, and regulatory history, see 73 FR 10860.

[6] Critical habitat was originally proposed for the Canada lynx on November 9, 2005: 70 FR 68294.

and describes results separately in terms of baseline impacts of lynx conservation and incremental impacts of the proposed critical habitat rule, as described in Chapter 2.

5. The major quantitative differences between the 2006 DEA and this analysis are associated with the analyses of impacts to development and forest management, as follows.

   - **Development.** The greatest quantitative differences between the impact estimates presented in the 2006 DEA and this report relate to impacts on development. The 2006 DEA did not monetize impacts to development, largely due to uncertainty regarding how this activity might be affected by lynx conservation. Information was, however, provided in the 2006 DEA detailing the geographic locations where development activities might occur in the future within the boundaries of the proposed designation, and the land values associated with these areas. Following the public comment period, the Department of the Interior and Service requested analysis of an alternate scenario in which, absent more specific information regarding how development may be affected by lynx conservation, the Lynx Conservation Assessment and Strategy (LCAS) thresholds related to timber management would be applied to development activities. Specifically, 2006 Final Economic Analysis (2006 FEA) quantified reductions in land values associated with precluding development of more than 15 percent of each watershed within proposed critical habitat. The current analysis concludes that this is not a reasonably foreseeable outcome. Since the lynx was listed in 2000, and since the last critical habitat designation in 2006, there have been limited consultations on development, none of which has resulted in project modification. In addition, in the context of the one known development plan in Unit 1 for which the Service did provide recommendations for lynx conservation, as described in Chapter 5 of this report, the 15 percent threshold assumption was not applied. Instead, purchase of conservation easements and avoidance of particular areas for development were recommended. It is these project modifications that are the focus of this analysis. This analysis also qualitatively describes portions of the designation which may subject to development pressure and therefore may be affected by lynx conservation.

   - **Forest Management.** With respect to timber management, Unit 1 accounts for the majority of the difference in monetized impacts between the 2006 DEA and the current analyses. The 2006 DEA considered a scenario under which all private landowners within the proposed critical habitat would manage for the lynx following designation. Specifically, the 2006 DEA assumed that landowners would undertake conservation efforts similar to those described in the LCAS (i.e., all landowners involved in forest management would preclude pre-commercial thinning). In this report, because new information is available regarding how landowners may manage for the lynx in Unit 1, preclusion of pre-commercial thinning is not considered reasonably foreseeable. Following the 2006 critical habitat designation, the Service developed draft guidelines specific to Maine for timber management in lynx habitat. These guidelines provide a

more regionally specific measure of potential future lynx management than the LCAS. As of September 2008, five private landowners have agreed to work with the Service to develop management plans according to these guidelines. As these guidelines are only in the draft stages, Chapter 4 of this analysis quantifies impacts to the five landowners of developing lynx management plans and qualitatively discusses the uncertainty regarding the impacts of implementing the plans and whether other landowners may adopt similar plans.

1.1 FOREWORD

6. Significant uncertainty exists regarding the future of Canada lynx conservation. As of the writing of this report, uncertainty surrounds the direction of lynx conservation on private timberlands, the nature and scope of planned development projects in the study area, and the likelihood that various land use activities are in fact risk factors for the species. The following examples highlight the major areas of uncertainty affecting the quantification of impacts in this analysis. Each is described in more detail in the activity-specific chapters of this report.

- **Forest management on private lands in Maine and Montana–** In 2007, the Maine Field Office of the Service drafted lynx habitat management guidelines for private timberland owners in Maine.[7] Adoption of these guidelines is voluntary, although the Service has expressed that forest land managers in Maine may be excluded from critical habitat designation if they implement lynx management that is sufficiently protective of habitat, as described generally in these guidelines.[8] Some landowners, however, have argued that implementation of these guidelines is not feasible on their lands.[9] On the other hand, five private landowners have agreed to adopt the guidelines and are working with the Service to determine how to alter their land management to comply with the guidelines. Additionally, private timber companies in both Maine and Montana are working with the Service on the development of the Maine Conservation Partnership Agreement (the Maine Agreement) and the Montana Conservation Partnership Agreement (the Montana Agreement). The Service has made draft versions of these plans available for public comment. The two plans are similar in terms of their objective to develop a conservation strategy that will preserve and protect the lynx, and in terms of the specific commitments that landowners agree to implement. Both agreements include measures to continue funding lynx research, educate the forest products industry on lynx conservation, develop voluntary habitat management guidelines, and convene annual meetings to review progress towards the goals of the agreements. However, the two

[7] McCollough, M. 2007. Draft Canada Lynx Habitat Management Guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office.

[8] "Federal Wildlife Officials Seeking Input on Habitat for Canada Lynx", *Bangor Daily News,* April 1, 2008. Accessed at http://bangornews.com/news/t/news.aspx?articleid=162365&zoneid=500 on June 17, 2008.

[9] Personal communication with Patrick Strauch, Maine Forest Products Council, May 2, 2008.

conservation agreements differ in the methodology applied to implement the above conservation measures. Uncertainty exists regarding: a) the ultimate shape of the draft plans, specifically the voluntary habitat management guidelines; b) how the resulting guidelines may affect on-the-ground timber management; and c) whether landowners will ultimately adopt these plans. This issue is discussed in further detail in Chapter 4.

- **Moosehead Land Use Concept Plan in Unit 1 –** In April 2005, Plum Creek Timber Company proposed a Land Use Concept Plan for its ownership in southern Maine (Unit 1), including residential and resort developments and placement of lands into conservation status. Since that time, the plan has been subject to review and comment by Maine's Land Use Regulatory Commission (or LURC, from which the project requires permitting), stakeholders, and the general public. As a result, the Plan has undergone multiple iterations, with Plum Creek revising its approach to development and conservation planning in terms of both scale and geographic distribution. In June 2008, LURC put forth recommendations to Plum Creek, including lynx conservation efforts that should be included in their final plan in order for it to be permitted. While Chapter 5 describes this ongoing issue in detail, the specifics of Plum Creek's final plan, the approach Plum Creek will follow in addressing LURC's recommendations, and whether the Service may request even greater levels of lynx conservation than LURC's recommendations in the future, contribute a significant level of uncertainty to this analysis.

- **Recreation activities –** Past lynx management plans, including the LCAS, describe recreation activities that compact snow (e.g., snowmobiling and skiing) as risk factors for the lynx as they may make it possible for competing predators to occupy lynx habitat during winter. More recent lynx management plans, such as the Northern Rockies Lynx Management Decision (NRLMD), however, cite recent research contradicting this theory, and therefore do not prescribe restrictions to the development of groomed trails. Further, the 2008 proposed rule states that compacted snow trails do not constitute a threat to lynx in the NRLMD area. The conservation efforts recommended in the LCAS regarding limiting compacted trails still stands for areas covered by that plan, however. Research is ongoing to determine whether, in fact, such recreation activities are a risk factor for the lynx. Chapter 6 of this report quantifies impacts of compliance with the various management plans with respect to recreation. The outcome of future research, however, has the potential to alter this conservation direction and therefore the associated economic impacts.

- **Grazing –** Similar to recreation, existing lynx management plans contain conflicting guidance for grazing activities that result in compacted snow. While the LCAS provides conservation direction for this activity (as described in Chapter 8), in its Biological Opinion on the effects of the NRLMD on the lynx, the Service has noted that it has found no evidence that grazing was a risk factor for the lynx.

This ongoing dialogue regarding appropriate lynx conservation direction complicates the forecast of associated economic impacts. This analysis, however, applies the best available information on these issues as of the writing of this report to quantify impacts, and highlights the associated areas of uncertainty.

1.2 LOCATION AND LAND OWNERSHIP

7. The study area for this analysis comprises five units in portions of northern Maine, northeastern Minnesota, the Northern Rocky Mountains (northwestern Montana and northeastern Idaho), the North Cascades (north-central Washington), and the Greater Yellowstone Area (southwestern Montana and northwestern Wyoming). Exhibit 1-2 describes the units according to the distribution of landownership.

8. The areas proposed for critical habitat designation are approximately 59 percent Federal lands (primarily U.S. Forest Service (USFS) lands), 29 percent private lands (both industrial and non-industrial landowners), and nine percent State lands. The remaining approximately three percent of the land area is of local, public ownership. In addition, approximately 323,000 acres of Tribal lands are being considered for exclusion from final critical habitat designation in Maine, Minnesota, and Montana. Exhibits 1-3 through 1-7 provide detailed maps of the study area highlighting landownership throughout.

1.3 SUMMARY OF RISK FACTORS TO LYNX AND ITS HABITAT

9. Review of the 2008 proposed critical habitat rule, final listing rule, existing management documents, and the consultation history identified the following activities as risk factors for the lynx and its habitat. Each activity is addressed in this report in terms of past and forecast lynx conservation.

- Forest management;
- Development;
- Recreation;
- Mining and oil and gas activities;
- Fire management;
- Wind energy projects;
- Transportation, utilities and municipal projects;
- Livestock grazing; and
- Species research and active management.

10. In the 2008 proposed rule, the Service identifies climate change as an issue of concern for the future conservation of the lynx and its habitat. The Service notes, however, that further study is required to determine how climate change may affect the lynx and its habitat. As a result, although climate change may be a risk factor for the lynx, absent

information on how this risk factor may be managed in the future we do not consider it in this analysis.

11. Exhibit 1-1 provides a summary of these land uses according to the potential risks presented to the species, and conservation efforts that have been or may be undertaken to avoid, mitigate, or compensate for these threats. These risk factors and the associated lynx management direction are the basis for this analysis and are described in detail in the activity-specific chapters of this report.

1.4 STRUCTURE OF THE REPORT

12. This remainder of this report is organized as follows:

- Chapter 2: Framework for the Analysis;
- Chapter 3: Lynx Management Plans;
- Chapter 4: Forest Management;
- Chapter 5: Development;
- Chapter 6: Recreation;
- Chapter 7: Mining and Oil and Gas Activities;
- Chapter 8: Other Activities;
- References;
- Appendix A: Initial Regulatory Flexibility and Energy Impacts Analyses;
- Appendix B: Detailed Impacts to Activities by Unit; and
- Appendix C: Undiscounted Impacts to Activities by Unit.

EXHIBIT 1-1 RISK FACTORS AND LYNX CONSERVATION

LAND USE ACTIVITIES	SPECIES AND HABITAT RISKS[a]	EXAMPLES OF LYNX CONSERVATION EFFORTS[b]
Forest Management	• Precommercial thinning may reduce stem densities in forest stands such that the young forests can no longer support snowshoe hare prey. • Particularly in Unit 1 (Maine), partial harvest techniques that have replaced clear cuts fragment the forests and do not provide the optimal, mid-regeneration conditions required to support large populations of the lynx. • In multistoried forests, commercial timber sales may either be beneficial to the species (removing tall trees and allowing development of new foraging habitat) or create risks (removing small trees and brush that create foraging habitat). • Removal of dead and down trees for salvage logging may reduce denning habitat for the lynx.	• Preclude precommercial thinning in young generating forests while they provide suitable snowshoe hare habitat. • If 30 percent of a Lynx Analysis Unit (LAU) is in an unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities. • Forest management actions shall not change more than 15 percent of lynx habitat within an LAU to an unsuitable condition within a 10-year period. • At any time, about 20 percent of the area in a lynx habitat unit should be in the optimal mid-regeneration conditions. • Some management plans require retaining dead and down woody material within denning habitat. Other plans suggest that denning habitat for the species is not limited, as is foraging habitat, and therefore precluding salvage logging is not required.
Development	• Private land development, especially resorts and developments along road corridors in mountain valleys, may fragment habitat.	• The only specific example of conservation efforts recommended to an ongoing development project is establishing set asides to offset development and avoidance of development in particular areas.
Recreation	• Disagreement exists in the literature regarding whether recreation activities such as snowmobiling and skiing that occur on groomed trails with compacted snow may increase access for predators to lynx habitat. • Downhill ski areas may affect lynx movement and increase human presence in lynx habitat. • Trapping and hunting programs for other species within the study area may increase mortality risk for lynx.	• No net expansion of groomed trails within an LAU. • Consider possible effects on lynx movement of ski area expansions or developments.
Mining and Oil and Gas Activities	• Access roads for mining and oil and gas development may improve access for predators into lynx habitat; the most recent lynx management direction, the NRLMD, however, suggest that available information does not suggest that mining and energy developments pose a threat to lynx populations.	• Conduct lynx research and remote monitoring of mine and energy development sites. • Reclaim exhausted sites and roads. • The NRLMD does not prescribe changes to mining and energy developments as it suggests there is no information to suggest that these activities pose a threat to lynx populations.

LAND USE ACTIVITIES	SPECIES AND HABITAT RISKS[a]	EXAMPLES OF LYNX CONSERVATION EFFORTS[b]
Fire Management	• Some fuel treatments may reduce foraging habitat by removing understory vegetation, although some may allow for the creation of foraging habitat. • Wildfire suppression may remove fire as a catalyst for the creation of foraging habitat.	• Most lynx management plans generally allow the thinning and fuel treatments in Wildland Urban Interface (WUI) areas.
Wind Energy	• The primary issue with wind energy projects is the associated road construction, which may increase human access to and use of otherwise inaccessible lynx habitat areas. • Additionally, electricity access may be introduced into areas which currently do not have electricity. This, in turn, could change the nature and interest in developing remote areas.	• Conduct research and monitoring of lynx populations. • Gate any roads created to access developments.
Transportation, Utilities, and Municipal Projects	• Forest roads and trails may make snow-compacting activities easier, which may provide increased access for predators into lynx habitat during the winter months. • Vehicle collisions on highways may increase lynx mortality. • Highways can fragment lynx habitat.	• Construct wildlife crossings for roads. • The LCAS recommends avoiding paving gravel roads and avoiding construction of new highways that may increase traffic volumes and speeds within the habitat areas. • Outside of recommending wildlife crossings, the NRLMD does not limit road and highway expansion as no information exists to determine the level of roadway or traffic volume that affects lynx.
Livestock Grazing	• The LCAS suggests that grazing may reduce foraging habitat. The more recent NRLMD, however, suggests that available information does not indicate that grazing poses a threat to lynx at the population level. • Grazing may decrease habitat connectivity for the lynx.	• Construct fencing around grazing allotments. • The NRLMD does not prescribe changes to grazing activities as they are not considered a threat to lynx populations.
Species Research and Active Management	• These activities are not necessarily a risk factor to the species but may require consultation to ensure they are conducted consistent with lynx conservation needs.	

Notes:

[a] Risk Factors were identified through review of the 2008 proposed rule, existing lynx management documents, and consultation history.

[b] Lynx conservation efforts were also identified through review of the 2008 proposed rule, existing lynx management documents, consultation history, and communication with the Service. Not all of the conservation efforts described above are applicable to all types of land across the designation. The various land management plans for the lynx prescribe different lynx conservation direction for the lands that they cover. As a result, conservation efforts in this table for an activity may be conflicting. In addition, land use activities on private lands not covered by a lynx management plan may not implement any of the conservation efforts absent a section 7 consultation for the species and its habitat.

EXHIBIT 1-2 PROPOSED CRITICAL HABITAT LAND OWNERSHIP

UNIT	UNIT NAME	LANDOWNER TYPE (ACRES)		
		LANDOWNER TYPE	LANDOWNER	AREA (ACRES)
Areas Proposed for Designation				
1	Northern Maine	Federal (0.1%)	National Park Service	5,273
			U.S. Fish and Wildlife Service	3
		State (7.6%)	Maine Dept of Conservation	281,832
			Baxter State Park Authority	201,456
		Private (92.3%)	Conservation NGO	161,403
			Private Timber Lands	3,819,628
			Other Private Landowners	1,848,469
		Unit 1 Subtotal		*6,318,064*
2	Northeastern Minnesota	Federal (41.1%)	Superior National Forest	1,806,389
			Voyageurs National Park	126,073
			U.S. Bureau of Land Management	471
		State (31.4%)	Minnesota Dept. of Natural Resources	1,474,178
			University of Minnesota	239
		Local Government (16.0%)	Local Public Ownership	753,327
		Private (11.5%)	Private Timber Lands	33,658
			Private Mining Lands	36,934
			Other Private Landowners	471,075
		Unit 2 Subtotal		*4,702,345*
3	Northern Rocky Mountains (ID/MT)	Federal (80.7%)	U.S. Forest Service	4,656,578
			U.S. Fish and Wildlife Service	2,147
			U.S. Bureau of Reclamation	3,882
			U.S. Bureau of Land Management	115,296
			U.S. Department of Defense	59
			Glacier National Park	888,775
		State (3.6%)	Montana Dept. of Natural Resources	209,192
			Montana Dept. of Transportation	209
			Montana Fish, Wildlife, and Parks	19,104
			Montana University System	22,145
		Local Government (<0.1%)	Local Public Landowners	1,148
		Private (15.7)	Conservation NGO	48,558
			Private Timber Lands	710,567
			Other Private Landowners	342,262
		Unit 3 Subtotal		*7,019,920*
4	North Cascades (WA)	Federal (91.6%)	National Park Service	83,783
			U.S. Bureau of Land Management	2,576
			U.S. Fish and Wildlife Service	166
			U.S. Forest Service	1,082,142
		State (8.2%)	WA Dept. of Natural Resources	104,463
			WA Dept. of Fish and Wildlife	195

UNIT	UNIT NAME	LANDOWNER TYPE (ACRES)		
		LANDOWNER TYPE	LANDOWNER	AREA (ACRES)
		Private (0.2%)	Private Landowners	2,822
		Unit 4 Subtotal		*1,276,147*
5	Greater Yellowstone Area (MT/WY)	Federal (96.9%)	U.S. Bureau of Land Management	3,243
			U.S. Bureau of Reclamation	35
			Federal Highway Administration	59
			National Park Service	1,446,161
			U.S. Fish and Wildlife Service	351
			U.S. Forest Service	5,069,991
		State (0.3%)	Montana State Highway Commission	366
			Montana Fish, Wildlife, and Parks	8,694
			Wyoming Game and Fish Commission	9,455
			Wyoming Dept. of Transportation	88
		Local Government (<0.1%)	Local Public Landowners	2,866
		Private (2.8%)	Private Mining Lands	3,690
			Other Private Landowners	186,545
		Unit 5 Subtotal		*6,731,544*
TOTAL ACRES PROPOSED FOR DESIGNATION				**26,041,316**
Areas Considered for Exclusion				
1	Northern Maine	Tribal	Maliseet Tribe, Micmic Tribe, Passamaquoddy Tribe, Penobscot Tribe	54,685
2	Northeastern Minnesota	Tribal	Grand Portage Indian Reservation, Vermillion Lake Indian Reservation	45,111
3	Northern Rocky Mountains (ID/MT)	Tribal	Flathead Indian Reservation	213,289
TOTAL ACRES CONSIDERED FOR EXCLUSION				**313,085**

Notes:

1.) Acreage values may not sum to the totals presented for each unit due to rounding error.

2.) All acreage estimates presented above exclude water.

Sources:

1.) U.S. Fish and Wildlife Service. Proposed Critical Habitat Units for the Canada Lynx. Received from the Service on March 21, 2008.

2.) Environmental Systems Research Institute, Inc. U.S. Water Bodies. Published March 1, 2004.

3.) Maine Land Use Regulation Commission (LURC). Maine LURC Parcels. Updated on July 30, 2007.

4.) J.W. Sewall Company. State on Maine Ownership Data. Updated in December, 2005.

5.) Minnesota Department of Natural Resources – Division of Forestry. State Forest Boundaries. Published on September 4, 2003 and updated in 2004-2005. Available online at: http://deli.dnr.state.mn.us.

6.) Minnesota Department of Natural Resources – Division of Parks and Recreation. State Park Statutory Boundaries. Published on January 1, 2002. Available online at: http://deli.dnr.state.mn.us.

7.) Minnesota Department of Natural Resources – Division of Ecological Services – Scientific and Natural Areas Program. Minnesota Scientific and Natural Area Boundaries. Published on September 4, 2003. Available online at: http://deli.dnr.state.mn.us.

UNIT	UNIT NAME	LANDOWNER TYPE (ACRES)		
		LANDOWNER TYPE	LANDOWNER	AREA (ACRES)

8.) Minnesota Department of Natural Resources – Division of Fish and Wildlife. State Wildlife Management Area Boundaries. Published February 14, 2006. Available online at: http://deli.dnr.state.mn.us.

9.) National Atlas of the United States. Federal Lands of the United States. Published in December, 2005. Available online at: http://nationalatlas.gov/atlasftp.html.

10.) National Atlas of the United States. Indian Lands of the United States. Published in December, 2005. Available online at: http://nationalatlas.gov/atlasftp.html.

11.) Montana Department of Administration, Information Technology Services Division, Geographic Information Services. Montana Cadastral Database. Published on January 24, 2008. Available online at: http://nris.mt.gov/nsdi/cadastral.

12.) U.S. Bureau of Land Management, Idaho State Office, Geographic Sciences. Land Status in Idaho (Federal, State, and Private Lands). Published January 1, 2008. Available online at: http://data.insideidaho.org/data/BLM/archive/statewide/landstatus_id_blm.tgz.

13.) U.S. Bureau of Land Management, Oregon State Office. Washington Surface Management Ownership. Current as of October 1, 2005.

14.) Washington Department of Natural Resources. NDMPL (Washington State Non-DNR Major Public Lands). Published in November, 2007. Available online at: http://www3.wadnr.gov/dnrapp6/dataweb/dmmatrix.html.

15.) Lincoln County Wyoming Assessor's Office in conjunction with the Lincoln County Planning Office. Lincoln County Parcels. Received from Lincoln County on April 3, 2008.

16.) Sublette County Wyoming GIS. Sublette County Ownership. Accessed online at: http://www.sublettewyo.com/gis/download/ on April 4, 2008.

17.) Teton County Wyoming GIS. Teton County Ownership. Accessed online at: http://www2.tetonwyo.org/gis/download/Default.asp on April 4, 2008.

EXHIBIT 1-3 PROPOSED CRITICAL HABITAT UNIT 1 BY LANDOWNER

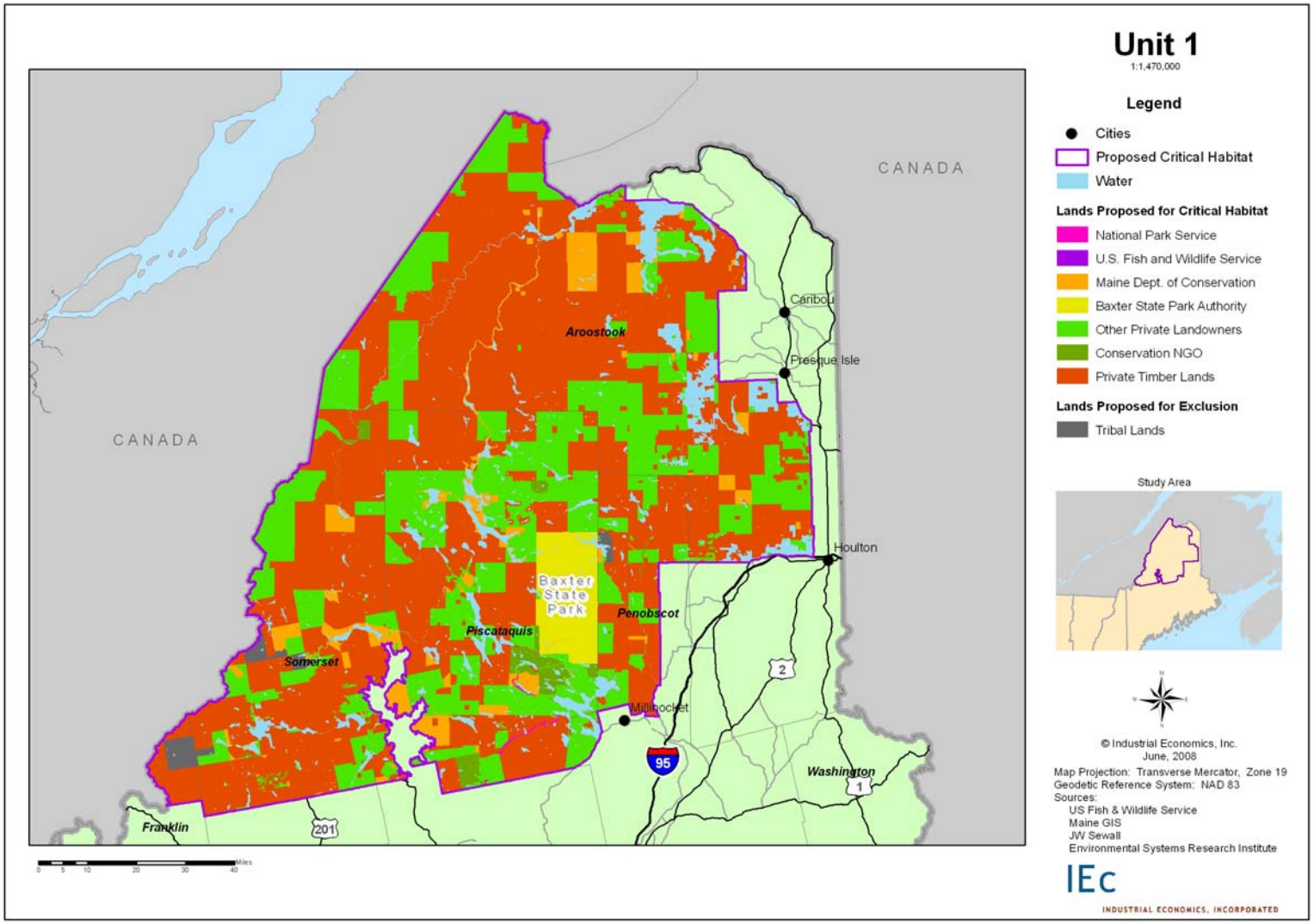


EXHIBIT 1-4 PROPOSED CRITICAL HABITAT UNIT 2 BY LANDOWNER

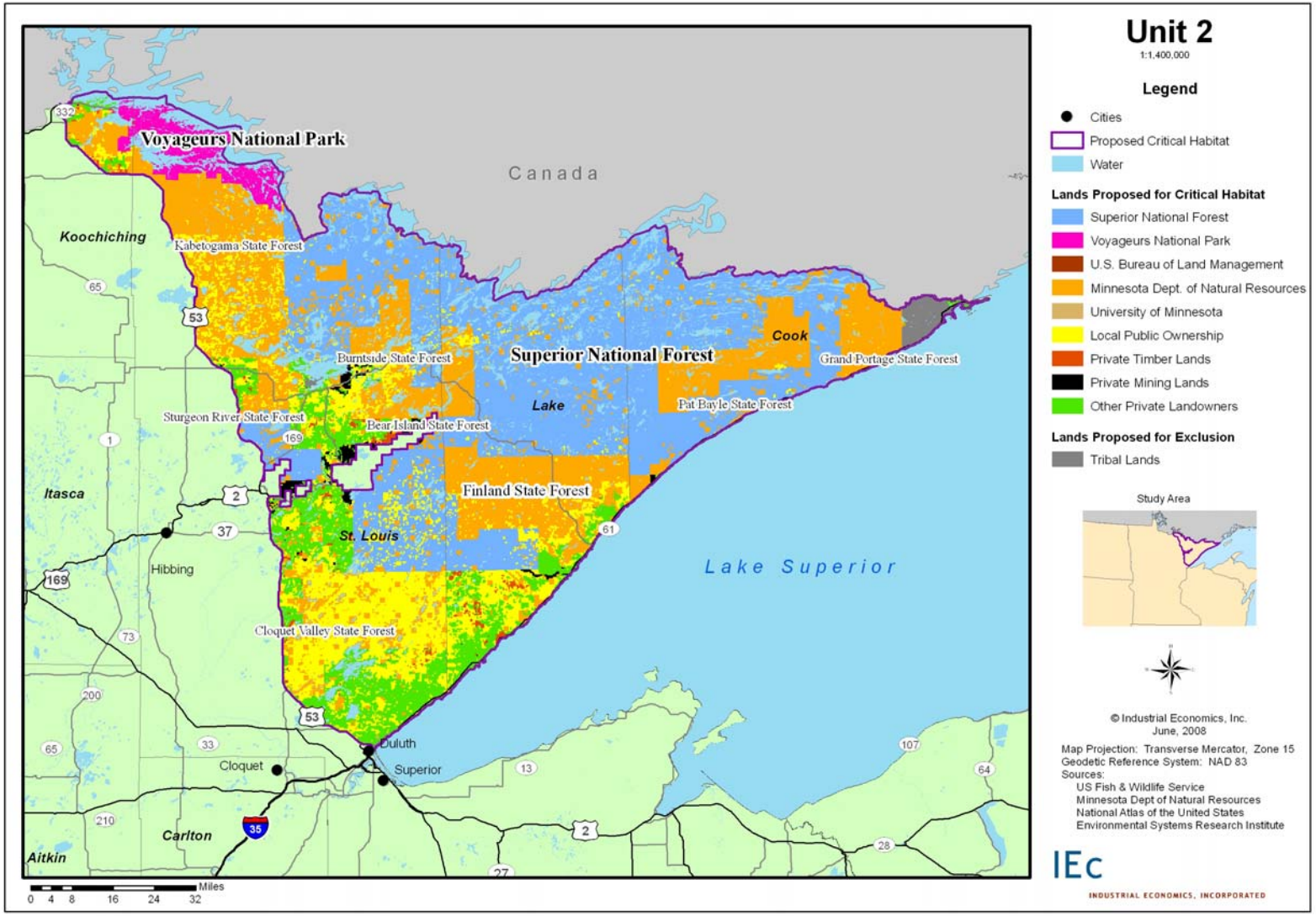


EXHIBIT 1-5 PROPOSED CRITICAL HABITAT UNIT 3 BY LANDOWNER

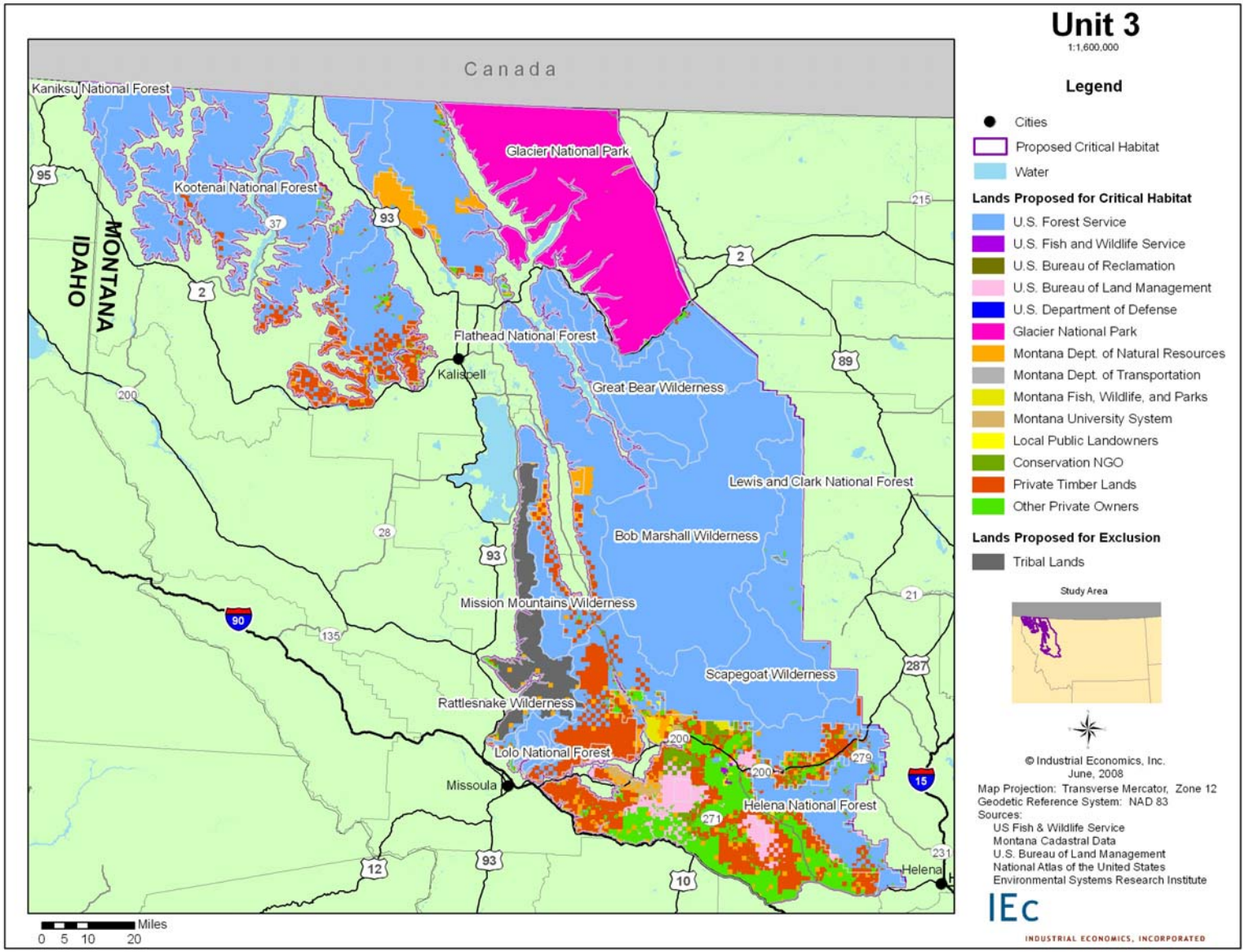


EXHIBIT 1-6 PROPOSED CRITICAL HABITAT UNIT 4 BY LANDOWNER

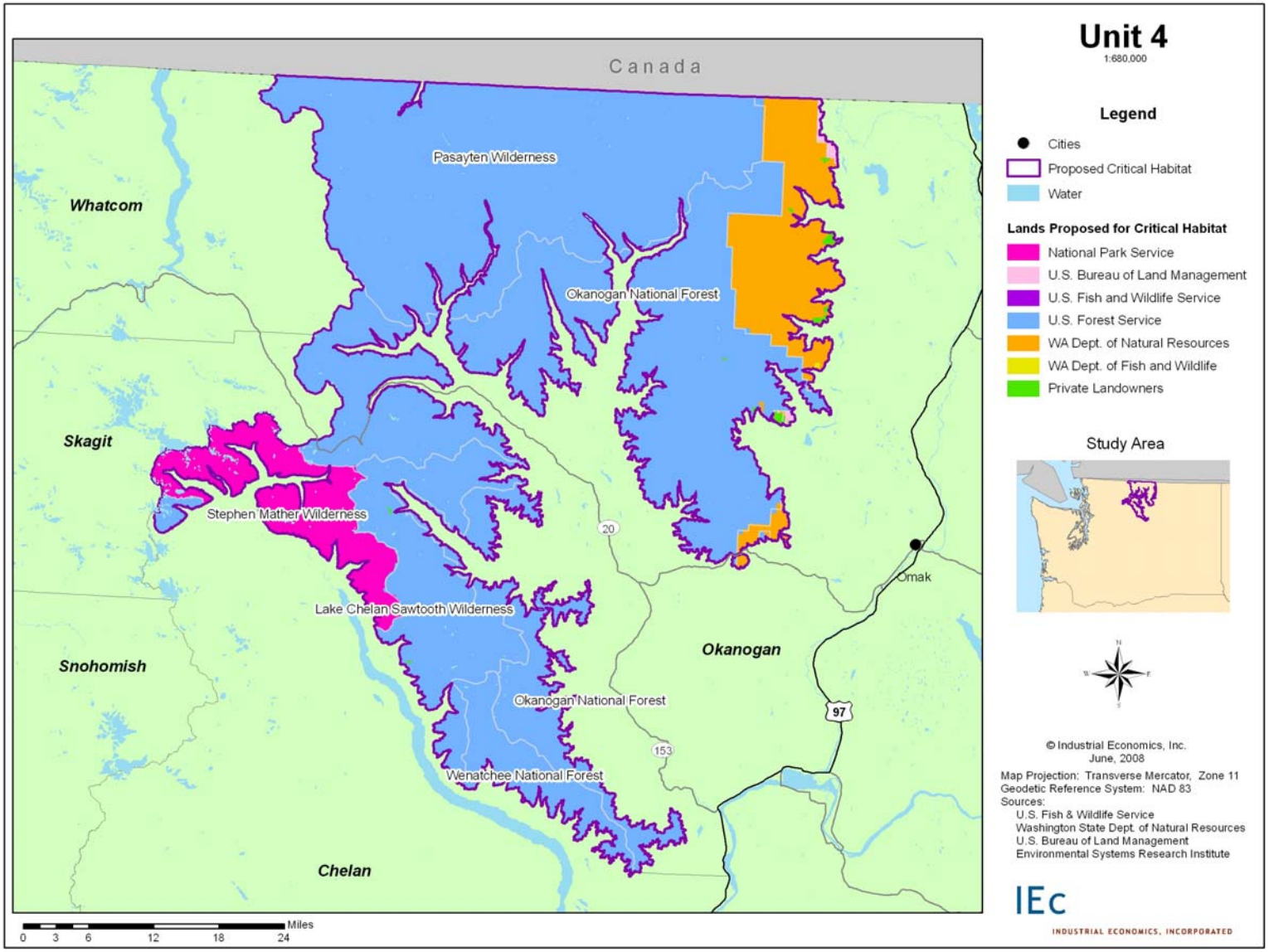
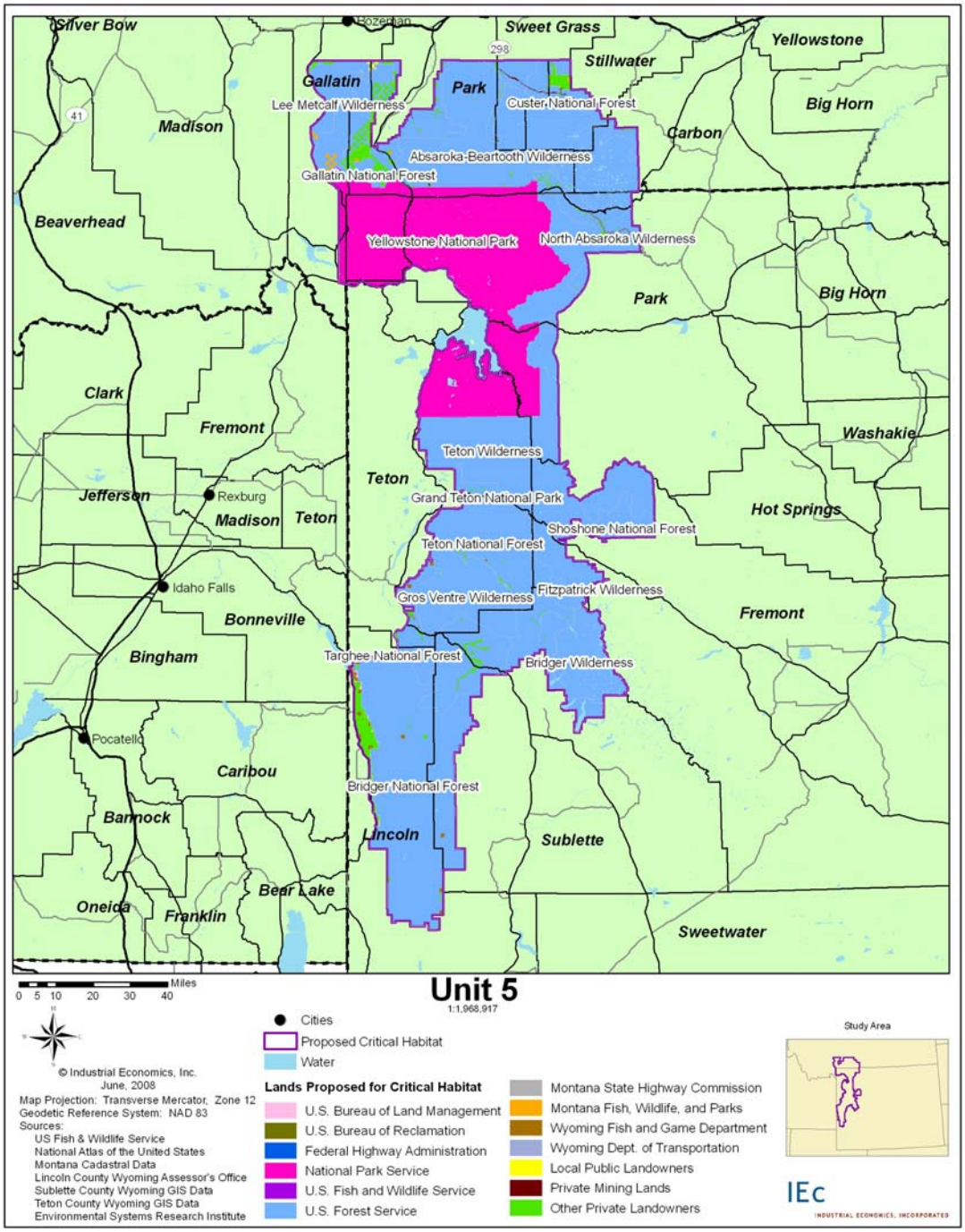


EXHIBIT 1-7 PROPOSED CRITICAL HABITAT UNIT 5 BY LANDOWNER



CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

13. The purpose of this report is to estimate the economic impact of actions taken to protect the lynx and its habitat. This analysis examines the impacts of restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the study area. This analysis employs "without critical habitat" and "with critical habitat" scenarios. The "without critical habitat" scenario represents the baseline for the analysis, considering protections already accorded the lynx; for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts are those not expected to occur absent the designation of critical habitat for the lynx. The analysis looks retrospectively at baseline impacts incurred since the species was listed (pre-designation impacts), and forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized (post-designation impacts).

14. This information is intended to assist the Secretary of the U.S. Department of the Interior (DOI) in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.[10] In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).[11]

15. This chapter describes the framework for this analysis. First, it describes the case law that led to the selection of the framework applied in this report. It then describes in economic terms the general categories of economic effects that are the focus of regulatory impact analysis, including a discussion of both efficiency and distributional effects. Next, this chapter defines the analytic framework used to measure these impacts in the context of critical habitat regulation and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis.

2.1 BACKGROUND

16. The U.S. Office of Management and Budget's (OMB) guidelines for conducting economic analysis of regulations direct Federal agencies to measure the costs of a regulatory action against a baseline, which it defines as the "best assessment of the way

[10] 16 U.S.C. §1533(b)(2).

[11] Executive Order 12866, Regulatory Planning and Review, September 30, 1993 (as amended by Executive Order 13258 (2002) and Executive Order 13422 (2007)); Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001; 5. U.S.C. §§601 *et seq*; and Pub Law No. 104-121.

the world would look absent the proposed action."[12] In other words, the baseline includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat. Impacts that are incremental to that baseline (i.e., occurring over and above existing constraints) are attributable to the proposed regulation. Significant debate has occurred regarding whether assessing the impacts of the Service's proposed regulations using this baseline approach is appropriate in the context of critical habitat designations.

17. In 2001, the U.S. Tenth Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat, regardless of whether those impacts are attributable co-extensively to other causes.[13] Specifically, the court stated,

> "The statutory language is plain in requiring some kind of consideration of economic impact in the CHD [critical habitat designation] phase. Although 50 C.F.R. 402.02 is not at issue here, the regulation's definition of the jeopardy standard as fully encompassing the adverse modification standard renders any purported economic analysis done utilizing the baseline approach virtually meaningless. We are compelled by the canons of statutory interpretation to give some effect to the congressional directive that economic impacts be considered at the time of critical habitat designation…. Because economic analysis done using the FWS's [Fish and Wildlife Service's] baseline model is rendered essentially without meaning by 50 C.F.R. § 402.02, we conclude Congress intended that the FWS conduct a full analysis of all of the economic impacts of a critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes. Thus, we hold the baseline approach to economic analysis is not in accord with the language or intent of the ESA [Endangered Species Act]."[14]

18. Since that decision, however, courts in other cases have held that an incremental analysis of impacts stemming solely from the critical habitat rulemaking is proper.[15] For example, in the March 2006 ruling that the August 2004 critical habitat rule for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

> "The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep't of the Interior,* 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the

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[12] OMB, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[13] *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

[14] *Ibid.*

[15] *Cape Hatteras Access Preservation Alliance v. Department of Interior,* 344 F. Supp. 2d 108 (D.D.C.); *Center for Biological Diversity v. United States Bureau of Land Management*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

> Service's baseline approach and the court held that the baseline approach was both consistent with the language and purpose of the ESA and that it was a reasonable method for assessing the actual costs of a particular critical habitat designation *Id* at 130. 'To find the true cost of a designation, the world with the designation must be compared to the world without it.'"[16]

19. In order to address the divergent opinions of the courts and provide the most complete information to decision-makers, this economic analysis reports both:

    a. The baseline impacts of lynx conservation from protections afforded the species absent critical habitat designation; and

    b. The estimated incremental impacts precipitated specifically by the designation of critical habitat for the species.

20. Incremental effects of critical habitat designation are determined using the Service's December 9, 2004 interim guidance on "Application of the 'Destruction or Adverse Modification' Standard Under Section 7(a)(2) of the Endangered Species Act" and information from the Service regarding what potential consultations and project modifications may be imposed as a result of critical habitat designation over and above those associated with the listing.[17] Specifically, in *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, the Ninth Circuit invalidated the Service's regulation defining destruction or adverse modification of critical habitat, and the Service no longer relies on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat.[18] Under the statutory provisions of the Endangered Species Act (Act), the Service determines destruction or adverse modification on the basis of whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional to serve its intended conservation role for the species. A detailed description of the methodology used to define baseline and incremental impacts is provided later in this Chapter.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

21. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the lynx and its habitat (hereinafter referred to collectively as "lynx conservation efforts"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if the set of activities that may take place

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[16] *Center for Biological Diversity et al, Plaintiffs, v. United States Bureau of Land Management et. al, Defendants and American Sand Association, et al, Defendant Intervenors*. Order re: Cross Motions for Summary Judgment, Case 3:03-cv-02509 Document 174 Filed 03/14/2006, pages 44-45.

[17] Director, U.S. Fish and Wildlife Service, Memorandum to Regional Directors and Manager of the California-Nevada Operations Office, Subject: Application of the "Destruction or Adverse Modification" Standard under Section 7(a)(2) of the Endangered Species Act, dated December 9, 2004.

[18] *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

on a parcel of land is limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of lynx conservation efforts.

22. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry. This information may be used by decision-makers to assess whether the effects of species conservation efforts unduly burden a particular group or economic sector. For example, while conservation efforts may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience relatively greater impacts. The differences between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

2.2.1 EFFICIENCY EFFECTS

23. At the guidance of OMB and in compliance with Executive Order 12866 "Regulatory Planning and Review," Federal agencies measure changes in economic efficiency in order to understand how society, as a whole, will be affected by a regulatory action. In the context of regulations that protect lynx habitat, these efficiency effects represent the opportunity cost of resources used or benefits foregone by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surpluses in affected markets.[19]

24. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal land manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

25. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection measures that reduce or preclude the development of large areas of land may

[19] For additional information on the definition of "surplus" and an explanation of consumer and producer surplus in the context of regulatory analysis, see: Gramlich, Edward M., A Guide to Benefit-Cost Analysis (2nd Ed.), Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, EPA 240-R-00-003, September 2000, available at http://yosemite.epa.gov/ee/epa/eed.nsf/ webpages/Guidelines.html.

shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the market.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

26. Measurements of changes in economic efficiency focus on the net impact of conservation efforts, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.[20] This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

Impacts on Small Entities and Energy Supply, Distribution, and Use

27. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the Regulatory Flexibility Act, might be affected by future species conservation efforts.[21] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation efforts on the energy industry and its customers.[22]

Regional Economic Effects

28. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.

29. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider

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[20] U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

[21] 5 U.S.C. §§601 *et seq*.

[22] Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by impacted businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

30. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

31. Impacts associated with lynx conservation efforts largely include decreased pre-commercial thinning in forest habitat; while in most cases, the overall quantity of timber produced is not anticipated to be affected, the decreased opportunity for businesses to participate in pre-commercial thinning may affect regional economies. As a result, information is provided in Chapter 4 of this analysis on the potential regional affect of this change in activity.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

32. This analysis identifies those economic activities most likely to threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid or minimize such threats within the boundaries of the study area, as described in Chapter 1.

33. This section provides a description of the methodology used to separately identify baseline impacts and incremental impacts stemming from the proposed designation of critical habitat for the lynx. This evaluation of impacts in a "with critical habitat designation" versus a "without critical habitat designation" framework effectively measures the net change in economic activity associated with the proposed rulemaking.

2.3.1 IDENTIFYING BASELINE IMPACTS

34. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, which provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. This "without critical habitat designation" scenario also considers a wide range of additional factors beyond the compliance costs of regulations that provide protection to the listed species. As recommended by OMB, the baseline incorporates, as appropriate, trends in market conditions, implementation of other regulations and policies by the Service and other government entities, and trends in other factors that have the potential to affect economic costs and benefits, such as the rate of regional economic growth in potentially affected industries.

35. Baseline impacts include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species.

- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations under the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are considered baseline impacts. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-2.
- Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[23] The economic impacts associated with this section manifest themselves in sections 7 and 10.
- Under section 10(a)(1)(B) of the Act, an entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.[24] The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately avoided or minimized. The development and implementation of HCPs is considered a baseline protection for the species and habitat unless the HCP is determined to be precipitated by the designation of critical habitat, or the designation influences stipulated conservation efforts under HCPs.

Enforcement actions taken in response to violations of the Act are not included in this analysis.

36. In the case of the lynx, critical habitat was previously designated in 2006.[25] The impacts of historical efforts to conserve critical habitat since that time are assigned to the baseline, as these costs have already been incurred and therefore are unaffected by the proposed rule. Furthermore, future impacts resulting from compliance with existing lynx management decisions (for example, as described within existing lynx management plans) that may incorporate critical habitat concerns because of the 2006 designation are also assigned the baseline. This is because the conservation direction now existing in these plans is unlikely to be affected by this proposed critical habitat rule.

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[23] 16 U.S.C. 1532.

[24] U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at http://endangered.fws.gov/hcp/.

[25] 71 FR 66007.

37. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction. If compliance with the Clean Water Act or State environmental quality laws, for example, protects habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Of note, however, is that such efforts may not be considered baseline in the case that they would not have been triggered absent the designation of critical habitat. In these cases, they are considered incremental impacts and are discussed below.

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

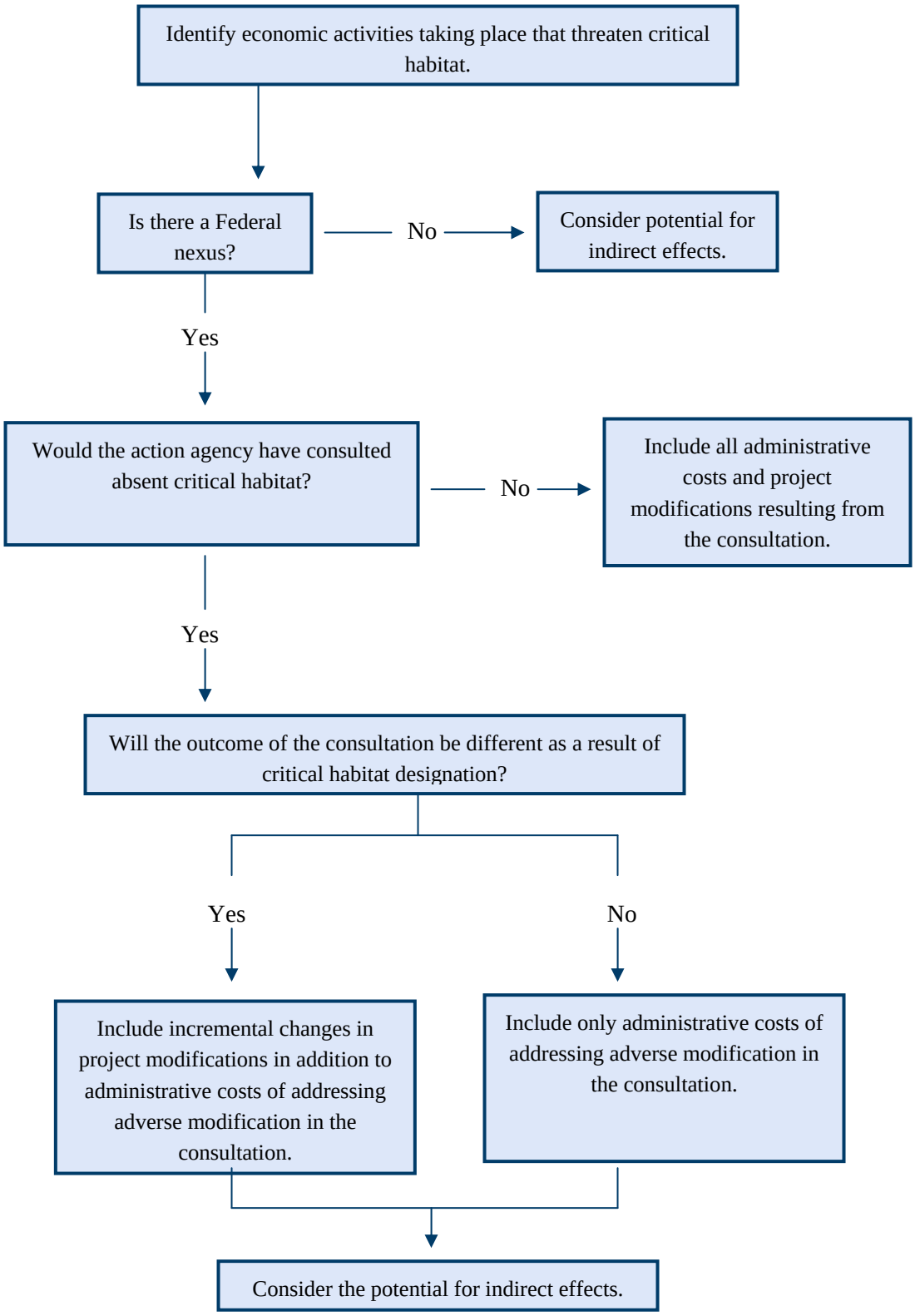
38. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts due to existing required or voluntary conservation efforts being undertaken due to other Federal, State, and local regulations or guidelines.

39. When critical habitat is designated, section 7 requires Federal agencies to ensure that their actions will not result in the destruction or adverse modification of critical habitat (in addition to considering whether the actions are likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in section 7 consultations, and the additional impacts of implementing project modifications resulting from the protection of critical habitat are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental impacts of the rulemaking.

40. Exhibit 2-1 depicts the decision analysis regarding whether an impact should be considered incremental. The following sections describe this decision tree in detail.

41. Incremental impacts may be the direct compliance costs associated with additional effort for forecast consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional project modifications that would not have been required under the jeopardy standard. Additionally, incremental impacts may include indirect impacts resulting from reaction to the potential designation of critical habitat (e.g., implementing lynx management direction in an effort to avoid designation of critical habitat), triggering of additional requirements under State or local laws intended to protect sensitive habitat, and uncertainty and perceptional effects on markets.

EXHIBIT 2-1 IDENTIFYING INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION



Direct Impacts

42. The direct, incremental impacts of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat during section 7 consultations. The two categories of direct, incremental impacts of critical habitat designation are: 1) the administrative costs of conducting section 7 consultation; and 2) implementation of any project modifications requested by the Service through section 7 consultation to avoid or minimize potential destruction or adverse modification of critical habitat.

Administrative Section 7 Consultation Costs

43. Parties involved in section 7 consultations include the Service, a Federal "action agency," and in some cases, a private entity involved in the project or land use activity. The action agency (i.e., the Federal nexus necessitating the consultation) serves as the liaison with the Service. While consultations are required for activities that involve a Federal nexus and may jeopardize the continued existence of the species regardless of whether critical habitat is designated, the designation may increase the effort for consultations in the case that the project or activity in question may adversely modify critical habitat. Administrative efforts for consultation may therefore result in both baseline and incremental impacts.

44. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

1. **Additional effort to address adverse modification in a new consultation -** New consultations taking place after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort required to consider critical habitat is considered an incremental impact of the designation.

2. **Re-initiation of consultation to address adverse modification -** Consultations that have already been completed on a project or activity may require re-initiation to address critical habitat. In this case, the costs of re-initiating the consultation, including all associated administrative and project modification costs are considered incremental impacts of the designation.

3. **Incremental consultation resulting entirely from critical habitat designation -** Critical habitat designation may trigger additional consultations that may not occur absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not, or consultations resulting from the new information about the potential presence of the species provided by the designation). Such consultations may, for example, be triggered in critical habitat areas that are not occupied by the species. All associated administrative and project modification costs

of incremental consultations are considered incremental impacts of the designation.

45. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation, as it may not be possible to predict the precise outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in a range of estimated administrative costs of consultation. For simplicity, the average of the range of costs in each category is applied in this analysis.

46. Exhibit 2-2 provides estimated administrative consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions were applied.

- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part or all of the costs, respectively, will be attributed to the proposed rule.
- Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review and report writing), and therefore incremental administrative costs of considering adverse modification in consultations precipitated by the listing result in the least incremental effort, roughly one-quarter of the cost of the entire consultation. The remaining three-quarters of the costs are attributed to consideration of the jeopardy standard in the baseline scenario. This latter amount also represents the cost of a consultation that only considers adverse modification (e.g., an incremental consultation for activities in unoccupied critical habitat) and is attributed wholly to critical habitat.
- Incremental costs of the re-initiation of a previously completed consultation because of the critical habitat designation are assumed to be approximately half the cost of a consultation considering both jeopardy and adverse modification. This assumes that re-initiations are less time-consuming as the groundwork for the project has already been considered in terms of its effect on the species. However, because the previously completed effort must be re-opened, they are more costly than simply adding consideration of critical habitat to a consultation already underway.

EXHIBIT 2-2 RANGE OF ADMINISTRATIVE CONSULTATIONS COSTS (2008 DOLLARS)

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	$405	n/a	$788	n/a	$1,130
Informal	$1,760	$2,250	$1,540	$1,500	$7,130
Formal	$3,980	$4,500	$2,630	$3,600	$15,000
Programmatic	$12,000	$9,940	n/a	$4,200	$26,100
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	**SERVICE**	**FEDERAL AGENCY**	**THIRD PARTY**	**BIOLOGICAL ASSESSMENT**	**TOTAL COSTS**
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	$540	n/a	$1,050	n/a	$1,500
Informal	$2,350	$3,000	$2,050	$2,000	$9,500
Formal	$5,300	$6,000	$3,500	$4,800	$20,000
Programmatic	$16,000	$13,300	n/a	$5,600	$34,800
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION (UNOCCUPIED HABITAT)					
Technical Assistance	$405	n/a	$788	n/a	$1,130
Informal	$1,760	$2,250	$1,540	$1,500	$7,130
Formal	$3,980	$4,500	$2,630	$3,600	$15,000
Programmatic	$12,000	$9,940	n/a	$4,200	$26,100
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	$270	n/a	$525	n/a	$750
Informal	$1,180	$1,500	$1,030	$1,000	$4,750
Formal	$2,650	$3,000	$1,750	$2,400	$10,000
Programmatic	$7,980	$6,630	n/a	$2,800	$17,400
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS ABOVE OF CONSIDERING JEOPARDY)					
Technical Assistance	$135	n/a	$263	n/a	$375
Informal	$588	$750	$513	$500	$2,380
Formal	$1,330	$1,500	$875	$1,200	$5,000
Programmatic	$3,990	$3,310	n/a	$1,400	$8,700

Source: IEc analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2008, and a review of consultation records from several Service field offices across the country conducted in 2002.
Notes:
1. Totals may not sum due to rounding.
2. Estimates reflect average hourly time required by staff.

Section 7 Project Modification Impacts

47. Section 7 consultation considering critical habitat may also result in additional project modification recommendations specifically addressing potential destruction or adverse modification of critical habitat. For forecast consultations considering jeopardy and adverse modification, and for re-initiations of past consultations to consider critical habitat, the economic impacts of project modifications undertaken to avoid or minimize adverse modification are considered incremental impacts of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), impacts of all associated project modifications are assumed to be incremental impacts of the designation. This is summarized below.

1. **Additional effort to address adverse modification in a new consultation -** Only project modifications above and beyond what would be requested to avoid or minimize jeopardy are considered incremental.
2. **Re-initiation of consultation to address adverse modification -** Only project modifications above and beyond what was requested to avoid or minimize jeopardy are considered incremental.
3. **Incremental consultation resulting entirely from critical habitat designation -** Impacts of all project modifications are considered incremental.

Indirect Impacts

48. The designation of critical habitat may, under certain circumstances, affect actions that do not have a Federal nexus and thus are not subject to the provisions of section 7 under the Act. Indirect impacts are those unintended changes in economic behavior that may occur outside of the Act, through other Federal, State, or local actions, and that are caused by the designation of critical habitat. This section identifies common types of indirect impacts that may be associated with the designation of critical habitat. Importantly, these types of impacts are not always considered incremental. In the case that these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline impacts in this analysis.

Habitat Conservation Plans

49. Under section 10 of the Act, landowners seeking an incidental take permit must develop an HCP to counterbalance the potential harmful effects that an otherwise lawful activity may have on a species. As such, the purpose of the habitat conservation planning process is to ensure that the effects of incidental take are adequately avoided or minimized. Thus, HCPs are developed to ensure compliance with section 9 of the Act and to meet the requirements of section 10 of the Act.

50. Application for an incidental take permit and completion of an HCP are not required or necessarily recommended by a critical habitat designation. However, in certain situations the new information provided by the proposed critical habitat rule may prompt a landowner to apply for an incidental take permit. For example, a landowner may have

been previously unaware of the potential presence of the species on his or her property, and expeditious completion of an HCP may offer the landowner regulatory relief in the form of exclusion from the final critical habitat designation. In this case, the effort involved in creating the HCP and undertaking associated conservation efforts are considered an incremental effect of designation. No specific plans to prepare new HCPs in response to this proposed designation were identified. As discussed in Chapter 4, however, this analysis similarly considers the potential for private landowners in Unit 1 to implement lynx management guidelines described by the Service's Maine Field Office in order to avoid critical habitat designation.

Other State and Local Laws

51. Under certain circumstances, critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these impacts would not have been triggered absent critical habitat designation, they are considered indirect, incremental impacts of the designation.

52. The California Environmental Quality Act (CEQA), for example, requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were "categorically exempt" from preparing an Environmental Impact Report under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation.

53. While this proposed rule is not expected to trigger changes to the implementation of State regulations, Chapter 5 considers the extent to which counties containing lynx critical habitat may differently manage development projects.

Additional Indirect Impacts

54. In addition to the indirect effects of compliance with other laws or triggered by the designation, project proponents, land managers and landowners may face additional indirect impacts, including the following:

- **Time Delays -** Both public and private entities may experience incremental time delays for projects and other activities due to requirements associated with the need to reinitiate the section 7 consultation process and/or compliance with other laws triggered by the designation. To the extent that delays result from the designation, they are considered indirect, incremental impacts of the designation.
- **Regulatory Uncertainty -** The Service conducts each section 7 consultation on a case-by-case basis and issues a biological opinion on formal consultations based on species-specific and site-specific information. As a result, government agencies

and affiliated private parties who consult with the Service under section 7 may face uncertainty concerning whether project modifications will be recommended by the Service and what the nature of these modifications will be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat on specific activities. Where information suggests that this type of regulatory uncertainty stemming from the designation may affect a project or economic behavior, associated impacts are considered indirect, incremental impacts of the designation. In the case of the lynx, regulatory uncertainty may affect private timberland owners (as described in Chapter 4) or snowmobilers (as described in Chapter 6); however, data limitations prevent their quantification in this analysis.

- **Stigma -** In some cases, the public may perceive that critical habitat designation may result in limitations on private property uses above and beyond those associated with anticipated project modifications and regulatory uncertainty described above. Public attitudes about the limits or restrictions that critical habitat may impose can cause real economic effects to property owners, regardless of whether such limits are actually imposed. All else equal, a property that is designated as critical habitat may have a lower market value than an identical property that is not within the boundaries of critical habitat due to perceived limitations or restrictions. As the public becomes aware of the true regulatory burden imposed by critical habitat, the impact of the designation on property markets may decrease. To the extent that potential stigma effects on markets are probable and identifiable, these impacts are considered indirect, incremental impacts of the designation. Stigma effects are possible in the case of the lynx; however data limitations prevent their quantification in this analysis.

2.3.3 BENEFITS

55. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[26] OMB's Circular A-4 distinguishes two types of economic benefits: *direct benefits and ancillary benefits*. Ancillary benefits are defined as favorable impacts of a rulemaking that are typically unrelated, or secondary, to the statutory purpose of the rulemaking.[27]

56. In the context of critical habitat, the primary purpose of the rulemaking (i.e., the direct benefit) is the potential to enhance conservation of the species. The published economics literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to

[26] Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

[27] U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf.

conduct new research.[28] *Rather than rely on economic measures, the Service believes that the direct benefits of the proposed rule are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

57. Critical habitat designation may also generate ancillary benefits. Critical habitat aids in the conservation of species specifically by protecting the primary constituent elements on which the species depends. To this end, critical habitat designation can result in maintenance of particular environmental conditions that may generate other social benefits aside from the preservation of the species. That is, management actions undertaken to conserve a species or habitat may have coincident, positive social welfare implications, such as increased recreational opportunities in a region. While they are not the primary purpose of critical habitat, these ancillary benefits may result in gains in employment, output, or income that may offset the direct, negative impacts to a region's economy resulting from actions to conserve a species or its habitat.

58. It is often difficult to evaluate the ancillary benefits of critical habitat designation. To the extent that the ancillary benefits of the rulemaking may be captured by the market through an identifiable shift in resource allocation, they are factored into the overall economic impact assessment in this report. For example, if habitat preserves are created to protect a species, the value of existing residential property adjacent to those preserves may increase, resulting in a measurable positive impact. Where data are available, this analysis attempts to capture the *net* economic impact (i.e., the increased regulatory burden less any discernable offsetting market gains), of species conservation efforts imposed on regulated entities and the regional economy.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

59. Although the entire study area, as defined in Chapter 1, is analyzed, emphasis is placed on understanding impacts in areas proposed for final designation. Results are presented by critical habitat unit. Because of the broad geographic scale of the units, results are also presented in each of the chapters according to landowner type, as defined in the fourth column of Exhibit 1-1. These landowner types are referred to as "subunits" in this analysis.

2.3.5 ANALYTIC TIME FRAME

60. The analysis estimates impacts based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available. "Pre-designation" economic impacts will be presented from 2000, the year of the species' final listing, to 2008. "Post-designation" impacts will be forecast beginning in 2009, the year of expected final critical habitat designation, and will be based on the average planning periods for potentially affected activities. Limited planning information is available for most activities to forecast activity levels for projects (e.g., development, mining, recreation projects) beyond a 20-year time frame. Where information is available to reliably forecast

[28] Ibid.

activities beyond the 20-year time frame, however, it will be incorporated into the analysis. For example, timber harvests are typically on a 40 to 80 year rotation within the study area allowing us to address forest management impacts over a longer time period.

61. Annualized impacts will be emphasized throughout the report so that impacts to activities across varying time frames (based on best available information) will be comparable. Pre-designation impacts (i.e., costs occurring from the time of listing to the designation of critical habitat) will be reported separately from the post-designation impacts (i.e., costs likely to occur after the designation of critical habitat).

2.4 INFORMATION SOURCES

62. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, Federal, State, and local governments and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records, and existing habitat management and conservation plans that consider the lynx. Due to the high number of entities contacted, the complete list of contacted stakeholders is within the reference section at the end of this document.

CHAPTER 3 | LYNX MANAGEMENT PLANS

3.1 INTRODUCTION

63. Existing lynx management plans guide lynx conservation efforts related to land use activities considered to be risk factors for the species and its habitat. These plans inform lynx management on approximately 15.2 million acres of Federal, State, and private land, covering approximately 60 percent of the study area. This analysis considers the conservation efforts outlined in these plans in characterizing the baseline of lynx conservation over the geographic areas to which the plans are applied. In certain cases, these plans also help forecast conservation efforts that may be requested via section 7 consultation regarding a project or activity.

64. This chapter describes the various lynx management plans and quantifies the costs of developing these plans as baseline impacts of lynx conservation. Impacts of implementing the various lynx management plans are not included in this chapter; impacts of implementation are described by activity in Chapters 4 through 8 of this report. Lynx management plans developed for lands within the study area were created in response to the species' listing in 2000. These plans are important to this analysis because their existence drives the results of this analysis that incremental impacts of the critical habitat designation are expected to be minimal and administrative. That is, because the existing lynx management plans are being implemented across the majority of the study area, and because these plans incorporate the best available information regarding species and habitat conservation needs, critical habitat designation for the lynx is not expected to result in changes to land management of areas covered by the plans.

65. Exhibits 3-1 and 3-2 provide information on the extent and distribution of the lynx management plans across the study area. Pre- and post-designation impacts are detailed by subunit in Exhibits 3-3 and 3-4 of this chapter, respectively.

3.2 LYNX MANAGEMENT PLANS OVERVIEW

66. Exhibit 3-1 highlights general information about each of the lynx management plans being applied within the study area. These plans share similar goals of avoiding lynx habitat fragmentation by preserving or managing for a desired amount of snowshoe hare and lynx habitat within a given area. Because these plans incorporate the best available information regarding species and habitat conservation, the designation of critical habitat is not expected to affect the lynx conservation efforts described in these plans.

EXHIBIT 3-1 LANDS WITH LYNX MANAGEMENT PLANS

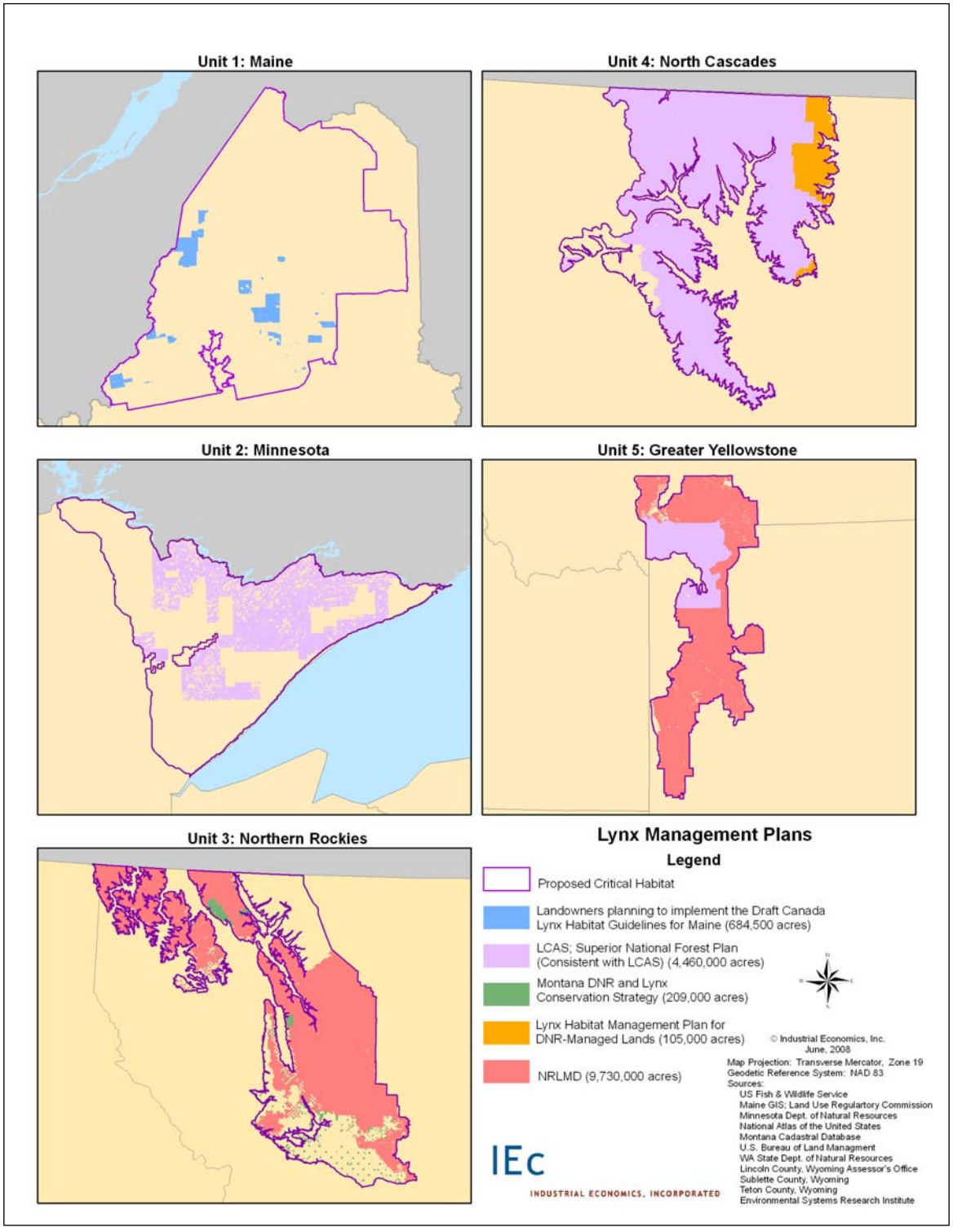


EXHIBIT 3-2 SUMMARY OF CANADA LYNX MANAGEMENT PLANS

MANAGEMENT PLAN (YEAR FINALIZED)	ACTIVITIES COVERED	CONSERVATION PLANNING SCALE	SUBUNITS APPLIED[1]	TREATMENT IN THIS ANALYSIS (AS DETAILED IN CHAPTERS 4 - 8)
Lynx Conservation Assessment and Strategy (LCAS) - (2000)[a]	• Timber management • Prescribed and wild fire • Livestock grazing • Recreation • Land Exchanges	• Lynx Analysis Units (LAUs)	• Unit 2 – U.S. Forest Service (USFS)[2] • Unit 3 – USFS • Unit 3 – U.S. Bureau of Land Management (BLM) • Unit 4 – USFS • Unit 4 – BLM • Unit 5 - USFS • Unit 5 – BLM • Unit 5 – National Park Service (NPS)	• Pre-designation impacts are quantified for all subunits implementing the LCAS according to when they began implementing the plan. • Post-designation impacts of implementing the LCAS are baseline impacts for all subunits implementing the LCAS. • No subunit not currently implementing the LCAS is expected to begin implementing the plan in the future. • For Units 3 and 5 USFS subunits, this analysis quantifies impacts of compliance with LCAS only from 2000 through 2006; in 2007 these subunits began implementing the NRLMD. • Of the NPS land in Unit 5, the LCAS is only implemented in Yellowstone National Park (since 2003). According to the NPS at Yellowstone, implementing the LCAS to address lynx conservation has not in the last five years measurably changed their operations or resulted in economic impacts and is not expected to in the future. Thus, no economic impacts are quantified of implementing the plan at Yellowstone.[b]
Northern Rockies Lynx Management Direction (NRLMD) – (2007)[c]	• Vegetation Management (includes fire and timber) • Livestock grazing • Human Use management: Recreation, Mineral and Energy development, Roads	• Lynx habitat within LAUs	• Unit 3 – USFS • Unit 5 – USFS	• Pre-designation impacts are quantified for all subunits implementing the NRLMD according to when they began implementing the plan. • Post-designation impacts of implementing the NRLMD are baseline impacts for all subunits currently implementing the plan. • No subunit not currently implementing the NRLMD is expected to begin implementing the plan in the future. • National Forests in Units 3 & 5 began implementing the NRLMD following its development in 2007. Prior to 2007, National Forests in Units 3 & 5 had been implementing the LCAS.
U.S. Fish and Wildlife Service Maine Field Office, Draft Canada Lynx Habitat Guidelines for Maine – (NOT FINALIZED, 2007 DRAFT)[d]	• Timber management (including forest roads)	• Lynx habitat units of 35,000 acres	• Unit 1 – Conservation NGO • Unit 1 – Private Timberlands • Unit 1 – Tribal Lands	• Five landowners owning approximately 10% of the land in Unit 1 have committed to applying these Guidelines: 1) the Nature Conservancy, 2) the Forest Society of Maine, 3) Katahdin Forest Management LLC, 4) Elliotsville Plantation, Inc., and 5) the Passamaquoddy Tribe. • Each of the five landowners identified are still in the process of developing management plans incorporating the Guidelines. No landowner has begun to implement the Maine lynx guidelines on their land. • A qualitative discussion of the uncertainty regarding whether landowners in addition to the five identified may adopt the Guidelines in the future is provided in Chapter 4. • Baseline impacts of developing land management plans according to the Guidelines are quantified only for the five landowners who have agreed to implement them. Because of the uncertainty of the ultimate shape of the Guidelines, this analysis does not quantify future impacts of implementing the guidelines. Such impacts related to the potential future adoption of the Maine lynx guidelines may be baseline or incremental depending on a landowner's reason for adopting the guidelines as described in Chapter 4.

MANAGEMENT PLAN (YEAR FINALIZED)	ACTIVITIES COVERED	CONSERVATION PLANNING SCALE	SUBUNITS APPLIED[1]	TREATMENT IN THIS ANALYSIS (AS DETAILED IN CHAPTERS 4 - 8)
Montana Department of Natural Resources and Conservation HCP – (NOT FINALIZED, 2005 DRAFT)[e]	• Timber/forest management	• Lynx Management Areas	Unit 3 – Montana Department of Natural Resources and Conservation (MT DNRC)	• Although the MT DNRC has not yet implemented the conservation measures included in their Draft HCP, they have been implementing a set of "administrative rules" related to forest management considering the lynx since 2003. • According to the MR DNRC, forest management according to the HCP are expected to be similar to those specified in the administrative rules. As a result impacts of applying the administrative rules and of applying the HCP are forecast in this analysis to be comparable.[f] • Pre-designation impacts include costs related to the development of administrative rules and the draft HCP, species research, and changes to forest management activities. • Post-designation baseline impacts include costs related to future work on the HCP and continued forest management conservative of the lynx. • No post-designation incremental impacts are quantified related to the MT DNRC HCP.
Lynx Habitat Management Plan for DNR-Managed Lands – (2006)[g]	• Forest/Timber management • Recreation • Livestock grazing	• Ecoprovinces • Lynx Management Zones • LAUs • Small Ecosystem/ Ecological community	Unit 4 – Washington Department of Natural Resources (WA DNR)	• Although the WA DNR habitat management plan was not finalized until 2006, the WA DNR began implementing conservation measures comparable to those in their habitat management plan following the species' listing in 2000. • Pre-designation impacts to WA DNR include impacts related to the conservation efforts taken between 2000 and 2006, habitat management plan development, and habitat management plan implementation. • Post-designation baseline impacts to WA DNR include impacts related to the continued implementation of their habitat management plan. • No post-designation incremental impacts are quantified related to the WA DNR habitat management plan.
Lynx Recovery Plan, Washington Department of Fish and Wildlife – (2001)[h]	• Hunting/Trapping • Transportation • Coordination with land managers throughout the State • Research/Surveying	• Lynx Management Zones	Unit 4 – Washington Department of Fish and Wildlife (WA DFW)	• Pre-designation impacts to WA DFW are quantified for recovery plan development and implementation. • Post-designation baseline impacts to WA DFW are quantified for continued recovery plan implementation. • No post-designation incremental impacts are quantified related to the WA DFW recovery plan.

SOURCES:

a) Ruediger, B., et al. 2000. Canada lynx conservation assessment and strategy 2nd Edition. August 2000 (as amended Oct. 23-24, 2001, May 6-8, 2003 and Nov. 12-13, 2003). USDA Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and National Park Service.

b) Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.

c) U.S. Department of Agriculture, Forest Service. 2007. Northern Rockies Lynx Management Direction. Final Environmental Impact Statement, and Record of Decision. National Forests in Montana, and parts of Idaho, Wyoming, and Utah.

d) McCollough, M. 2007. Draft Canada Lynx Habitat Management Guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office.

MANAGEMENT PLAN (YEAR FINALIZED)	ACTIVITIES COVERED	CONSERVATION PLANNING SCALE	SUBUNITS APPLIED[1]	TREATMENT IN THIS ANALYSIS (AS DETAILED IN CHAPTERS 4 - 8)

SOURCES (continued):

e) Montana Department of Natural Resources and Conservation (DNRC), Trust Land Management Division. 2005. Montana DNRC Forested Trust Land Habitat Conservation Plan, Draft Conservation Strategy for Canada Lynx.

f) Personal communication with Timothy Spoelma of the Montana Department of Natural Resources, June 18, 2008.

g) Washington State Department of Natural Resources (DNR). 2006. Lynx Habitat Management Plan for DNR-managed lands.

h) Stinson, D. W. 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.

NOTES:

1) For all subunits implementing a specific management plan, each subunit is considered to have implemented the management plan since the year it was finalized and is expected to continue implementing the management plan through the final year of the analysis (2028), unless otherwise noted.

2) USFS land in Unit 2 consists only of Superior National Forest. In 2004, Superior National Forest developed a revised forest management plan, which incorporates the standards and guidelines contained in the LCAS.

3.2.1 LYNX CONSERVATION ASSESSMENT AND STRATEGY (LCAS)

67. The Service, U.S. Forest Service (USFS), Bureau of Land Management (BLM), and National Park Service (NPS) cooperatively developed the LCAS to guide lynx management. A 2006 Conservation Agreement between the Service and the USFS describes the agencies' intent to use the LCAS both for coordinating lynx management efforts and streamlining section 7 consultations.[29] A similar Conservation Agreement between the Service and the BLM was signed in 2000 and the BLM units within the proposed critical habitat have incorporated LCAS guidance into their management plans through amendments following the expiration of this agreement.[30] The following portions of the study area for this analysis are covered by the LCAS (approximately 4.46 million acres):

- USFS lands in Units 2 and 4 (Superior and Okanogan-Wenatchee National Forests),
- BLM lands in Units 3, 4, and 5,
- NPS land in Unit 5 (Yellowstone National Park).[31]

68. For lands covered by the LCAS, this analysis quantifies the ongoing impacts of complying with the LCAS as a baseline impact of lynx conservation (Chapters 4 through 8). The economic impacts associated with implementation of the LCAS derive primarily from limits on pre-commercial thinning of forests as discussed in Chapter 4.

69. Some Federal lands, such as Glacier National Park and Voyageurs National Park do not currently implement, and are not expected to adopt, the LCAS. Although these areas were designated as critical habitat for the lynx in 2006, they have not formally applied the LCAS although they are currently designated as critical habitat for the lynx, and are therefore not expected to do so in the case that they are included in the revised critical habitat designation.[32]

70. While the LCAS technically only covers Federal lands, the 2008 proposed rule designating critical habitat for the lynx notes that "many of the conservation measures are pertinent for non-Federal lands."[33] The LCAS has therefore been referenced by the Service in its project modification recommendations during section 7 consultation for the

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[29] U.S. Fish and Wildlife Service and U.S. Forest Service. Canada Lynx Conservation Agreement. USFS Agreement #00-MU-11015600-013.

[30] Personal communication with Shawn Sartorius, U.S. Fish and Wildlife Service on September 19, 2008.

[31] Note that Glacier National Park, Voyageurs National Park, and North Cascades National Park are not actively implementing the LCAS. (Personal communication with Steve Gniadek, January 11, 2006; Written communication from Steve Windels, Biologist, Voyageurs National Park, May 30, 2008; Personal communication with Bob Kuntz, North Cascades National Park, March 6, 2006.)

[32] Written communication from Steve Windels, Biologist, Voyageurs National Park, May 30, 2008.

[33] 73 FR 10860, page 10868.

lynx.[34] In addition, other lynx management plans (e.g., NRLMD) rely on the information developed in the LCAS, augmented with newer or more region-specific information to inform lynx conservation. This analysis does not assume that private landowners will adopt the conservation efforts described in the LCAS for their land management activities but references the conservation efforts described in the LCAS in considering the types of project modifications that the Service may recommend in the case that section 7 consultation occurs on lands not covered by these plans.

3.2.2 NORTHERN ROCKIES LYNX MANAGEMENT DIRECTION (NRLMD)

71. Also referred to as the Northern Rockies Mountain Lynx Amendment, this management plan was developed by the USFS in 2007 for 18 National Forests in Montana, Idaho, and Wyoming. Individual National Forests are currently adopting and implementing the NRLMD's guidelines and standards.[35]

72. The NRLMD incorporates much of the LCAS guidance but includes additional conservation efforts for vegetation with regard to maintenance of multi-storied forest stands. The standard, known as VEG S6, precludes the implementation of all vegetation management activities that would reduce snowshoe hare habitat in multi-story mature or late successional forests. In addition, the NRLMD differs from the LCAS in that wildlife urban interfaces (WUIs) are defined and delineated areas where exceptions to the NRLMD standards (e.g., VEG S6) may be implemented to reduce wildland fire risks to urban communities. The NRLMD also differs from the LCAS regarding standards for over-the-snow recreation and grazing. Rather than prescribing standards that must be met for these activities, it provides guidelines that should be considered in project evaluation for impacts to lynx. In effect, this is a less rigid interpretation of the LCAS guidance for these activities based on the USFS' understanding of risk factors to lynx on its lands.

3.2.3 WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES (WA DNR) LYNX HABITAT MANAGEMENT PLAN

73. Developed to guide forest management, recreation, and grazing activities on WA DNR-managed lands in Washington State, this plan uses four scales of analysis, with the LAU as the focal level for considering lynx conservation.[36] For forest management, it defines practices at the LAU level like the LCAS, but also defines practices at broader ecoprovince and Lynx Management Zone (LMZ) levels. In general, the forest management practices defined at the LAU level focus on maintaining suitable lynx habitat, including denning and forage habitat, and on maintaining connectivity between suitable habitat areas. The guidelines for over-the-snow recreation mirror those of the

[34] U.S. Department of the Interior, Fish and Wildlife Service. 2004. Informal section 7 consultation on a proposed timber sale on Penobscot Nation Tribal Lands in T2&3R9 NWP Townships.

[35] Personal communication with Tim Bertram, U.S. Forest Service, April 22, 2008.

[36] The other scales are the broader ecoprovinces (broad areas defined by macro-climatic processes and habitat types), and lynx management zones, and the smaller local ecosystem. Washington State Department of Natural Resources. 2006. Lynx Habitat Management Plan for DNR-managed lands.

LCAS. The guidance for grazing activities adopts Washington's Ecosystem Standards for State-owned Agricultural and Grazing Land.[37]

3.2.4 MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION (MT DNRC) HABITAT CONSERVATION PLAN DRAFT CONSERVATION STRATEGY FOR CANADA LYNX

74. MT DNRC is currently developing a Habitat Conservation Plan (HCP) for its forested trust lands, focused on forest management; the lynx is one of the species covered by this HCP. The conservation strategy is currently in draft stages. Costs associated with development of the plan include work on administrative rules related to forest management, policy implementation, and evaluation of the 2006 critical habitat proposal.[38]

3.2.5 DRAFT CANADA LYNX HABITAT MANAGEMENT GUIDELINES FOR MAINE

75. In 2007, the Service's Maine Field Office drafted voluntary lynx habitat management guidelines specifically for forest managers in Maine. They were intended to allow for continued silvicultural production, and may be used in conjunction with other conservation efforts such as "biodiversity management objectives under forest certification programs or conservation easements."[39] Currently, five landowners are developing forest plans based on these guidelines through the Natural Resources Conservation Service's Maine Healthy Forests Reserve Program which subsidizes landowners and provides the option to enter into Safe Harbor Agreements with the Service. Other landowners, however, have argued that implementation of these guidelines is not feasible on their lands.[40] The Maine Forest Products Council is working with the Service, the Maine Department of Inland Fisheries and Wildlife, and the University of Maine's Cooperative Forestry Research Unit to determine alternative guidelines that may work to meet the dual goals of timber management operations and lynx conservation.

3.2.6 OTHER MANAGEMENT PLANS

76. In Washington, the State Department of Fish and Wildlife (WA DFW) developed a Lynx Recovery Plan in 2001. The plan outlines lynx management with the goal of recovering the species in the State, and focuses on the over three million acres identified as lynx management zones on primarily (over 90 percent) Federal lands in the State.[41] In effect, the WA DFW plan provides statewide guidance on lynx management, but does not

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[37] HB 1309. 1994. Ecosystem Standards for State-owned agriculture and grazing land. State of Washington Conservation Commission.

[38] Email communication from Mike O'Herron, Montana Department of Natural Resources and Conservation, February 14. 2006.

[39] McCollough, M. 2007. Draft Canada Lynx Habitat Management Guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Page 3.

[40] Personal communication with Patrick Strauch of the Maine Forest Products Council May 2, 2008.

[41] Stinson, D. W. 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.

contain management prescriptions like those in other plans in use in Washington State (LCAS, WA DNR plan). The plan's effect on land use is therefore limited, and the economic impacts of the plan implementation only result in costs of public and hunter/trapper education (described in Chapter 6), and research and surveying activities (described in Chapter 8).

77. Additional management plans exist or are being developed that incorporate lynx conservation as a component of broader management goals. The BLM in Wyoming is currently developing a lynx management plan based on the NRLMD and the LCAS to cover its lands that overlap Unit 5.[42] Individual Federal lands (e.g., Superior National Forest, and the BLM Garnet Resource Area District) have incorporated lynx management into the structure of their existing management plans.

78. In Unit 4 in the past, private timber companies have also developed lynx management plans in order to be exempt from the State of Washington Forest Practices Board's critical wildlife habitat for state-listed species. The Board has regulatory authority over timber harvest on State and private lands.[43] Forest practice regulations, however, allows landowners to prepare special wildlife management plans in lieu of being subject to a critical habitat rule.[44] Boise Cascade Corporation and Plum Creek Timber Company each completed such plans in 1996, and therefore the Board determined that no State critical habitat rule was warranted.[45, 46] As these plans were developed before the listing of the lynx, the economic impacts associated with the development of these plans are not included in this Chapter.

3.3 IMPACTS ASSOCIATED WITH LYNX MANAGEMENT PLAN DEVELOPMENT

79. This section describes the costs of developing these lynx management plans. The economic impacts on land use activities of implementing these plans are quantified in Chapters 4 through 8 of this report. Plan development cost information was collected through interviews with lynx management plan developers and land management agencies.

3.3.1 PRE-DESIGNATION IMPACTS

80. Pre-designation impacts of lynx conservation related to the development of management plans include surveying and mapping efforts, research and administrative work to

[42] Personal communication with Jeff Carroll, Threatened and Endangered Species Coordinator, BLM – Wyoming State Office, May 16, 2008.

[43] WAC 222-16-010.

[44] WAC 222-16-080, section 2.

[45] Stinson, D. W. 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.

[46] Note that Plum Creek Timber Company sold the affected lands to Stimson Lumber Company, which then took over management of the wildlife management plan. (Stinson, D. W. 2001. Washington state recovery plan for the lynx. Washington Department of Fish and Wildlife, Olympia, Washington. 78 pp. + 5 maps.)

coordinate stakeholder and field office information, and production and publication of the plans. The pre-designation cost of developing these plans is $3.37 million as described in Exhibit 3-3.

EXHIBIT 3-3 SUMMARY OF POTENTIAL PRE-DESIGNATION ECONOMIC IMPACTS OF LYNX MANAGEMENT PLAN DEVELOPMENT (7 PERCENT DISCOUNT RATE)

UNIT	SUBUNIT	ACTION AGENCY	YEAR	PROJECT MODIFICATIONS	BASELINE IMPACTS (2008$)
AREAS PROPOSED FOR DESIGNATION					
1	Private Timber Lands	Natural Resources Conservation Service; U.S. Fish and Wildlife Service	2006, 2007	None. Individual forest plans will be based on the Service's draft Maine guidelines.	$29,900
2	U.S. Forest Service	U.S. Forest Service	Multiple	Apply/incorporate LCAS	$82,700
3,5	U.S. Forest Service	U.S. Forest Service	2007	Modified adoption of LCAS. Reasonable and prudent measures to reduce harm to lynx from fuels management and precommercial thinning. Development of survey protocol to detect lynx in currently unoccupied habitat.	$17,180
3	Montana Dept. of Natural Resources	Montana DNRC, Bureau of Land Management	Multiple	Apply/incorporate LCAS	$1,420,000
	U.S. Forest Service	U.S. Forest Service	Multiple		Unknown
4	WA Dept. of Natural Resources	Washington DNR, Washington DFW	Multiple	N/A	$1,600,000
	U.S Bureau of Land Management	Bureau of Land Management	2003	N/A	$2,790
5	U.S. Forest Service	U.S. Forest Service	Multiple		Unknown
	U. S. Bureau of Land Management	Bureau of Land Management	2005	Over 50 conservation measures and best management practices	$18,400
TOTAL					**$3,200,000**
AREAS PROPOSED FOR EXCLUSION					
1	Tribal Lands	Passamaquoddy Tribe/ Penobscot Tribe	Multiple	N/A	$125,000
2	Tribal Lands	Grand Portage Band of Chippewa	Multiple	N/A	$41,000
TOTAL					**$166,000**
Note: Entries may not sum to totals reported due to rounding.					

3.3.2 POST-DESIGNATION BASELINE IMPACTS

81. The total present value post-designation baseline economic impacts are $990,000, an annualized impact of $93,400 applying a seven percent discount rate, as described in Exhibit 3-4. The majority of these impacts are expected to result from the incorporation of the NRLMD by National Forests in Units 3 and 5 into their Forest Management Plans. Impacts are also forecast to be baseline for the development of BLM's plan for areas overlapping Unit 5, and revisions to the Forest Plans for Superior and Chippewa National Forests in Unit 2. Administrative costs of section 7 consultation are also included for these forecast plan development efforts. All impacts associated with lynx management plan development are baseline impacts of lynx conservation with the exception of a portion of the administrative costs of consultation ($12,300 present value applying a seven percent discount rate).

82. Cost information was unavailable for a number of management plans: specifically, the Draft Maine Forest Management Guidelines, the Lynx Recovery Plan on WA DFW lands in Unit 4, and the incorporation of the NRLMD on USFS lands in Unit 3 and Unit 5. The scope and cost per-acre costs of existing management plans does not offer a representative per-acre cost that can be applied to these other management plans. Therefore, this analysis does not include these baseline costs.

EXHIBIT 3-4 SUMMARY OF POTENTIAL POST-DESIGNATION ECONOMIC IMPACTS OF LYNX MANAGEMENT PLAN DEVELOPMENT (7 PERCENT DISCOUNT RATE)

SUBUNIT	PRESENT VALUE BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION				
UNIT 2 – MINNESOTA				
Superior National Forest	$12,400	$1,170	$4,130	$390
UNIT 3 – NORTHERN ROCKIES				
U.S. Forest Service	$514,000	$48,600	$0	$0
Montana Dept. of Natural Resources	$116,000	$10,900	$0	$0
UNIT 5 – GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$24,400	$2,300	$8,130	$767
U.S. Forest Service	$323,000	$30,500	$0	$0
TOTAL	**$990,000**	**$93,400**	**$12,300**	**$1,160**
Note: Entries may not sum to totals reported due to rounding.				

3.3.3 ASSUMPTIONS AND CAVEATS

83. The major assumption applied in this analysis is that compliance with the existing lynx management plans provides sufficient lynx habitat conservation to avoid adverse modification of critical habitat. That is to say, this analysis does not anticipate that critical habitat designation will affect land management on areas covered by these plans because of the lynx management plans being implemented. It is possible in some cases, however, that additional project modification would have to be undertaken above and beyond the existing lynx management plans to avoid adverse modification of critical habitat.

84. The LCAS contains a timber management standard by which no more than 15 percent of a LAU may be converted to a temporary unsuitable condition. That is, the LCAS requires that, within an LAU, management actions should not convert more than 15 percent of lynx habitat to a temporarily unsuitable condition within a 10-year period. Relative to the overall limits placed on unsuitability of lynx habitat within LAUs, the LCAS also requires that, if more than 30 percent of lynx habitat within an LAU is in a temporarily unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management actions by federal agencies.

85. Given how LAUs overlap with the much broader critical habitat boundaries, it is technically possible to have a scenario where the either the 15 or 30 percent LAU thresholds is not met, however, over 15 or 30 percent of an entire critical habitat unit is considered unsuitable within a given time frame. There are several reasons why this analysis does not quantify impacts associated with this scenario. First, the thresholds at which adverse modification may alter projects is unknown; while the LCAS and NRLMD employ the 15 and 30 percent thresholds at the LAU level, it is uncertain whether they are relevant at the critical habitat unit level when considering adverse modification. Second, land managers and section 7 biologists do not believe the cumulative effects of individual projects within LAUs are likely to reach a threshold where concern about adverse modification of the critical habitat unit is raised.[47] Finally, in the case that such threshold information was available, specific data would be needed on the location, size, and timing of all potential projects within the unit, so they could be considered collectively.

[47] Personal communication with Scott Hicks and Anne Belleman, U.S. Fish and Wildlife Service, Wyoming Field Office, April 15, 2008; and personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.

CHAPTER 4 | FOREST MANAGEMENT

86. Active forest management is the predominant land use activity within the study area. Approximately 19.7 million acres in the study area (76 percent) are currently managed for timber harvest. This section provides a summary of the regional timber industry, describes how forest management activities have been altered for lynx conservation purposes since the species was listed in 2000, and forecasts the baseline and incremental economic impacts associated with changing forest management activities to conserve the lynx and its habitat.

87. Exhibit 4-1 summarizes the forecast baseline and incremental impacts as described in the remainder of this chapter. Lynx conservation is applied broadly across the study area forests due to the existence of multiple lynx management plans. Forecast impacts stemming from continued compliance with existing lynx management plans are considered baseline impacts of lynx conservation. These impacts are not expected to be affected by the designation of critical habitat. Baseline impacts stem from the following conservation efforts: species research and monitoring, developing set-asides for the purposes of lynx conservation (Washington Department of Natural Resources), developing lynx habitat management plans, and increased planning efforts for timber harvests across land ownerships. In addition, this Chapter provides a discussion of potential costs that are not quantified, primarily: 1) implementation of lynx management plans on private lands in Maine (absent information regarding the ultimate shape of lynx conservation in the plans and which landowners may seek to apply them); and 2) non-market costs of precluding pre-commercial thinning, such as decreased resiliency of stands to catastrophic events such as wildfires and disease outbreaks.

88. Because of the level of existing lynx conservation resulting from implementation of the management plans, the incremental impacts of critical habitat designation are forecast to be relatively minor and administrative.

89. This chapter first provides a profile of the regional timber industry. Second, it describes how units were identified that have experienced or are forecast to incur economic impacts of lynx conservation. Third, it describes the forest management impacts associated with implementing lynx conservation. The fourth section details the analytic methods applied to quantify the impacts of these conservation efforts and the final sections present the results of the analysis by subunit and highlight the major assumptions and caveats of the analysis.

EXHIBIT 4-1 SUMMARY OF POTENTIAL IMPACTS OF CANADA LYNX CRITICAL HABITAT DESIGNATION ON FOREST MANAGEMENT (7 PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION				
1	$522,000	$49,300	$13,900	$1,320
2	$1,050,000	$99,000	$10,600	$1,000
3	$332,000	$31,300	$111,000	$10,400
4	$11,300,000	$1,070,000	$35,300	$3,330
5	$166,000	$15,600	$55,200	$5,210
Total	**$13,400,000**	**$1,270,000**	**$226,000**	**$21,300**
AREAS PROPOSED FOR EXCLUSION FROM CRITICAL HABITAT				
1	$133,000	$12,500	$4,860	$458
2	$0	$0	$0	$0
3	$8,390	$792	$2,800	$264
Total	**$141,000**	**$13,300**	**$7,650**	**$722**
Overall Total	**$13,500,000**	**$1,280,000**	**$233,000**	**$22,000**

Entries may not sum to totals reported due to rounding.

4.1 PROFILE OF REGIONAL TIMBER INDUSTRIES

90. Forest management occurs on Federal, State, Tribal, and private lands across the study area but the characteristics of the timber industries vary greatly by unit. Exhibit 4-2 highlights timber industry statistics for each State to provide context for the analysis.

EXHIBIT 4-2 KEY TIMBER INDUSTRY CHARACTERISTICS

TIMBER INDUSTRY STATISTICS	MAINE	MINNESOTA	MONTANA	IDAHO	WASHINGTON	WYOMING
Forested Area	17.7 million acres (90 % of total land area).[1]	16.4 million acres (32% of total land area).[7]	25.2 million acres (27% of total land area).[9]	22.3 million acres (42 percent of total land area).[12]	22.3 million acres (52% of total land area).[15]	11.4 million acres (18% of total land area).[19]
Amount of Non-Restricted Timberland	17.0 million acres (96% private, 4% public).[1]	15.1 million acres (46% private, 54% public).[7]	19.8 million acres (31% private, 69% public).[9]	17.6 million acres (73% USFS, 9% other public, 11% non-industrial private, 7% forest industry).[12]	18.9 million acres (51% private; 49% public).[15]	6.5 million acres (62% USFS, 23% non-industrial private lands, 15% other public lands).[19]
Annual Harvest Levels	3,500 million board feet (MMBF) in 2006.[2]	1,900 MMBF.[8]	785 MMBF in 2004.[10]	1,007 MMBF in 2001.[13]	3,500 MMBF in 2004.[16]	70.5 MMBF in 2000.[20]
Employment	20,900 jobs worth $1.24 billion in associated income.[3]	39,800 jobs worth $1.92 billion in associated income.[8]	10,300 jobs worth $414 million in associated income.[10]	17,900 jobs worth $900 million in associated income in 2000.[13]	45,000 jobs worth $2 billion in associated income in 2005.[17]	1,260 jobs worth $50 million in associated income.[21]
Type of Log Harvested	Roughly 3,130,000 cords of pulpwood and 2,960,000 cords of sawlogs harvested in 2006.[2]	Roughly 3,020,000 cords of pulpwood were harvested in 2005 and 544,000 cords of sawlogs and specialty wood in 2004.[8]	Mainly sawlogs (76% of total harvest in 2004). Secondarily, veneer logs (16% of total harvest in 2004).[10]	Mainly sawlogs (90% of total harvest in 2001). Secondarily, veneer and plywood logs (5% of total harvest in 2001).[13]	Primarily sawlogs (61% of wood harvested in 2002 was processed by sawmills). Secondarily, pulpwood (5% of wood harvested in 2002 was chipped for use in pulp mills).[16]	Mainly sawlogs (89% of total harvest in 2000).[20]
Species Harvested	Primarily, spruce-fir species. Secondarily, pine and aspen.[2]	Primarily aspen, specifically quaking aspen. Secondarily balsam fir, paper birch, and oak species.[8]	Mainly Douglas fir (38% of wood harvested in 2004). Secondarily, ponderosa and lodgepole pine (each represented 20%of wood harvested in 2004).[10]	Mainly Douglas fir (26% of wood harvested in 2001). Secondarily, grand fir and subalpine fir (24% of wood harvested in 2001).[13]	Mainly Douglas fir. Secondarily, spruce-fir and hemlock species.[15]	Primarily ponderosa pine (60% of total harvest in 2000). Secondarily, lodgepole pine (27% of total harvest in 2000).[20]
Stumpage Prices	Pulpwood: $4-$11 per ton in 2006. Sawlogs: $63-$263 per thousand board feet (MBF) in 2006.[4]	Pulpwood: $6-$48 per cord in 2006. Sawlogs: $52-$378 per MBF.[8]	Sawlogs: $312-$630 per MBF.[11]	Pulpwood: $45-$50 per ton in 2007. Sawlogs: $200-$950 per MBF in 2007.[14]	Chipwood: $8-$12 per ton in 2008. Sawlogs: $15-$736 per MBF.[18]	Sawlogs: $360-$450 per MBF.[14]
Notes on Regional Industry	Shelterwood harvests used on 50% of harvested land in 2006. Other types of partial harvests used on an additional 45% of harvested land in 2006.[5]	In recent years, aspen supply has been decreasing due to mills converting to other species and to additional imports of aspen from Canada and Wisconsin. In addition	There has been a considerable reduction in the amount of wood harvested from National Forests in Montana in the last 20 years because of timber sale appeals	There has been a considerable reduction in the amount of wood harvested from national forests in Idaho in the last 20 years due to timber sale appeals and	There have been reductions in the amount of wood harvested from National Forests in Washington over the last 15 to 20 years. The reduction in	Similar to Montana and Idaho, the amount of wood harvested in National Forests in Wyoming has decreased significantly in the past 15 years. Prior to 2000, annual

TIMBER INDUSTRY STATISTICS	MAINE	MINNESOTA	MONTANA	IDAHO	WASHINGTON	WYOMING
	In 2003, only 2.1 percent of the timberland in Maine was a product of artificial regeneration. [6] In 2006, pre-commercial thinning occurred on less than one percent of the timberland in the State.[5]	to pulpwood and sawlogs, Minnesota has an emerging biomass market.[8]	and litigation, the effects of past harvesting, and protection for listed species. [10]	litigation, the effects of past harvesting, and protection for threatened and endangered species.[13]	harvest levels in National Forests is due to forest management changes, which occurred after the 1994 adoption of the Northwest Forest Plan.[17]	timber harvests were larger with majority of the wood harvested (roughly 75 percent) coming from National Forests. [20]

Sources:

1. U.S. Forest Service. 2003. Northeastern Forest Inventory and Analysis Statewide Results: Maine Inventory Tables accessed online at http://www.fs.fed.us/ne/fia/states/me/index.html on April 10, 2008.
2. Maine Department of Conservation, Maine Forest Service. 2007. 2006 Wood Processors Report. Published October 29, 2007. Augusta, Maine.
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4. Maine Department of Conservation, Maine Forest Service. 2007. 2006 Stumpage Prices by Maine County. Published July 13, 2007. Augusta, Maine.
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21. American Forest and Paper Association. 2003. Wyoming State Economic Brochure. Accessed at www.afandpa.org on March 22, 2008.

4.2 IDENTIFYING AREAS FOR WHICH IMPACTS ARE FORECAST

91. The majority of the lands proposed for designation that are being managed for timber are already managed according to established lynx conservation plans. For lands not currently subject to lynx management plans, this analysis considers the potential for implementation of lynx conservation efforts in the future (e.g., through section 7 consultation or the adoption of conservation efforts to avoid critical habitat designation or regulatory uncertainty). All subunits forecast to experience impacts to forest management activities due to lynx conservation are discussed in section 4.3 and summarized in Exhibit 4-3.

92. The following subunits do not support commercial timber harvest but are managed for general forest health and are therefore not relevant to the analysis of impacts to timber management.

- **Unit 1:** U.S. Fish and Wildlife Service and Baxter State Park Authority;
- **Unit 2:** Voyageurs National Park, U.S. Bureau of Land Management, and Private Mining Lands;
- **Unit 3:** U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, U.S. Department of Defense, Glacier National Park, Montana Department of Transportation, and Montana Fish, Wildlife, and Parks;
- **Unit 4:** National Park Service, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife; and
- **Unit 5:** U.S. Bureau of Reclamation, Federal Highway Administration, National Park Service, U.S. Fish and Wildlife Service, Montana State Highway Commission, Montana Fish, Wildlife, and Parks, Wyoming Department of Transportation, and Private Mining Lands.

93. Landowners managing forests in the following subunits have not implemented any lynx conservation in the past. For many of these landowners, timber harvest is either not occurring or not the primary goal of land management. In addition, consultations have not occurred regarding the lynx in the past and are not forecast following critical habitat designation. For these reasons, this analysis does not forecast changes to timber management in these subunits.

- **Unit 2:** Minnesota Department of Natural Resources, University of Minnesota, Local Public Ownership, Private Timber Lands, Other Private Landowners, and Tribal Lands;
- **Unit 3:** Montana University System, Unknown State Lands, Local Public Landowners, Conservation NGO, and Other Private Landowners;
- **Unit 4:** Private Landowners
- **Unit 5:** Local Public Landowners and Other Private Landowners

4.3 LYNX CONSERVATION EFFORTS DESCRIBED IN EXISTING AND FUTURE LYNX MANAGEMENT PLANS

94. This section details changes to forest management practices resulting from lynx conservation efforts. Specifically, this analysis describes how on the ground forest management may change as a result of implementing these plans, and whether those changes may result in economic effects. Section 4.4 describes the analytic methods applied to quantify the impacts of these changes in land management and Section 4.5 provides the results of the analysis.

95. Exhibit 4-3 summarizes the forecast baseline and incremental lynx conservation efforts related to forest management activities quantified in this analysis. Five subunits are forecast to experience only administrative costs of section 7 consultation. For these subunits, the consultation history indicates that no project modifications have been recommended by the Service with respect to their timber management projects to date. Landowners and the Service have not indicated that the outcome of these consultations would change following critical habitat designation for the lynx. Section 4.4 describes the methods applied to quantify the economic impacts associated with these efforts summarized in the exhibit and following text.

EXHIBIT 4-3 SOURCES OF ECONOMIC IMPACTS TO FOREST MANAGEMENT ACTIVITIES BY SUBUNIT

SUBUNIT	PRE-DESIGNATION IMPACTS	POST-DESIGNATION BASELINE IMPACTS	POST-DESIGNATION INCREMENTAL IMPACTS
UNIT 1: MAINE			
National Park Service	• Administrative costs[a]	• Administrative costs	• Administrative costs
Maine Dept. of Conservation	• Administrative costs	• Administrative costs	• Administrative costs
Conservation NGO	• Costs of developing Habitat Restoration Plans (HRPs) as part of the Maine Healthy Forest Reserve Program (MHFRP)[b]	• Unknown	• Unknown
Private Timber Lands	• Administrative costs	• Developing HRPs • Administrative costs	• Administrative costs
Other Private Landowners	• Administrative costs	• Administrative costs	• Administrative costs
Tribal Land (considered for exclusion)	• Administrative costs	• Developing HRPs • Administrative costs	• Administrative costs
UNIT 2: MINNESOTA			
Superior National Forest	• Lynx Conservation Assessment and Strategy (LCAS) (2000-2008) • Administrative costs	• LCAS (2009-2028) • Administrative costs	• Administrative costs
UNIT 3: NORTHERN ROCKY MOUNTAINS			
U.S. Forest Service	• LCAS (2000-2006) • Northern Rockies Lynx Management Direction (NRLMD) (2007-2008) • Administrative costs	• NRLMD (2009-2028) • Administrative costs	• Administrative costs
U.S. Bureau of Land Management	• LCAS (2000-2008) • Administrative costs	• LCAS (2009-2028) • Administrative costs	• Administrative costs

SUBUNIT	PRE-DESIGNATION IMPACTS	POST-DESIGNATION BASELINE IMPACTS	POST-DESIGNATION INCREMENTAL IMPACTS
Montana Dept. of Natural Resources	• Administrative forest management rules developed to conserve for the lynx and its habitat (2003-2008)	• Administrative forest management rules developed to conserve for the lynx and its habitat (2009-2028)	• None
Private Timber Lands	• Administrative costs	• Administrative costs	• Administrative costs
Tribal Land (considered for exclusion)	• Administrative costs	• Administrative costs	• Administrative costs
UNIT 4: NORTH CASCADES			
U.S. Bureau of Land Management	• LCAS (2000-2008) • Administrative costs	• LCAS (2009-2028) • Administrative costs	• Administrative costs
U.S. Forest Service	• LCAS (2000-2008) • Administrative costs	• LCAS (2009-2028) • Administrative costs	• Administrative costs
WA Dept. of Natural Resources	• Washington Department of Natural Resources (WA DNR) Habitat Management Plan for the Canada Lynx (2000-2008)	• WA DNR Habitat Management Plan for the Canada Lynx (2009-2028)	• None
UNIT 5: GREATER YELLOWSTONE AREA			
U.S. Forest Service	• LCAS (2000-2006) • NRLMD (2007-2008) • Administrative costs	• NRLMD (2009-2028) • Administrative costs	• Administrative costs
U.S. Bureau of Land Management	• Administrative costs	• Administrative costs	• Administrative costs
Wyoming Game and Fish Commission	• LCAS (2005-2008)	• LCAS (2009-2028)	• None

Notes:
[a] Administrative costs are associated with section 7 consultations considering the lynx and its habitat.
[b] Conservation effort is not forecast to be borne by all private landowners in Maine, only those participating in the Maine Healthy Forest Reserve Program (MHFRP).
[c] The LCAS, NRLMD, Montana Department of Natural Resources Administrative Forest Management Rules, and WA DNR Habitat Management Plan for the Canada Lynx all include restrictions on pre-commercial thinning activities.

4.3.1 TIMBER MANAGEMENT ACCORDING TO THE LCAS

96. As presented in Exhibit 4-3, the following subunits within the study area for this analysis have applied and/or are forecast to apply forest management direction as defined in the LCAS:

- Unit 2: Superior National Forest
- Unit 3: U.S. Forest Service (USFS) and Bureau of Land Management (BLM)
- Unit 4: USFS and BLM
- Unit 5: USFS and Wyoming Game and Fish Commission (WY GFC)[48]

[48] Wyoming Game and Fish Commission. 2005. A comprehensive wildlife conservation strategy for Wyoming. WYGFC. Cheyenne, Wyoming.

The LCAS includes various standards and guidelines to follow when conducting forest management activities. The specific standards and guidelines related to on-the-ground forest management activities are as follows:

1. If more than 30 percent of lynx habitat within a Lynx Analysis Unit (LAU) is currently in unsuitable condition, no further reduction of suitable conditions shall occur as a result of vegetation management activities (30 percent LAU threshold).
2. Forest management actions shall not change more than 15 percent of lynx habitat within an LAU to an unsuitable condition within a 10-year period (15 percent LAU threshold).
3. Following a disturbance, such as a blowdown, fire, insects/pathogens mortality that could contribute to lynx denning habitat, do not salvage harvest when the affected area is smaller than 5 acres.
4. In lynx habitat, pre-commercial thinning will be allowed only when stands no longer provide snowshoe hare habitat (e.g. self-pruning processes have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack.)
5. In aspen stands within lynx habitat, apply harvest prescriptions that favor regeneration of aspen.
6. Plan regeneration harvests in lynx habitat where little or no habitat for snowshoe hares is currently available, to recruit a high density of conifers, hardwoods, and shrubs preferred by hares.
7. In areas where recruitment or additional denning habitat is desired, or to extend the production of snowshoe hare foraging habitat where forage quality and quantity is declining due to plant succession, consider improvement harvests (commercial thinning, selection, etc).
8. Focus vegetation management, including timber harvest and use of prescribed fire, in areas that have potential to improve snowshoe hare habitat (dense horizontal cover) but that presently have poorly developed understories that have little value to snowshoe hares.[49]

97. Guidelines 3, 5, 6, 7, and 8 are unlikely to result in economic impacts to forest management activities. Specifically, salvage harvests typically occur over large areas following forest fires. Thus, restricting salvage harvests in areas smaller than five acres should not result in significant foregone harvests. Guidelines 5, 6, 7, and 8 do not specifically prescribe management that may result in decreased harvest. Rather, the

[49] Ruediger, B., Claar, J., Gniadek, S., Holt, B., Lewis, L., Mighton, S., Naney, B., Patton, G., Rinaldi, T., Trick, J., Vandehey, A., Wahl, F., Warren, N., Wenger, D. and A. Williamson. 2000. Canada lynx conservation assessment and strategy. U.S. Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, Montana.

guidelines recommend harvesting timber in areas where the harvest may benefit the lynx and using forest management practices that may improve lynx habitat. Landowners implementing the LCAS have indicated that upfront planning of harvests around these guidelines have not affected timber production or measurably increased their management costs.[50] This analysis therefore focuses on guidelines 1, 2, and 4, as follows.

98. Guideline 1 precludes regeneration harvests in Lynx Analysis Units (LAUs) where more than 30 percent of the area is considered "unsuitable" habitat for lynx. Guideline 2 precludes converting more than 15 percent of an LAU to an unsuitable condition in a ten-year period. Despite the potential for impacts associated with guidelines 1 and 2, forest management activities have not historically been affected by these guidelines due to the overall size of the areas where the LCAS is implemented. Specifically, the LCAS is predominantly implemented in National Forests and other Federal or State-managed forests containing numerous LAUs. In the case that the threshold is approached in one LAU, the substantial size of the Forests has provided opportunities to manage at substitute sites in other LAUs. Thus, landowners have indicated that the 30 percent threshold of guideline 1 is not likely to reduce the use of regeneration harvests to the point where economic impacts at the forest level would be incurred. Further, timber harvest planning that incorporates consideration of both guideline thresholds up front (including avoiding conversion of more that 15 percent of an LAU to an unsuitable condition in a ten-year period), has allowed forest managers to meet their goals with respect to timber harvest and lynx conservation without measurable effects, aside from the effort in the primary planning stage. To date, Superior National Forest, which has implemented these LCAS guidelines the longest, since 2000, has not incurred any reduced timber harvests in order to comply with guidelines 1 and 2.[51]

99. In considering which guidelines of the LCAS are most likely to result in economic impacts, this analysis therefore focuses on the impacts of restricting pre-commercial thinning (guideline 4 above). The quantitative analysis of pre-commercial thinning impacts is provided in Section 4.4.1. Consistent with information provided by the USFS in Units 2, 3, and 5, this analysis concludes that the primary effects of not pre-commercial thinning in the Federal and State Forests within the designation are not economic in nature as discussed in detail in Section 4.4.1.

4.3.2 TIMBER MANAGEMENT ACCORDING TO THE NORTHERN ROCKIES LYNX MANAGEMENT DIRECTION

100. In 2007, the USFS developed the Northern Rockies Lynx Management Direction (NRLMD). The NRLMD incorporated new scientific information published after the development of the LCAS in 2000.[52] As highlighted in Exhibit 4-3, the following subunits have been applying NRLMD on their timber lands since its development in 2007:

[50] Personal communication with Mary Shedd, Superior National Forest, June 11, 2008.

[51] Personal communication with Mary Shedd, Superior National Forest, June 11, 2008.

[52] Personal communication with Tim Bertram of the U.S. Forest Service, April 22, 2008.

- Unit 3: USFS
- Unit 5: USFS[53]

The forest management standards and guidelines defined in the NRLMD are similar to those defined above in the LCAS.[54] Also similar to the LCAS, most of the standards and guidelines described in the NRLMD are not expected to affect timber yield or increase management costs at the forest level. Specifically, the Final Environmental Impact Statement (FEIS) for the NRLMD states the following:

> [Standards limiting regeneration harvest to no more than 15 percent of an LAU in a 10-year period and precluding regeneration harvest in LAUs where more than 30 percent of the unit is unsuitable lynx habitat] may defer regeneration harvest in some areas, but commercial thinning, or other 'intermediate' treatments could occur in lieu of regeneration harvest. In addition, [recommending that forest management projects be designed to recruit a high stem density of conifers, hardwoods, and shrubs where such habitat is scarce or not available] encourages projects creating winter snowshoe hare habitat (regeneration harvest) where winter habitat is lacking. Based on this, the [NRLMD] would likely have no change in overall timber harvest outputs, but the [NRLMD] may change what material is harvested and where.[55]

The only guideline described in the NRLMD that significantly differs from those described in the LCAS is focused on restricting vegetation management projects in multi-story mature and late successional forests.[56] This standard could affect forest management activities by limiting harvests in late successional forests. The USFS, however, is still working to establish a clear definition of "multi-story mature or late successional forests" and to establish thresholds below which forest management activities within late successional forests will be allowed.[57] Absent information on the forest lands to which this standard applies, this analysis does not quantify impacts of complying with this guideline.

101. The NRLMD also mirrors the LCAS in its restriction on the use of pre-commercial thinning. Potential impacts of this conservation effort are discussed in Section 4.4.1.

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[53] U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

[54] U.S. Forest Service. 2007. Final Environmental Impact Statement: Northern Rockies Lynx Management Direction. U.S. Forest Service.

[55] U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

[56] Personal communication with Tim Bertram of the U.S. Forest Service, April 22, 2008.

[57] *Ibid.*

4.3.3 TIMBER MANAGEMENT ACCORDING TO THE DRAFT CANADA LYNX HABITAT MANAGEMENT GUIDELINES FOR MAINE

102. In 2007, the Maine Field Office of the Service developed a set of draft Canada Lynx Habitat Management Guidelines for Maine (Maine lynx guidelines) to be used by private landowners in order "to manage for lynx habitat in a forest managed primarily for forest products."[58] The Maine lynx guidelines recognize that timberland owners employ a number of different strategies to reach their forest management goals; thus the guidelines are written to be outcome-based and not prescriptive. The Maine lynx guidelines specify the following four measures related to on-the-ground forest management:

1. Avoid upgrading or paving dirt or gravel roads traversing lynx habitat. Avoid construction of new high speed/high traffic volume roads in lynx habitat.
2. Maintain through time at least one lynx habitat unit of 35,000 acres (~1.5 Maine townships) or more for every 200,000 acres (~9 Maine townships) of ownership. At any time, about 20% of the area in a lynx habitat unit should be in the optimal mid-regeneration conditions.
3. Employ silvicultural methods that will create regenerating conifer-dominated stands 12-35 ft in height with high stem density (7,000 - 15,000 stems/acre) and horizontal cover above the average snow depth that will support > 1.1 hares/hectare.
4. Retain standing dead trees after harvest and leave patches (at least 3/4 of an acre) of windthrow or insect damage.

103. If implemented, guideline 1 above is unlikely to affect land management within the study area because roads traversing lynx habitat are largely harvest roads, which are not paved and are unlikely to be altered to increase speed and traffic volume in the near future.[59] Further, the rural character of Unit 1 minimizes the need for major roads. Guideline 4 is also unlikely to have a significant effect on landowners except during future spruce budworm outbreaks. Specifically, salvage harvesting is not a routine forest management practice in Maine due to its lack of frequent forest fires. However, extensive salvage harvesting occurred during the most recent spruce budworm outbreak in Maine and is expected to be used during future outbreaks to limit the economic impacts of the outbreak.[60] Due to the uncertainty associated with the timing and severity of future budworm outbreaks, this analysis does not quantify impacts associated with following guideline 4.

104. Guidelines 2 and 3 are therefore most likely to result in economic impacts. Guideline 2 is intended to serve as a landscape level reference for landowners wishing to conserve for

[58] McCollough, M. 2007. Draft Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[59] Personal communication with Marcia McKeague of Katahdin Forest Management LLC, May 21, 2008.

[60] Personal communication with Patrick Strauch of the Maine Forest Products Council, May 2, 2008.

the lynx.[61] Specifically, maintaining large suitable habitat areas is thought to be critical to lynx survival. If suitable habitat areas are small and scattered across the landscape, it is doubtful that such areas would benefit the lynx. Based on lynx research in Maine, a 35,000 acre unit is thought to be the minimum area required to support multiple adult lynx. Therefore, maintaining a number (roughly one unit for every 200,000 acres) of 35,000 acre units across timberland in Maine, "would likely meet the population and habitat goals adequate for the recovery of the lynx in Maine."[62] In order to comply with the guidelines, landowners owning less than 35,000 acres of land should work to maintain a number of suitable lynx habitat patches (≥ 100 acres) distributed across their land.[63] Landowners owning greater than 35,000 acres of land should strive to maintain at one lynx habitat unit of 35,000 acres or more for every 200,000 acres of ownership. Because many landowners own less than 35,000 and most own less than 200,000 acres, however, the guidelines are designed to be flexible and work around different ownership patterns and forest types. Thus, maintaining a contiguous 35,000 acre lynx habitat unit is not necessarily required to comply with the guidelines. The Service plans to work with landowners and State agencies to determine the most effective and cost-efficient way to manage lynx habitat areas.

105. The "optimal mid-regeneration conditions" discussed in guideline 2 are defined in guideline 3: specifically, "conifer-dominated stands 12 to 35 feet in height, with high stem cover and an open canopy (generally less than 25 percent canopy closure)."[64] Typically, these stand conditions occur 10 to 30 years following a major disturbance. Guideline 3 states that landowners should use silvicultural methods that produce optimal lynx habitat. This includes increasing the use of large (≥ 100 acre) clearcuts and more intensive shelterwood harvests. The use of such harvest techniques may subject landowners to additional permitting costs under the Maine Forest Practices Act.[65] Specifically, landowners are required to develop harvest plans for clearcuts larger than 20 acres (category 2 and 3 clearcuts under the Maine Forest Practices Act).[66] The Service plans on working with the Maine Forest Service to potentially ease some of the requirements placed on landowners by the Maine Forest Practices Act if they agree to

[61] Personal communication with Mark McCollough of the Maine Field Office of the U.S. Fish and Wildlife Service on August 5, 2008.

[62] McCollough, M. 2007. Draft Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[63] Personal communication with Mark McCollough of the Maine Field Office of the U.S. Fish and Wildlife Service on August 5, 2008.

[64] McCollough, M. 2007. Draft Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[65] Personal communication with Mark McCollough of the Maine Field Office of the U.S. Fish and Wildlife Service on August 5, 2008; Jake Metzler of the Forest Society of Maine on May 19, 2008 and Marcia McKeague of Katahdin Forest Management LLC on May 21, 2008.

[66] Maine Department of Conservation, Maine Forest Service. Maine Forest Service Rules - Chapter 20 Forest Regeneration and Clearcutting Standards. Published April 28, 1999. Augusta, Maine.

follow the Maine lynx guidelines.[67] To date, the Service and the Maine Forest Service have not begun to discuss how implementing the Maine lynx guidelines will affect a landowner's obligations under the Maine Forest Practices Act.[68]

106. Further, the use of more frequent clearcuts and more intensive shelterwood harvests may negatively affect the public perception of industrial landowners in Maine.[69] Specifically, the Maine Forest Products Council fears that the use of frequent clearcuts may be viewed as irresponsible land stewardship by environmental and conservation groups. However, the use of more frequent clearcuts and more intensive shelterwood harvests is not expected to reduce timber yields on private timberlands in Maine.[70] In fact, the use of such harvest techniques may be more profitable than the current practice of partial harvests as they allow landowners to focus logging activities in specific areas cutting down on transportation and road maintenance costs.[71]

107. Due to: a) the negative perception of large clearcuts; b) the lack of a recent spruce budworm outbreak; c) the shift in land ownership from industrial timber companies to timber investment companies and small, non-industrial landowners; and d) an increased understanding of selective harvest techniques, landowners in Maine have primarily used selective harvest techniques following the passage of the Maine Forest Practices Act in 1989.[72] For example, in 2006 clearcuts were used on only 3.6 percent of the total acres harvested in Maine.[73] The use of such selective harvest techniques does not create the large patches of optimal mid-regeneration conditions to support large populations of lynx.[74] Guideline 3 of the Maine lynx guidelines is designed to address this risk factor.

108. To date, no landowner is fully implementing the Maine lynx guidelines. Five landowners have agreed to implement the guidelines. These landowners are participants of the Maine Healthy Forest Reserve Program (MHFRP), which requires that landowners develop management plans incorporating the Maine lynx guidelines, are still developing habitat management plans (HRPs) and thus have not yet implemented the guidelines on the ground.[75] Some timber landowners (not participating in the MHFRP) have expressed that

[67] Personal communication with Mark McCollough of the Maine Field Office of the U.S. Fish and Wildlife Service on August 5, 2008.

[68] Personal communication with Donald Mansius of the Maine Forest Service on August 5, 2008.

[69] Personal communication with Patrick Strauch of the Maine Forest Products Council on May 2, 2008.

[70] Based on personal communication with Jake Metzler of the Forest Society of Maine on May 19, 2008; Tom Rumpf of the Nature Conservancy on May 19, 2008; and Marcia McKeague of Katahdin Forest Management LLC on May 21, 2008.

[71] Personal communication with Mark McCollough of the Maine Field Office of the U.S. Fish and Wildlife Service on August 5, 2008.

[72] McCollough, M. 2007. Draft Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[73] Maine Department of Conservation, Maine Forest Service. 2007. 2006 Silvicultural Activities Report Including Annual Report on Clearcutting and Pre-commercial Activities. Published August 15, 2007. Augusta, Maine.

[74] McCollough, M. 2007. Draft Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[75] Personal communication with Bill Yamartino of the Natural Resources Conservation Service of Maine, May 20, 2008

the implementation of the Maine lynx guidelines on their lands is infeasible and have proposed alternative guidelines that focus on supporting research and education efforts rather than changes in timber management activities.[76] Landowners (including MHFRP participants) are awaiting ongoing lynx research at the University of Maine to provide insight into the best way to structure and apply lynx conservation guidelines.

109. Despite the Service's issuance of the draft Maine lynx guidelines, significant uncertainty surrounds the future direction of lynx conservation on the private timberlands in Maine. As mentioned, the Maine Forest Products Council (MFPC) is currently working with the Service to determine alternative guidelines that may meet the dual goals of timber management operations and lynx conservation. As a result, uncertainty exists regarding: a) the ultimate shape of the guidelines; b) how the resulting guidelines will affect on-the-ground timber management; and c) whether landowners will adopt the guidelines. As a result of the layered uncertainties, this analysis does not quantify impacts associated with the possible implementation of lynx conservation on private timberlands in Maine.

4.3.4 MAINE AND MONTANA DRAFT CONSERVATION PARTNERSHIP AGREEMENTS

110. Private timber companies in Maine (members of the MFPC) and Montana (Plum Creek Timber Company, F.H. Stoltze Land and Lumber Company, and Stimson Lumber Company) are working with the Service on the development of the Maine Conservation Partnership Agreement (the Maine Agreement) and the Montana Conservation Partnership Agreement (the Montana Agreement). The Service has made draft versions of these plans available for public comment. The two plans are similar in terms of their objective to develop a conservation strategy that will preserve and protect the lynx, and in terms of the specific commitments that landowners agree to implement. Both agreements include measures to continue funding lynx research, educate the forest products industry on lynx conservation, develop voluntary habitat management guidelines, and convene annual meetings to review progress towards the goals of the agreements.[77, 78]

111. If implemented, forest management practices may be affected by the voluntary habitat management guidelines developed as part of the Maine and Montana Agreements. Both agreements state that a technical team will be assembled in order to develop the voluntary guidelines. The technical teams will include members of the forest products industry, academic researchers, state researchers, and Service biologists. The voluntary guidelines associated with both agreements are expected to include measures that can be feasibly implemented on the private timberlands covered by both agreements. Further, the voluntary guidelines are expected to build off the results of ongoing lynx research at the

[76] Personal communication with Patrick Strauch of the Maine Forest Products Council, May 2, 2008 and Bill Yamartino of the Natural Resources Conservation Service of Maine, May 20, 2008.

[77] U.S. Fish and Wildlife Service. 2008. Draft Maine Conservation Partnership Agreement for the Benefit of Canada Lynx in Maine by and between the U.S. Fish and Wildlife Service, Maine Department of Inland Fisheries and Wildlife, and the Maine Forest Products Council. August 27, 2008 Draft.

[78] U.S. Fish and Wildlife Service. 2008. Draft Montana Partnership Conservation Agreement for the Benefit of Canada Lynx in Montana by and between the U.S. Fish and Wildlife Service, Plum Creek Timber Company, Inc., F.H. Stoltze Land and Lumber Company, and Stimson Lumber Company, Inc. September 5, 2008 Draft.

University of Maine and the University of Montana. However, the following aspects of the guidelines are currently unclear: a) the ultimate shape of the voluntary guidelines developed as part of these plans; b) how the resulting voluntary guidelines will affect on-the-ground timber management in the areas covered by the Maine and Montana Agreements; and c) whether companies signing on to the Maine and Montana Agreements will adopt the voluntary guidelines. Thus, this analysis does not quantify impacts associated with the possible implementation of voluntary habitat management guidelines for the lynx in the areas covered by the Maine and Montana Agreements.[79,80]

112. In a public comment on the draft version of this economic analysis, Plum Creek stated it would incur impacts of $230,000 over the next twenty years (present value applying a three percent discount rate) associated with the implementation of the Maine and Montana Agreements on its land in both states. Further, Plum Creek noted that these agreements would only be implemented in the absence of critical habitat designation. Therefore, the benefits to the lynx associated with the conservation agreements would be lost in the case that critical habitat is designated on Plum Creek lands in Maine and Montana.[81]

4.3.5 TIMBER MANAGEMENT ACCORDING TO THE MONTANA DEPARTMENT OF NATURAL RESOURCES FOREST MANAGEMENT RULES

113. In 2003, the Montana Department of Natural Resources (MT DNRC) developed a set of forest management rules incorporating conservation of lynx and its habitat.[82] For the same reasons as described above for the LCAS and NRMLD, most of the lynx conservation guidelines described in these rules are unlikely to result in reductions in timber harvest at the forest level. Also similar to the other plans, the primary impact of the rules is that they effectively preclude the use of pre-commercial thinning.[83]

4.3.6 TIMBER MANAGEMENT ACCORDING TO THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES HABITAT MANAGEMENT PLAN FOR THE CANADA LYNX

114. The WA DNR developed a habitat management plan for the lynx in 1996 following the State listing of the species.[84] In 2000, WA DNR began to revise their habitat

[79] U.S. Fish and Wildlife Service. 2008. Draft Maine Conservation Partnership Agreement for the Benefit of Canada Lynx in Maine by and between the U.S. Fish and Wildlife Service, Maine Department of Inland Fisheries and Wildlife, and the Maine Forest Products Council. August 27, 2008 Draft.

[80] U.S. Fish and Wildlife Service. 2008. Draft Montana Partnership Conservation Agreement for the Benefit of Canada Lynx in Montana by and between the U.S. Fish and Wildlife Service, Plum Creek Timber Company, Inc., F.H. Stoltze Land and Lumber Company, and Stimson Lumber Company, Inc. September 5, 2008 Draft.

[81] Plum Creek Timber Company LP. 2008. Plum Creek Timber Company Comments on the Revised Canada Lynx Critical Habitat Designation-Proposed Rule to the U.S. Fish and Wildlife Service.

[82] Montana Department of Natural Resources. 2003. Montana DNRC Forest Management Rules for Canada Lynx. Published March 2003. Helena, Montana.

[83] Personal communication with Timothy Spoelma of the Montana Department of Natural Resources, June 18, 2008.

[84] Washington State Department of Natural Resources. 2006. Final Draft- Lynx Habitat Management Plan for DNR-Managed Lands. WADNR-Land Management Division. Olympia, Washington.

management plan to avoid incidental take of the lynx and in 2006 published the final draft of their revised habitat management plan for lynx, which incorporated conservation efforts to avoid incidental take of the species. The habitat management plan specifies several on-the-ground forest management regulations, which resemble the forest management standards and guidelines included in the LCAS. In contrast to the LCAS, however, the habitat management plan defines forest management practices at the LAU level, but also defines practices at broader "Ecoprovince" and "Lynx Management Zone" levels. In general, the forest management practices defined at the LAU level focus on maintaining suitable lynx habitat including denning and forage habitat and on maintaining connectivity between suitable habitat areas. Impacts to forest management activities on WA DNR lands are quantified in Section 4.4 using information provided by the WA DNR on the costs of implementing the plan.

4.3.7 TIMBER MANAGEMENT OF LANDOWNERS NOT SUBJECT TO PLANS AND GUIDELINES DESCRIBED ABOVE

115. The majority of the timberland within the study area is public and is managed according to one of these lynx conservation plans. However, the private timberland, and a portion of the public lands (e.g., Glacier National Park), do not formally incorporate lynx conservation efforts in their forest management activities. With the exception of the private timberland guidelines in Maine (as discussed in Section 4.3.3) and the draft Maine and Montana Agreements (as discussed in Section 4.3.4), available information does not indicate that these private landowners will voluntarily change their forest management activities or be regulated to change their activities following the designation of critical habitat.

116. There are few Federal nexuses associated with forest management on private timberlands in the study area that may necessitate section 7 consultation for the lynx. To date, the only section 7 consultations for the lynx involving forest management projects on private timberlands has been for special use permits in order to access private timberland across federal lands.[85] These consultations have not focused on the proposed forest management projects on the private timberland inholdings, but rather on the proposed actions (e.g. use of existing roads or construction of new roads) on Federal lands. To date, no project modifications have resulted from section 7 consultations regarding the special use permits outside of road decommissioning recommendations; road decommissioning following a project is undertaken by a matter of course and therefore no associated impacts are forecast.[86] As a result, as highlighted in Exhibit 4-3, for private and State timberlands not subject to lynx management plans, this analysis quantifies only administrative costs of consultation for special use permits.

[85] Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008.

[86] Based on a review of the consultation history in the areas proposed for critical habitat from 2000 to 2008, no projects were required to decommission roads due to the lynx because projects involving the construction of new roads already included measures to decommission the roads following the proposed use of roads. Additionally, Superior National Forest indicated that road closures would not change due lynx conservation as roads are typically closed after use is finished regardless (written communication with Mary Shedd, Superior National Forest, March 17, 2006).

117. F.H. Stoltze Land and Lumber Company (Stoltze) and the Plum Creek Timber Company, Inc. (Plum Creek) expressed concerns about potential impacts of critical habitat designation on private timberlands in Units 1 and 3. In a comment on the 2008 proposed rule, Stoltze prepared its own economic analysis of critical habitat designation on its land in Unit 3. Plum Creek prepared a set of technical comments in response to the 2008 proposed rule, which assert that critical habitat designation on Plum Creek land in Units 1 and 3 is unnecessary given Plum Creek's current land management activities. Further, Plum Creek submitted its own economic analysis of critical habitat designation on its land following its review of the Service's 2008 draft economic analysis. Plum Creek's comments on the October 2008 draft economic comments are summarized below along with their economic comments on the economic analysis of the 2006 critical habitat designation for the lynx.

118. Plum Creek's 2008 economic comments quantify costs of Plum Creek's ongoing and forecast lynx conservation efforts. Plum Creek describes the following impacts to their timber management activities related to lynx conservation in the baseline:

- Plum Creek intends to continue to contribute to research in Maine and Montana for lynx and snowshoe hare, whether or not critical habitat is designated, at a cost of $150,000 ($10,000 per year discounted at three percent).[87]
- Plum Creek also expects to implement mitigation measures for road construction at a cost of between $110,000 and $250,000 per year absent critical habitat regardless of critical habitat designation for the benefit of the lynx. Slower speed limits at these sites are expected to result in social welfare impacts to motorists. Plum Creek noted, however, that not enough information is available to quantify these welfare impacts.
- Absent critical habitat designation, Plum Creek expects to continue to conduct experimental pre-commercial thinning to inform lynx conservation needs on approximately 200 acres per year at a present value cost of $230,000 (assuming an internal rate of return of eight percent and a 15 percent discount rate).[88] The comment asserts that, in the case critical habitat is designated, they will no longer conduct the pre-commercial thinning lynx research.

119. This comment indicates that baseline impacts of lynx conservation to Plum Creek may be underestimated in the economic analysis. These impacts have not been added to the baseline impacts provided in this economic analysis for the following reasons. First, Section 8.5 of this analysis does quantify costs to private timberland owners in Maine of their funding of lynx-related research. While these research costs are for all private timberland owners in Maine, a fraction of the total is expected to be incurred by Plum Creek. This analysis does not sum Plum Creek's estimates to avoid double counting

[87] Plum Creek Timber Company LP. 2008. Plum Creek Timber Company Comments on the Revised Canada Lynx Critical Habitat Designation-Proposed Rule to the U.S. Fish and Wildlife Service.

[88] Plum Creek Timber Company LP. 2008. Plum Creek Timber Company Comments on the Revised Canada Lynx Critical Habitat Designation-Proposed Rule to the U.S. Fish and Wildlife Service.

costs. Second, information is not available to split these potential costs to Plum Creek across subunits (Maine and Montana). Finally, because Plum Creek expects to cease its lynx conservation-related, experimental pre-commercial thinning in the case of critical habitat designation, there is likely to be an offsetting incremental benefit of the critical habitat designation as they could put this land to a more productive use. This is not addressed in the comment. Regardless, the impacts described by Plum Creek are baseline impacts of lynx conservation. These impacts are not incremental impacts of a critical habitat designation.

120. Plum Creek's 2006 economic analysis quantifies the impact of precluding pre-commercial thinning activities on its land. Plum Creeks assumes it would be required to implement conservation efforts for the lynx similar to those discussed in the LCAS as a result of critical habitat designation. Applying a 15 percent internal rate of return on the cost of implementing pre-commercial thinning ($100 per acre) and that approximately 4,000 acres per year would be treated with pre-commercial thinning absent lynx conservation, Plum Creek estimates the present value of economic impacts of critical habitat designation on its timber ownership in Units 1 and 3 would be approximately $436,000 (assuming a 15 percent discount rate). [89, 90]

121. Stoltze presents two scenarios in its economic analysis of critical habitat designation.[91] The first scenario presents impacts associated with section 7 consultations and assumed project modifications. The second scenario presents impacts associated with implementing the LCAS on Stoltze timberlands. Stoltze identifies three potential Federal nexuses on their land: 1.) The need to obtain special use permits to access land across federally-owned lands; 2.) The potential need to obtain 404 permits from the U.S. Army Corps of Engineers (USACE) for road construction projects; 3.) Federal funding received for fire hazard mitigation projects. Stoltze assumes that consultation for Federal access permits results in the loss of access to timberlands accessed across Federal lands. The timber losses associated with this assumption are 600 MBF per year worth approximately $240,000 annually. With respect to implementing the LCAS, Stoltze estimates a 50 percent reduction in its annual harvest. Further, Stoltze anticipates that implementing the LCAS would require a change its forest management practices from uneven-aged management to even-aged management (i.e. clearcuts, seed tree harvests, and shelterwood harvests). Stoltze states that such management changes would negatively affect their public image due to a negative perception of even-aged forest management. Stoltze therefore states that it would try to sell its lands if it were required to implement the LCAS resulting in approximately $91,000,000 of losses to the company.

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[89] Calculation of impacts: (15%) x ($100/acre) = $15/acre = foregone harvest value per acre; ($15/acre) x (4,000 acres affected/year) = $60,000 = foregone harvest value per year. $60,000 per year is experienced over a 20 year horizon, which applying a 15% discount rate has a present value of approximately $436,000.

[90] Plum Creek Timber Company Inc.. 2006. Economic Comments: Proposed Designation of Critical Habitat for the Canada Lynx on Plum Creek Lands in Maine and Montana.

[91] F.H. Stoltze Land and Lumber Company to the U.S. Fish and Wildlife Service on April 28, 2008. Public Comment on Proposed Canada Lynx Critical Habitat Designation. FWS-R6-ES-2008-0026.

122. While recognizing that regulatory uncertainty associated with the critical habitat designation may affect private timber landowners, the impacts described in Plum Creek's 2006 and Stolze's 2008 economic analyses are not considered reasonably likely to occur for the following reasons:

- The analyses by both Plum Creek and Stoltze rely on the assumption that the conservation efforts described in the LCAS will be applied on private timberlands. Outside of regulation such as through section 7 consultation, implementation of conservation efforts for the lynx, such as those described in the LCAS, are not expected to occur on private lands. First, the LCAS was developed in 2000 coincident with the listing of the lynx and has not to date been implemented on private lands. Second, improved information on regionally-specific lynx needs (such as those described in the draft guidelines for Maine), do not include the conservation efforts described in the LCAS. Thus, the economic impacts associated with implementing the LCAS conservation efforts on Plum Creek and Stoltze lands are not considered unlikely to occur.
- While this analysis does forecast administrative costs associated with section 7 consultation for special use permits on private land, to date no consultations have occurred in Unit 3 on private lands for 404 permits or fire hazard mitigation projects.
- Further, while Stoltze assumes consultation for special use permits would preclude access to its inholdings through public lands, no consultations for special use permits have resulted in any project modification. Critical habitat designation is not expected to increase the need for consultation or for project modification associated with these permits, but instead to result in incremental administrative impacts on consultations that would have occurred regardless of the designation.

4.4 ANALYTIC METHODS

123. This section describes the analytic methods employed to quantify impacts associated with the lynx conservation plans described above. As described in Section 4.3, the quantitative analysis focuses on determining the effects of precluding pre-commercial thinning, as this conservation effort is recommended in most of the existing lynx plans (LCAS, NRLMD, MT DNRC, and WA DNR plans).[92] This section therefore begins by detailing the approach to quantifying impacts to forest managers of constraints on pre-commercial thinning.

[92] Although some of the economic impacts associated with the WA DNR Habitat Management Plan for Lynx are due to restrictions on pre-commercial thinning, impacts also stem from setting aside lynx travel corridors and denning habitat and from not altering more than 15 percent of land in a ten-year period. Based on personal communication with Scott Fisher of the Washington Department of Natural Resources on March 16, 2006.

4.4.1 QUANTIFYING IMPACTS OF RESTRICTIONS ON PRE-COMMERCIAL THINNING

124. This analysis concludes that the timber market benefits of pre-commercial thinning in areas for which the LCAS and NRLMD are being applied are less than the cost savings to the land managers of not pre-commercial thinning. That is, if the only cost category considered is the foregone income associated with decreases in harvest, there is a net benefit associated with precluding pre-commercial thinning in this analysis. While this may seem counterintuitive, the following text describes in detail that pre-commercial thinning is undertaken for a variety of reasons not related to timber sales, including improving the resiliency of the stands. This conclusion is consistent with the findings of the USFS with respect to their management under the LCAS and NRLMD in Units 2, 3, and 5 of the proposed designation. This analysis does, however, quantify the regional economic costs (in terms of income and employment) associated with restricting pre-commercial thinning. The remainder of this section provides the support for this conclusion and highlights the limitations associated with monetizing other potential cost categories of precluding pre-commercial thinning.

125. Pre-commercial thinning is used in light sensitive stands for a variety of reasons, such as, to increase future harvest yields, to create stands containing merchantable timber where it otherwise would not exist, to improve forest health, and to reduce harvest rotation length. The different reasons for implementing pre-commercial thinning are described in more detail below:

- **Increased Harvest Yields:** Increasing future harvest yields not only increases future harvest revenues, but may also increase the long-term sustained yield of a forest, allowing land managers to increase their current harvest levels if they manage at the long-term sustained yield.[93]
- **Development of Merchantable Stands:** Depending on site productivity and species composition, some stands would never reach merchantable size or contain merchantable species if pre-commercial thinning were not implemented.[94]
- **Improved Forest Resiliency:** Significant in western forests where the risk of wildland fire and bark beetle outbreaks is high, pre-commercial thinning can limit the risk and severity of wildland fires, insect outbreaks, and disease. Specifically, pre-commercial thinning helps maintain shade intolerant species such as western larch, ponderosa pine, and western white pine that are relatively resistant to fire. Further, pre-commercial thinning reduces high stem densities that may lead to the formation of dangerous forest fuels as individual trees perish due to competition for light and other resources. Reducing forest fuels and maintaining fire-resistant forest communities

[93] The NRLMD defines the long-term sustained yield as: "the highest uniform wood yield that may be sustained under specified management intensities consistent with multiple-use objectives after stands have reached desired conditions." U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

[94] Personal communication with Elizabeth Davy of Bridger-Teton National Forest on July 2, 2008.

may limit the spread and severity of future wildfires. Further, reduced stem densities limit the spread of disease and insect outbreaks.[95]

- **Faster Growth:** Pre-commercial thinning may accelerate forest growth allowing stands to be harvested at a younger age, thereby increasing the number of harvests that can occur over time.[96]

126. Although the guidelines of the various lynx plans allow for pre-commercial thinning once stands no longer provide suitable habitat for lynx, this effectively precludes the use of pre-commercial thinning altogether as there would be no benefit to a pre-commercial thin once a stand is no longer suitable lynx habitat.[97] In general, the benefits of pre-commercial thinning are realized through reducing stem densities early in a stand's development, thereby increasing the growth of residual trees, increasing the amount of light in the forest to maintain shade intolerant species, and decreasing the risk of disease and infestation. Typically, stands that no longer provide suitable lynx habitat are far enough along in their development that there would not be a significant growth response in residual trees following a pre-commercial thin. Further, shade tolerant species may have already started to replace shade intolerant species that have perished due to competition for light and nutrients. Such competition also leads to a large amount of standing deadwood, which increases the risk of wildfire, disease, and infestation.[98]

127. The effects of precluding pre-commercial thinning depend on site productivity, stand type, and the reason pre-commercial thinning is implemented (i.e., the management goal of the thinning). Non-timber value benefits of pre-commercial thinning, such as improved forest resiliency should be considered at a landscape level rather than a stand level (i.e., the role of multiple disturbance events over a large area consisting of multiple stand types).[99] Quantifying the value of such benefits is difficult because the timing and extent of future disturbance events is unknown. Due to the complexity associated with estimating the effects of pre-commercial thinning on forest resiliency, this analysis focuses on the effects of precluding pre-commercial thinning on the value of future timber harvests. Specifically, this analysis quantifies the effects of precluding pre-commercial thinning on future harvest revenues. To the extent that improving forest resiliency lessens the impact of potential future disturbance events, such as wildfires and insect outbreaks, the analysis underestimates the economic impacts of precluding pre-commercial thinning.

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[95] Personal communication with Barry Bollenbacher, Regional Silviculturalist, U.S. Forest Service, Northern Region on September 8, 2008.

[96] Oester, P.T. and W.H. Emmingham. 1997. Stand Management: Using Precommercial Thinning to Enhance Woodland Productivity. Oregon State University Extension Service.

[97] Personal communications with Bob Seymour of the University of Maine, March 24, 2006; Kenny Ferguson of Huber Resources on March 1, 2006; and Russell Roy of the Penobscot Nation, March 8, 2006.

[98] Personal communication with Timothy Spoelma of the Montana Department of Natural Resources on June 18, 2008.

[99] Personal communication with Barry Bollenbacher, Regional Silviculturalist, U.S. Forest Service, Northern Region on September 8, 2008.

128. This analysis applies the following steps to quantify impacts associated with precluding pre-commercial thinning. These steps are detailed in the following text.

1. Estimate acreage that would be pre-commercially thinned absent lynx conservation needs.
2. Identify forest types for which the preclusion of pre-commercial thinning would result in a decreased future volume (and therefore decreased future harvest level).
3. Estimate per acre costs of pre-commercial thinning (gained by landowners).
4. Quantify the value of the increased forest yield associated with pre-commercial thinning (lost to landowners).
5. Calculate the net present value of impacts of restrictions on pre-commercial thinning.

Step 1: Acreage of forests pre-commercially thinned

129. Exhibit 4-4 provides an estimate of the acreage within the study area that would be pre-commercially thinned each year absent lynx conservation. On average, of the total timberland acreage, only 0.4 percent is pre-commercially thinned annually.

Step 2: Identify forest types for which the preclusion of pre-commercial thinning would result in a decreased harvest level

130. In its Environmental Impact Statement for the development of the NRLMD, the USFS concluded that, in the absence of pre-commercial thinning, shade intolerant tree species such as western larch, ponderosa pine, and western white pine would be replaced by shade tolerant species such as, subalpine fir, Engelmann spruce, grand fir, and white fir, but such a change in species composition would not result in reduced forest volumes. Rather, the change in species composition would make forests much less resilient to disturbance events. However, the same is not true of lodgepole pine stands where precluding pre-commercial thinning may lead to reduced forest volume.[100]

131. Lodgepole pine is very shade and competition intolerant.[101] Further, natural thinning in pure lodgepole pine stands is poor; i.e., unthinned lodgepole pine stands have high stem densities leading to reduced yield. Unlike other stand types, lodgepole pine is not likely to be replaced by other, more shade tolerant tree species. Given that lodgepole pine growth is highly dependent on stocking levels and that lodgepole pine is unlikely to be replaced by shade tolerant species, precluding pre-commercial thinning in lodgepole pine stands could reduce the overall volume in these stands.[102]

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[100] U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

[101] U.S. Forest Service. 1990. Silvics of North America: 1. Conifers; 2. Hardwoods. Agriculture Handbook 654. U.S. Department of Agriculture, Forest Service, Washington, DC. vol.2, 877 p.

[102] U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

132. Economic impacts resulting from decreased timber harvest yields due to the preclusion of pre-commercial thinning are therefore considered in this analysis for lodgepole pine forest areas. USFS remote sensing data describing the forest types of the United States informed this step of the analysis. According to the forest type data and the Environmental Impact Statement for the NRLMD, the following subunits do not contain any lodgepole pine forest and thus do not incur reduced timber harvest yields:

- Unit 3: USFS[103]
- Unit 4: BLM[104]

133. The remaining subunits for which impacts of precluding pre-commercial thinning are quantified in this analysis are:

- Unit 3: BLM and MT DNRC;
- Unit 4: USFS and WA DNR; and
- Unit 5: USFS and WY GFC.

Areas of these lodgepole pine forests that would be pre-commercially thinned absent lynx conservation are summarized in Exhibit 4-5. Importantly, this analysis quantifies the impacts associated with precluding pre-commercial thinning of the acres described in Exhibit 4-5. In some cases, these estimates are based on the forest management goals of the landowners. In fact, Federal landowners may not receive the full funding requested to conduct this pre-commercial thinning and therefore only a fraction of these acres may have been pre-commercially thinned absent lynx conservation.

Step 3: Estimate per acre costs of pre-commercial thinning

134. Landowners' expenditures on pre-commercial thinning are a savings associated with precluding this forest management activity. This analysis estimates a per acre cost of conducting pre-commercial thinning that would not be spent and multiplies this by the acreage that would be pre-commercially thinned. The per acre costs of pre-commercial thinning are described in Exhibit 4-7.

[103] U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana. Although there are lodgepole pine stands on USFS land in Unit 3, there is not a significant amount of pre-commercial thinning scheduled in these stands over the next ten years. Thus, lodgepole pine stands on USFS land in Unit 3 are unlikely to be affected by the preclusion of pre-commercial thinning.

[104] Based on GIS analysis using Washington Department of Natural Resources ownership data: Washington Department of Natural Resources. NDMPL (Washington State Non-DNR Major Public Lands). Published in November, 2007; and U.S. Forest Service forest type data: U.S. Forest Service - Remote Sensing Applications Center (RSAC). 2004. Forest Types of the United States. U.S. Forest Service - Forest Inventory and Analysis (FIA) Program. Unpublished material.

EXHIBIT 4-4 ANNUAL ACREAGE OF STUDY AREA PRE-COMMERCIALLY THINNED

SUBUNIT	TOTAL TIMBERLAND ACREAGE[1]	ANNUAL ACREAGE OF PRE-COMMERCIAL THINNING[2]	PERCENTAGE OF TOTAL ACRES AFFECTED[2]
UNIT 2: MINNESOTA			
Superior National Forest	2,060,000	0[3]	0.00%
UNIT 3: NORTHERN ROCKY MOUNTAINS			
U.S. Forest Service	4,660,000	7,930[4]	0.17%
U.S. Bureau of Land Management	115,000	1,150	1.00%
Montana Dept. of Natural Resources	209,000	1,500[5]	0.72%
UNIT 4: NORTH CASCADES			
U.S. Forest Service	1,080,000	10,800	1.00%
U.S. Bureau of Land Management	2,580	26	1.00%
WA Dept. of Natural Resources	104,000	NA[6]	30.00%
UNIT 5: GREATER YELLOWSTONE AREA			
U.S. Forest Service	5,070,000	2,060[4]	0.04%
Wyoming Game and Fish Commission	9,450	72[7]	0.76%
Total	**13,300,000**	**54,900**	**0.41%**

Notes:

(1.) Based on GIS analysis.

(2.) Absent more specific information, this analysis assumes that one percent of timberlands are pre-commercially thinned each year. This assumption is based on personal communication with a number of landowners: Scott McLeod, MTDNRC, April 10, 2006; Bill Berguson, NRRI, April 6, 2006; Jon Nelson, MNDNR, March 8, 2006; Cheryl Adams, UPM Blandin March 14, 2006; and Tom Ray, Plum Creek Timber Company, June 30, 2006. Also, F.H. Stoltze Land & Lumber Co. "Comments on potential impacts of designation of Critical Habitat for Canada Lynx," provided via facsimile, February 21, 2006.

(3.) For Superior National Forest, no pre-commercial thinning occurred prior to implementing the LCAS (personal communication with Mary Shedd, Superior National Forest, June 11, 2008).

(4.) For the USFS in Units 3 and 5, acreage is based on forecast thinning activities over the next ten years provided in U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana. Data (NRLMD_Econ_Analysis_2008_05_29.xls) provided by Tim Bertram of the USFS, June 6, 2008.

(5.) Personal communication with Timothy Spoelma of the Montana Department of Natural Resources, June 18, 2008.

(6.) As a result of the Washington Department of Natural Resources (WADNR) Habitat Management Plan for the lynx, roughly 30 percent of WADNR timberlands are effectively removed from active timber management due to restrictions on pre-commercial thinning, setting aside lynx travel corridors and denning habitat, and not altering more than 15 percent of land within a ten year period. Impacts to WA DNR forest management activities are not due solely to restrictions on pre-commercial thinning, but to the effective removal of WA DNR land from active forest management (personal communication with Scott Fisher of the Washington Department of Natural Resources, March 17, 2006).

(7.) For Wyoming Game and Fish Commission, analysis assumes that LCAS will be applied only to areas for which LAUs are defined.

EXHIBIT 4-5 ANNUAL ACREAGE PRE-COMMERCIALLY THINNED IN LODGEPOLE PINE STANDS WITHIN THE STUDY AREA

SUBUNIT	ACRES IN LODGEPOLE PINE FOREST[1]	ACRES PRE-COMMERCIALLY THINNED ANNUALLY[2]
UNIT 3		
U.S. Bureau of Land Management	41,200	412
Montana Dept. of Natural Resources	22,600	162
UNIT 4		
U.S. Forest Service	181,000	1,810
WA Dept. of Natural Resources[3]	Unknown	Unknown
UNIT 5		
U.S. Forest Service	2,870,000	711
Wyoming Game and Fish Commission	498	5

Notes:
(1.) Based on GIS analysis using Washington Department of Natural Resources ownership data: Washington Department of Natural Resources. NDMPL (Washington State Non-DNR Major Public Lands). Published in November, 2007; and U.S. Forest Service forest type data: U.S. Forest Service - Remote Sensing Applications Center (RSAC). 2004. Forest Types of the United States. U.S. Forest Service - Forest Inventory and Analysis (FIA) Program. Unpublished material.
(2.) The amount of lodgepole pine forest pre-commercially thinned is assumed to be proportional to the acreage of the total forested acres in the subunit that is pre-commercially thinned as presented in Exhibit 4-4.
(3.) Impacts associated with pre-commercial thinning are quantified in this analysis for the WA DNR lands. These impacts, however, came from personal communication with the land managers (Scott Fisher of the Washington Department of Natural Resources, March 17, 2006) and not by applying the five step method described in this report.

Step 4: Quantify the value of the increased forest yield associated with pre-commercial thinning.

135. Although pre-commercial thinning may be used to develop merchantable stands or reduce rotation lengths, stakeholders indicated that precluding pre-commercial thinning would prevent lodgepole pine stands from reaching a merchantable size on only poor quality sites.[105] On most sites, precluding pre-commercial thinning would result only in reduced volumes. Further, pre-commercial thinning is assumed to increase a forest's growth rate without changing the rate at which the forest's growth rate changes. Thus, the growth of a thinned stand is expected to stagnate at the same time as an unthinned stand, but with a greater volume amassed. Rotation lengths are assumed to be determined by forest growth rates (i.e., harvest occurs when forest growth stagnates), not by forest volume (i.e., harvest occurs when a stand reaches a specific volume). Thus, precluding pre-commercial thinning on lodgepole pine stands is not expected to alter rotation length. Impacts are expected to be similar if rotation lengths are determined by volume. Specifically, thinned and unthinned stands would yield the same volume, however thinned stands would yield it sooner. The economic value of a reduced rotation length

[105] Personal communication with Elizabeth Davy of Bridger-Teton National Forest on July 2, 2008.

due to pre-commercial thinning is expected to be similar to the economic value of an increase in the final harvest amount. Thus, this analysis estimates the impact of reduced final harvests associated with precluding pre-commercial thinning applying the same rotation length for thinned and unthinned stands. The impact of precluding pre-commercial thinning is the decreased forest yield multiplied by the associated average stumpage values. The estimated decreased per acre yields per subunit are highlighted in Exhibit 4-6. Exhibit 4-7 describes the foregone value associated with decreased harvest yields.

EXHIBIT 4-6 ASSUMPTIONS APPLIED IN QUANTIFYING PRE-COMMERCIAL THINNING

SUBUNIT	BASIS FOR PRE-COMMERCIAL THINNING IMPACTS
UNIT 3: NORTHERN ROCKY MOUNTAINS	
U.S. Bureau of Land Management	Based on an increased yield of 10.26 MBF per acre on pre-commercially thinned areas, assuming a 100 year harvest rotation with pre-commercial thinning occurring after 20 years.[1, 2]
Montana Dept. of Natural Resources	Based on an increased yield of 10.26 MBF per acre on pre-commercially thinned areas, assuming an 85 year harvest rotation with pre-commercial thinning occurring after 20 years.[3]
UNIT 4: NORTH CASCADES	
U.S. Forest Service	Based on an increased yield of 10.26 MBF per acre on pre-commercially thinned areas, assuming a 100 year harvest rotation with pre-commercial thinning occurring after 20 years.[1, 2]
WA Dept. of Natural Resources	The aggregated costs of implementing the WA DNR habitat management plan for lynx were provided by WA DNR.[4] Impacts associated with precluding pre-commercial thinning are included in the aggregated costs, but are not separable from the rest of the costs.[5]
UNIT 5: GREATER YELLOWSTONE AREA	
U.S. Forest Service	Based on an increased yield of 10.26 MBF per acre on pre-commercially thinned areas, assuming a 100 year harvest rotation with pre-commercial thinning occurring after 20 years.[1, 2]
Wyoming Game and Fish Commission	

Notes:
(1.) Increase yield estimate based on personal communication with Timothy Spoelma of the Montana Department of Natural Resources, June 18, 2008.
(2.) Rotation length and pre-commercial thinning age information based on personal communication with Barry Bollenbacher, Regional Silviculturalist, U.S. Forest Service, Northern Region on September 4, 2008.
(3.) Forest management information based on personal communication with Timothy Spoelma of the Montana Department of Natural Resources, June 18, 2008.
(4.) Personal communication with Scott Fisher of the Washington Department of Natural Resources, March 17, 2006.
(5.) As a result of the Washington Department of Natural Resources (WADNR) Habitat Management Plan for the lynx roughly 30 percent of WADNR timberlands are effectively removed from active timber management due to restrictions on pre-commercial thinning, setting aside lynx travel corridors and denning habitat, and not altering more than 15 percent of land within a ten year period. Impacts to WA DNR forest management activities are not due solely to restrictions on pre-commercial thinning, but to the effective removal of WA DNR land from active forest management (personal communication with Scott Fisher of the Washington Department of Natural Resources, March 17, 2006).

EXHIBIT 4-7 IMPACTS OF PRECLUDING PRE-COMMERCIAL THINNING (7 PERCENT DISCOUNT RATE, $2008)

SUBUNIT	A: ACRES PRE-COMMERCIALLY THINNED ANNUALLY[2]	B: PRE-COMMERCIAL THINNING COST PER ACRE[3]	C: ANNUAL COST SAVINGS (A * B)	D: AVERAGE STUMPAGE VALUE PER MBF[4]	E: REDUCED TIMBER YIELD (MBF) (A * 10.26 MBF)[5]	F: FUTURE FOREGONE HARVEST VALUE (D * E)	G: PRESENT FOREGONE HARVEST VALUE ($F * (1.07)^{(t_0 - t_1)}$)[6]	H: ANNUAL NET IMPACT (G - C)[7]
UNIT 3								
U.S. Bureau of Land Management	412	$252	$104,000	$126	4,220	$532,000	$2,370	$0
Montana Dept. of Natural Resources	162	$141	$22,800	$126	1,670	$210,000	$2,580	$0
UNIT 4								
U.S. Bureau of Land Management	0	$81	$0	$80	0	$0	$0	$0
U.S. Forest Service	1,810	$81	$146,000	$80	18,600	$1,490,000	$6,640	$0
UNIT 5								
U.S. Forest Service	711	$260	$185,000	$109	7,300	$795,000	$3,550	$0
Wyoming Fish and Game Commission	5	$256	$1,280	$109	51	$5,570	$25	$0

Notes:
(1.) Estimates may not sum to reported totals due to rounding.
(2.) Estimates of the number of acres pre-commercially thinned annually come from Exhibit 4-5.
(3.) With the exception of the Montana Dept. of Natural Resources (MTDNRC) and the U.S. Forest Service in Unit 5, average pre-commercial thinning costs are for National Forests in Montana, Wyoming, and Idaho published in U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana. "NRLMD_Econ_Analysis_2008_05_29.xls" Excel files provided by Tim Bertram of the U.S. Forest Service on June 6, 2008. For USFS in Units 3 and 5, National Forest-specific thinning costs are used as reported in the Final Environmental Impact Statement for the Northern Rockies Lynx Management Direction (see full citation above). For the MTDNRC, average thinning costs are based on personal communication with Scott McLeod of the MTDNRC, April 10, 2006. For the U.S. Forest Service in Unit 5, average thinning costs are based on personal communication with Michael Niccolucci, acting budget coordinator, U.S. Forest Service, Northern Region, Forest and Rangeland Staff on September 8, 2008. Analysis assumes that future pre-commercial thinning costs will be equal to current costs.
(4.) With the exception of Unit 5, average stumpage values are based on past stumpage values reported quarterly for timber sales in National Forests in Montana, Wyoming, and Idaho as reported in Kling, D. 2008. Stumpage prices and volumes sold for individual western national forests: 1984-2007. U.S. Forest Service, Pacific Northwest Research Station. Research note PNW-RN-558. For Unit 5, average stumpage values are based on personal communication with Michael Niccolucci, acting budget coordinator, U.S. Forest Service, Northern Region, Forest and Rangeland Staff on September 8, 2008. Analysis assumes that future stumpage prices will be equal to current prices.
(5.) Reduced timber yield is calculated by multiplying column A (affected acreage) by the foregone per-acre yield highlighted in Exhibit 4-6 of 10.26 MBF.

(6.) The present values of future foregone timber harvests are calculated by discounting future foregone timber harvests using the formula expressed in heading G (assumes a seven percent discount rate) with t_0 equal to the stand age at the time of pre-commercial thinning and t_1 equal to the stand age at final harvest. See Exhibit 4-6 for thinning and final harvest ages by subunit. For all subunits except MTDNRC, which operates on an 85-year rotation, the difference between t_0 and t_1 is 80 years. For MTDNRC, the difference between t_0 and t_1 is 65 years.
(7.) With the exception of the U.S. Bureau of Land Management land in Unit 4, the result of deducting the cost savings (column C) from the present foregone harvest value (column G) is negative for all subunits. However, negative annual net impacts (column H) are zeroed out to reflect the fact that this analysis does not quantify all the potential benefits associated with pre-commercial thinning (see detailed discussion in section 4.4.1 Step 5). Based on personal communication with Forest and Rangeland Staff of the Northern Region of the U.S. Forest Service, precluding pre-commercial thinning is expected to have a net benefit if the only potential impact of precluding pre-commercial thinning considered is reduced harvest yields. The net benefit occurs because of the delay between the time of pre-commercial thinning investment and the time of increased harvest revenues (65 or 80 years depending on the subunit, see note 6). However, when non-timber value benefits, such as increased forest resiliency, are considered, impacts associated with precluding pre-commercial thinning are expected to be non-negative. Therefore, negative annual net impacts are zeroed out to avoid implying that there are net benefits associated with precluding pre-commercial thinning and thus, that landowners are financially better off if they never invest in pre-commercial thinning.

Step 5: Calculate the net present value of impacts of restrictions on pre-commercial thinning.

136. The annual net losses to landowners associated with precluding pre-commercial thinning take into account the cost savings landowners gain by not investing in pre-commercial thinning and the reduced timber harvest revenue landowners receive in the future. The annual impacts are calculated by deducting the cost savings, which are experienced in the current year, from the present value of the future foregone harvest value. Exhibit 4-7 details the methodology used to calculate annual net losses.

137. Although the future foregone harvest value is greater than the annual cost savings associated with not pre-commercially thinning stands in every subunit, the present value of the future foregone harvest value is less than the annual cost savings in every subunit (Exhibit 4-7). This result seems to imply that pre-commercial thinning is a poor investment, given that the benefit of pre-commercial thinning is less than the cost of thinning. However, this analysis does not quantify all the benefits of pre-commercial thinning. As previously noted (see beginning of current subsection), pre-commercial thinning is implemented for a variety of reasons, only one of which is potential increased harvest yields. The main reason for pre-commercial thinning in western forests (Units 3, 4, and 5) is to increase forest resiliency to wildfires, infestation, and disease.[106] For example, a pre-commercially thinned stand may be capable of withstanding a disturbance event that would wipe-out an unthinned stand. The economic value of the continued existence of forests for timber harvest is expected to far outweigh the potential increase in harvest yield achieved through pre-commercial thinning.

138. This analysis does not quantify the economic value of increased forest resiliency for two reasons. First, the economic benefit of increased forest resiliency depends on the occurrence of future disturbance events, the frequency and severity of which are difficult to predict and beyond the scope of the current analysis. Second, a landscape-level analysis including multiple stands and stand types and spanning a large geographic area is necessary to accurately model the potential economic benefits associated with improved forest resiliency.[107] Thus, while this analysis does not quantify the likelihood of catastrophic events occurring and the margin by which pre-commercial thinning contributes to the minimization of their effects, the long-run costs of not pre-commercial thinning are expected to outweigh the benefits of not pre-commercial thinning.[108]

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[106] Personal communication with Barry Bollenbacher, Regional Silviculturalist, U.S. Forest Service, Northern Region on September 8, 2008.

[107] Personal communication with Gary Dickerson, Assistant Director, Michael Niccolucci, Acting Budget Coordinator, Timothy Bertram, Wildlife Biologist, and Barry Bollenbacher, Regional Silviculturalist, of the U.S. Forest Service, Northern Region, Forest and Rangeland Staff on September 4, 2008.

[108] Negative annual net impacts of precluding per-commercial thinning are zeroed out to reflect the fact that this analysis does not quantify all the potential benefits associated with pre-commercial thinning. Based on personal communication with Forest and Rangeland Staff of the Northern Region of the U.S. Forest Service, precluding pre-commercial thinning is expected to have a net benefit if the only potential impact of precluding pre-commercial thinning considered is reduced harvest yields. The net benefit occurs because of the delay between the time of pre-commercial thinning investment and the time of increased harvest revenues (see Exhibit 4-6). However, when non-timber value benefits, such as increased

Regional Economic Impacts

139. Regional economic modeling accounts for the interconnectedness of industries within a geographic area. That is, industries not only supply goods and services to consumers but also to each other. Thus decreased spending in one economic sector has a larger impact on the regional economy as a whole. This concept is commonly referred to as the "multiplier effect."

140. In addition to the on-the-ground impacts associated with precluding pre-commercial thinning activities on USFS, BLM, MT DNRC, WA DNR, and Wyoming Game and Fish Commission lands in Units 3, 4, and 5, this analysis estimates the regional economic impacts associated with the reduced pre-commercial thinning activity. Within the study area, pre-commercial thinning work has primarily been conducted by contractors and not by landowners, such as the USFS. The USFS considers the regional economic impacts generated by the reduced payments to forest service contractors to be the greatest effect of implementing the NRLMD. As a result, the economic analysis contained in the Final Environmental Impact Statement for the NRLMD includes an input-output analysis of the job and labor income effects of precluding pre-commercial thinning.[109]

141. The results of the USFS regional impact analysis are included in this report as baseline impacts associated with precluding pre-commercial thinning to USFS land in Units 3 and 5 starting in 2008 (the first year the NRLMD is assumed to be implemented). These impacts are prorated by land area to account for the fact that the study area of this analysis is less than the area covered by the NRLMD. In addition, this analysis employs IMPLAN, a commonly used regional economic modeling tool, to quantify the regional impacts associated with precluding pre-commercial thinning in the areas covered by the other lynx management plans (LCAS, and MT DNRC).

142. For purposes of this regional economic analysis, the study area for each subunit includes the counties that overlap the study area. The model draws upon data from several Federal and State agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics. IMPLAN translates the lost expenditures (i.e., the decreased spending on pre-commercial thinning that would have provided revenue to forest service contractors) into changes from demand for inputs to the forest service industry. These effects can be described as direct, indirect, or induced, depending on the nature of the change:

- *Direct effects* represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in ranching expenditures on goods and services, by sector);

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forest resiliency, are considered, impacts associated with precluding pre-commercial thinning are expected to be non-negative. Therefore, negative annual net impacts are zeroed out to avoid implying that there are net benefits associated with precluding pre-commercial thinning and thus, that landowners are financially better off if they never invest in pre-commercial thinning.

[109] U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.

- *Indirect and induced effects* are changes in output industries that supply goods and services to those that directly affected by the initial change in expenditures; and Induced effects reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.

143. There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at a single point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. A second caveat to the IMPLAN analysis is related to the model data. The IMPLAN analysis relies upon input/output relationships derived from 2004 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies is a reasonable approximation of current and future conditions. If significant changes have occurred since 2004 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption.

144. The results of the regional economic impact analyses are presented as post-designation impacts in Section 4.5, Exhibit 4-10. As noted, these regional economic impact estimates represent separate, distinct measures of economic impact, the regional impacts are not summed with the efficiency effects quantified in this analysis.

4.4.2 QUANTIFYING OTHER IMPACTS ON FOREST MANAGEMENT ACTIVITIES

145. In addition to considering pre-commercial thinning impacts, this analysis quantifies the following types of impacts.

- **Administrative costs of consultation.** Consultations have historically occurred on Federal lands for forest management activities and on private lands for the issuance of special use permits to access private lands through Federal lands. These consultations have not resulted in project modification nor affected private landowner's ability to access their lands for harvest. This analysis therefore quantifies only baseline and incremental administrative costs associated with these consultations based on the historic rates of consultation on these activities across the subunits.
- **Development of Habitat Restoration Plans.** Five timberland owners in Maine: The Nature Conservancy (TNC), the Passamaquoddy Tribe, the Forest Society of Maine, Katahdin Forest Management LLC, and Elliotsville Plantation, Inc, joined the voluntary Maine Healthy Forest Reserve Program (MHFRP) run by the Natural Resources Conservation Service (NRCS) in 2006 and 2007.[110] Each participating landowner is required to develop a Habitat

[110] Personal communication with Bill Yamartino of the Natural Resources Conservation Service of Maine, May 20, 2008.

Restoration Plan (HRP), which incorporates the draft Maine lynx guidelines into the landowners overall management plans. Program members are subsidized by the NRCS through a cost-share program for their involvement in the MHFRP. Additionally, participating landowners are eligible to enter into Safe Harbor Agreements with the Service, freeing the landowner from additional regulation related to the lynx, as long as the landowner continues to meet the goals of the MHFRP.[111] Currently, all five members of the MHFRP are still developing their HRPs.[112] The pre-designation and forecast post-designation impacts of developing these plans, including funding species research and monitoring, are included in Section 4.5 of this analysis.

- **Superior National Forest management.** Impacts of lynx conservation in Superior National Forest include annual costs related to conserving for lynx during timber harvest, planting, and prescribed burn projects. Application of these lynx conservation efforts are expected to continue in the foreseeable future and are included in Section 4.5.
- **WA DNR land management.** WA DNR's lynx management plan includes guidelines for restricting pre-commercial thinning and creating "set-asides" of lands removed from active forest management. Impacts associated with the implementation of this plan were provided by WA DNR and are included in the results in Section 4.5.

4.5 RESULTS OF THE ANALYSIS

146. This section presents pre- and post-designation impacts to forest management activities in the study area, by unit. Pre-designation baseline impacts stem from the past implementation of forest management guidelines to benefit the lynx and from past consultations resulting in administrative costs. Post-designation baseline impacts to forest management activities are forecast to result from continued compliance with existing lynx management plans and continued section 7 consultations. Post-designation incremental impacts are limited to administrative costs of consultation.

4.5.1 PRE-DESIGNATION IMPACTS

147. Exhibit 4-8 summarizes the pre-designation impacts of lynx conservation on forest management activities by subunit. The following text explains the pre-designation impacts by subunit.

[111] U.S. Fish and Wildlife Service, Maine Ecological Service Field Office and the Natural Resources Conservation Service, Maine State Office. 2006. Programmatic Biological Assessment and Programmatic Biological Opinion for the Natural Resources Conservation Service's Maine Healthy Forest Reserve Program.

[112] Personal communication with Bill Yamartino of the Natural Resources Conservation Service of Maine, May 20, 2008.

EXHIBIT 4-8 TOTAL PRE-DESIGNATION IMPACTS BY SUBUNIT (7 PERCENT DISCOUNT RATE)

SUBUNIT	PRE-DESIGNATION IMPACTS
PROPOSED CRITICAL HABITAT	
UNIT 1: MAINE	
National Park Service	$4,920
Maine Dept of Conservation	$3,380
Conservation NGO	$281,000
Private Timber Lands	$27,000
Other Private Landowners	$1,130
Subtotal Unit 1	*$318,000*
UNIT 2: MINNESOTA	
Superior National Forest	$347,000
Subtotal Unit 2	*$347,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS	
U.S. Forest Service	$361,000
U.S. Bureau of Land Management	$31,900
Private Timber Lands	$26,100
Subtotal Unit 3	*$419,000*
UNIT 4: NORTH CASCADES	
U.S. Bureau of Land Management	$5,260
U.S. Forest Service	$103,000
WA Dept. of Natural Resources	$12,700,000
Subtotal Unit 4	*$12,800,000*
UNIT 5: GREATER YELLOWSTONE AREA	
U.S. Bureau of Land Management	$25,900
U.S. Forest Service	$165,000
Subtotal Unit 5	*$191,000*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$14,100,000**
AREAS CONSIDERED FOR EXCLUSION	
UNIT 1: MAINE	
Tribal lands	$14,900
Subtotal Unit 1	*$14,900*
UNIT 3: NORTHERN ROCKY MOUNTAINS	
Tribal Lands	$12,200
Subtotal Unit 3	*$12,200*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$27,100**
TOTAL IMPACT	**$14,100,000**
Note: Entries may not sum to totals reported due to rounding.	

148. For the majority of the subunits, the only pre-designation impacts include administrative costs of consultation. In addition to these administrative costs, the following pre-designation impacts are included in this exhibit (additional impacts are summed with administrative costs to achieve the values reported in Exhibit 4-8):

- **Unit 1: Conservation NGO subunit -** Costs to TNC associated with the development of their HRP of approximately $263,000 in 2007.[113]
- **Unit 2: Superior National Forest -** Approximately $40,000 in annual impacts have been incurred by Superior National Forest since 2004. These annual costs are due to lynx conservation measures taken during timber harvest, planting, and prescribed burning projects.[114]
- **Unit 3: MT DNRC subunit -** A 2008 programmatic consultation between the Service and the NRCS was conducted to determine the acres where pre-commercial thinning could occur as part of NRCS forest stand improvement projects in this subunit.[115] Pre-designation baseline administrative costs associated with the programmatic consultation are included.
- **Unit 4: WA DNR subunit -** Impacts to forest management activities on WA DNR lands associated with implementing the habitat management plan are quantified using information provided by the WA DNR. Impacts stem from restrictions on pre-commercial thinning as well as setting aside land to provide lynx travel corridors and denning habitat and not altering more than 15 percent of land within a ten-year period, which results in the effective removal of 30 percent of WA DNR lands from active timber management. Annual impacts are estimated to be approximately $1.06 million. This impact began in 2000 and is included in Exhibit 4-8.[116]

4.5.2 POST-DESIGNATION IMPACTS

149. Exhibit 4-9 summarizes the post-designation baseline and incremental impacts of lynx conservation on forest management activities by subunit. The following text explains the impacts by subunit.

[113] Personal communication with Bill Patterson of the Nature Conservancy of Maine, May 22, 2008. The NRCS incurred 50 percent of these costs as part of the MHFRP cost share agreement.

[114] Personal communication with Mary Shedd of Superior National Forest, June 11, 2008.

[115] USDI Fish and Wildlife Service. 2008. Biological opinion on the effects of implementation of the forest stand improvement (code 666) practice in lynx foraging habitat on Canada lynx. U.S. Fish and Wildlife Service. Helena, Montana.

[116] Acres of WADNR land in Unit 4 based on GIS analysis using WADNR data.

EXHIBIT 4-9 TOTAL POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS BY SUBUNIT (7 PERCENT DISCOUNT RATE)

SUBUNIT	POST-DESIGNATION BASELINE IMPACTS	ANNUALIZED POST-DESIGNATION BASELINE IMPACTS	POST-DESIGNATION INCREMENTAL IMPACTS	ANNUALIZED POST-DESIGNATION INCREMENTAL IMPACTS
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
National Park Service	$4,720	$446	$1,570	$149
Maine Dept of Conservation	$3,970	$375	$1,320	$125
Private Timber Lands	$512,000	$48,300	$10,600	$1,000
Other Private Landowners	$1,320	$125	$441	$42
Subtotal Unit 1	*$522,000*	*$49,300*	*$13,900*	*$1,320*
UNIT 2: MINNESOTA				
Superior National Forest	$1,050,000	$99,000	$10,600	$1,000
Subtotal Unit 2	*$1,050,000*	*$99,000*	*$10,600*	*$1,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$282,000	$26,600	$93,900	$8,870
U.S. Bureau of Land Management	$19,500	$1,840	$6,490	$613
Private Timber Lands	$30,700	$2,900	$10,200	$967
Subtotal Unit 3	*$332,000*	*$31,300*	*$111,000*	*$10,400*
UNIT 4: NORTH CASCADES				
U.S. Bureau of Land Management	$4,720	$446	$1,570	$149
U.S. Forest Service	$99,800	$9,420	$33,300	$3,140
WA Dept. of Natural Resources	$11,200,000	$1,060,000	$441	$42
Subtotal Unit 4	*$11,300,000*	*$1,070,000*	*$35,300*	*$3,330*
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$19,500	$1,840	$6,490	$613
U.S. Forest Service	$146,000	$13,800	$48,700	$4,600
Subtotal Unit 5	*$166,000*	*$15,600*	*$55,200*	*$5,210*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$13,400,000**	**$1,270,000**	**$226,000**	**$21,300**
AREAS CONSIDERED FOR EXCLUSION				
UNIT 1: MAINE				
Tribal lands	$133,000	$12,500	$4,860	$458
Subtotal Unit 1	*$133,000*	*$12,500*	*$4,860*	*$458*
UNIT 3: NORTHERN ROCKY MOUNTAINS				
Tribal Lands	$8,390	$792	$2,800	$264
Subtotal Unit 3	*$8,390*	*$792*	*$2,800*	*$264*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$141,000**	**$13,300**	**$7,650**	**$722**
TOTAL IMPACT	**$13,500,000**	**$1,280,000**	**$233,000**	**$22,000**

Note: Entries may not sum to totals reported due to rounding.

Post-designation Baseline Impacts

150. Exhibit 4-3 describes the post-designation lynx conservation efforts quantified in this exhibit. Baseline impacts stem from continued compliance with lynx management plans and administrative costs of consultation. The majority of the total baseline impacts, 83 percent, are associated with the continued implementation of the WA DNR habitat management plan. Impacts, included in Exhibit 4-9 outside of the administrative impacts of section 7 consultation are described below (these impacts are combined with administrative cost estimates to achieve the values reported in Exhibit 4-9):

- **Unit 1: Private Timberland and Tribal lands subunits -** Five timberland owners in Maine: TNC, the Passamaquoddy Tribe, the Forest Society of Maine, Katahdin Forest Management LLC, and Elliotsville Plantation, Inc, joined the voluntary Maine Healthy Forest Reserve Program (MHFRP) run by the NRCS in 2006 and 2007.[117] Impacts of plan development to the Nature Conservancy are included in the pre-designation impacts. HRP development costs to the Forest Society of Maine, Katahdin Forest Management LLC, and Elliotsville Plantation, Inc. are estimated to total $514,000 (undiscounted) in 2009 and are included as post-designation baseline costs Exhibit 4-9.[118] Further, HRP development costs include $126,000 (undiscounted) in 2009 incurred by the Passamaquoddy Tribe to develop its HRP. These impacts are included in the areas proposed for exclusion portion of Exhibit 4-10.[119]
- **Unit 2: Superior National Forest -** Approximately $40,000 in annual impacts are forecast by Superior National Forest to be incurred due to lynx conservation measures taken during timber harvest, planting, and prescribed burning projects.[120] Annual lynx conservation measure costs are discounted over 20 years in Exhibit 4-9.
- **Unit 4: WA DNR subunit -** Impacts to forest management activities on WA DNR lands associated with implementing the habitat management plan are quantified using information provided by the WA DNR. The impacts of creating set-asides and reducing pre-commercial thinning activities are estimated to be approximately $1.06 million annually.[121] This annual impact is discounted over 20 years in Exhibit 4-9.

Post-designation Incremental Impacts

151. In all subunits, the incremental impacts of critical habitat designation are significantly less than the baseline impacts of lynx conservation. This is due to the level of existing lynx conservation prescribed in the various management plans. Incremental impacts are

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[117] Personal communication with Bill Yamartino of the Natural Resources Conservation Service of Maine, May 20, 2008.

[118] The NRCS will incur 50 percent of the development costs under the MHFRP cost share agreement.

[119] Personal communication with Bill Patterson of the Nature Conservancy of Maine, May 22, 2008. The NRCS incurred 50 percent of these costs as part of the MHFRP cost share agreement.

[120] Personal communication with Mary Shedd of Superior National Forest, June 11, 2008.

[121] Acres of WADNR land in Unit 4 based on GIS analysis using WADNR data.

solely associated with additional administrative effort undertaken in section 7 consultation.

152. As described in Section 4.3, significant uncertainty surrounds the future of lynx conservation with respect to forest management practices in Maine. While the Service drafted voluntary lynx habitat management guidelines in 2007 explicitly to provide information to private timberland owners in Maine (these guidelines are detailed in Section 4.2.1), landowners have questioned the feasibility of their implementation. Discussion is ongoing between the Service and the MFPC regarding appropriate conservation efforts.[122] To the extent that landowners do adopt the guidelines for reasons related to the critical habitat designation (for example, to be excluded from critical habitat), this analysis would include those impacts as incremental. Available information, however, is insufficient to determine whether or how the private landowners in Maine may change their land management and therefore quantification of associated impacts is considered too speculative at this time.

Regional Economic Impacts

153. In addition to the post-designation impacts quantified in Exhibit 4-9, this analysis provides information on the potential regional economic impacts associated with the restrictions on pre-commercial thinning. Exhibit 4-10 describes the baseline income and employment effects of restricting pre-commercial thinning for the purposes of lynx conservation. These impacts were generated using the IMPLAN regional economic modeling tool unless otherwise indicated in the exhibit.

[122] Personal communication with Patrick Strauch of the Maine Forest Products Council, May 2, 2008.

EXHIBIT 4-10 REGIONAL ECONOMIC IMPACTS OF PRECLUDING PRE-COMMERCIAL THINNING BY SUBUNIT ($2008)

SUBUNIT	INCOME LOSSES	JOB LOSSES
UNIT 3: NORTHERN ROCKIES		
U.S. Forest Service*	$583,000	65
U.S. Bureau of Land Management	$297,000	12
Montana Dept. of Natural Resources	$219,000	9
UNIT 4: NORTH CASCADES		
U.S. Forest Service	$1,170,000	38
U.S. Bureau of Land Management	$2,450	0
WA Dept. of Natural Resources	$2,430,000	104
UNIT 5:		
U.S. Forest Service*	$176,000	15
Wyoming Game and Fish Commission	$19,600	0

Notes:
(1.) U.S. Forest Service estimates in Units 3 and 5 are taken from: U.S. Forest Service. 2007. Final Environmental Impact Statement Northern Rockies Lynx Management Direction Volume 1. US Department of Agriculture, Forest Service. Missoula, Montana.
(2.) Job and income losses represent the effects of reduced pre-commercial thinning levels on the regional economy, not the effects of reduced pre-commercial thinning levels on logging jobs alone.

4.6 CAVEATS

154. The major assumptions underlying the analysis of impacts to forest management activities are summarized in Exhibit 4-11.

EXHIBIT 4-11 SUMMARY OF CAVEATS TO FOREST MANAGEMENT ANALYSIS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
Analysis assumes that lynx conservation efforts related to forest management (e.g. standards and guidelines specified in LCAS and NRLMD) will not change with the designation of critical habitat.	+/-
Potential impacts associated with implementing the Canada lynx habitat management guidelines for Maine in Unit 1 are not quantified due to the uncertainty associated with how the guidelines may affect forest management practices, and which landowners may adopt the guidelines.	-
Analysis assumes that precluding pre-commercial thinning will not reduce the future volume of any forest type in the study area except lodgepole pine forests.	-
This analysis does not quantify particular categories of potential costs of not pre-commercial thinning, such as decreased resiliency of stands in the event of a wildfire or insect outbreak.	-
Analysis assumes that pre-commercial thinning in lodgepole pine stands in Units 3, 4, and 5 results in an increased harvest yield of 10.26 MBF per acre.	+/-
No alternative management to speed growth or increase yield will occur in response to prohibitions on pre-commercial thinning (i.e. no substitute forest stand improvement measures will be used on stands that would have been pre-commercially thinned).	-
The analysis assumes that no market for slash from pre-commercial thinning exists. An increase in biomass energy production would create demand and provide a market for residue for pre-commercial thinning.	-
Analysis does not forecast future fluctuations in stumpage prices or pre-commercial thinning costs but assumes stumpage prices and thinning costs will remain constant and equal to current values in the future.	+/-
Analysis assumes that MTDNRC HCP (in progress) will result in similar economic impacts as their ongoing forest management rules (i.e., impacts are of reduced pre-commercial thinning).	+/-
+: This assumption may result in an overestimate of real costs. - : This assumption may result in an underestimate of real costs. +/-: This assumption has an unknown effect on estimates.	

CHAPTER 5 | DEVELOPMENT

5.1 INTRODUCTION

155. This section describes potential impacts of lynx conservation efforts on residential, commercial, and industrial development in the study area. Development may affect the species or its habitat by restricting movement via habitat fragmentation, or direct habitat loss.[123] Owners of parcels containing a federally-listed species, or critical habitat for a listed species, may face certain land use restrictions that preclude, restrict, delay, or increase the cost of development on some or the entire parcel. Economic impacts resulting from restrictions on development activities that may result from protections already accorded the lynx are baseline impacts of lynx conservation and are not expected to be affected by the designation of critical habitat (e.g., Federal listing status and other Federal, State, or local regulations). This chapter considers the extent to which baseline impacts of lynx conservation on development activities may occur. In addition, this chapter contemplates the potential for incremental impacts stemming from the designation of critical habitat for the lynx. Incremental impacts considered include whether projects may result in section 7 consultation and be subject to lynx conservation recommendations to avoid adverse modification. In addition, incremental impacts include the possibility of indirect effects such as project time delays resulting from regulatory uncertainty, or stigma effects that diminish property value.

156. To evaluate whether baseline or incremental impacts are reasonably foreseeable, the analysis first considers whether development activities have been affected by lynx conservation efforts associated with baseline regulatory protections to the lynx, or by its original critical habitat designation in 2006. Between 2000 and 2008, there has been little evidence that lynx conservation has affected development activities. Since the final lynx listing in 2000, there have been no consultations within proposed critical habitat on residential development that considered the lynx, and only four on commercial developments (all in Minnesota). None of these consultations resulted in project modification for the purposes of lynx conservation. Furthermore, conversations with county planners in proposed critical habitat areas indicate that few examples exist of proposed developments that have been modified to accommodate lynx conservation goals. In regards to incremental impacts, none of the development consultations occurred after the original lynx critical habitat designation in late 2006, and therefore information

[123] Ruediger, B., et al. 2000. Canada lynx conservation assessment and strategy 2nd Edition. August 2000 (as amended Oct. 23-24, 2001, May 6-8, 2003 and Nov. 12-13, 2003), pg. 50.

is not available from the section 7 consultation history regarding the potential for incremental impacts.

157. In addition to the consultation history, the following factors support the conclusions of this analysis that impacts of lynx conservation on development activities will likely be minimal in the majority of proposed critical habitat areas (these are discussed in more detail in the remainder of the chapter):

- The primary land use activity in proposed critical habitat is timber management. Although development pressure has been increasing in specific areas (e.g., southern Maine, western Montana), it remains very low in the majority of the study area.
- Neither the Lynx Conservation Assessment Strategy (LCAS) nor Maine's Canada Lynx Habitat Management Guidelines specify conservation guidelines related to commercial and residential developments. Regarding land ownership, the LCAS specifies as a general goal, "(w)ork toward unified management direction via habitat conservation plans, conservation easements, or agreements, and land acquisition."[124]
- With few exceptions, counties within proposed critical habitat are either unaware of the lynx, actively assist landowners in streamlining the development permitting process, or have no regulatory authority to recommend lynx or other habitat conservation measures.

158. Given the absence of a Federal nexus for most development projects in the study area, and the variability in local development regulations, this analysis considers potential impacts on a project- and county-specific basis. As discussed below, future development activities within proposed critical habitat may occur on lands currently zoned for timber management. Thus, the analysis considers potential impacts on all privately-owned lands rather than only on lands currently zoned for development.

159. The analysis quantifies potential project modification impacts of lynx conservation only for the Moosehead Development in Maine, which is the only known development project for which both specific project information and potential lynx conservation recommendations are available. This project is discussed in further detail in Section 5.4.1. Aside from the Moosehead project, Missoula and Flathead Counties, Montana and St. Louis County, Minnesota may also experience impacts related to development activities. Missoula has placed restrictions on particular development projects in the past for not meeting the habitat-related requirements laid out in their subdivision guidelines, and will likely continue to do so in future years. Timber companies in Flathead County have recently proposed large-scale developments within their holdings, and county guidance documents consider wildlife and habitat as possible reasons for project modifications. Although St. Louis County has not restricted development projects previously for habitat-related reasons, the county contains Duluth, which has by far the largest population of any town or city in proposed critical habitat and is anticipated to grow in future years.

[124] Ruediger, B., et al. 2000. Canada lynx conservation assessment and strategy 2nd Edition. August 2000 (as amended Oct. 23-24, 2001, May 6-8, 2003 and Nov. 12-13, 2003).

160. Available evidence suggests that development in other parts of the study area will continue as planned. Moosehead and Missoula, Flathead, and St. Louis Counties are unique in proposed critical habitat: Moosehead would experience impacts primarily because of the large scale of development proposed, which is unprecedented in Maine; Missoula and Flathead Counties have both significant development pressure and clear habitat-related requirements for development projects; and St. Louis County is the only county containing a major, growing population center.

161. This analysis employs the best available information in each geographic region within proposed critical habitat to quantify or qualitatively discuss the potential economic impacts to development activities in Units 1 (Maine), 2 (Minnesota), and 3 (northwestern Montana). As the study area in Unit 3 in Idaho, Unit 4 in Washington, and Unit 5 in Wyoming and southwestern Montana is characterized by public lands that are managed for timber and recreation and limited private lands managed for agriculture, development is not considered a likely future land use and the value of these lands for future development is considered negligible.

162. A summary of potential post-designation baseline and incremental impacts are presented in Exhibit 5-1. Present value, post-designation baseline impacts range from $90.6 million to $100 million, or $8.55 million to $9.47 million annualized (both discounted at seven percent). All of these potential costs are associated with the Moosehead Lake development project in Maine, and will largely occur absent critical habitat designation. A programmatic consultation on this project accounts for $24,400 of the present value impacts and the remainder relate to project modification costs (see section 5.4.1 for further discussion of the Moosehead project). Incremental impacts are entirely administrative costs of section 7 consultation, and relate to the incremental component (i.e., addressing adverse modification issues) of the programmatic consultation at Moosehead.

EXHIBIT 5-1 SUMMARY OF POTENTIAL IMPACTS OF CANADA LYNX CRITICAL HABITAT DESIGNATION ON DEVELOPMENT ACTIVITIES (7 PERCENT DISCOUNT RATE)

UNIT	POST-DESIGNATION BASELINE IMPACTS				INCREMENTAL IMPACTS	
	PRESENT VALUE		ANNUALIZED		PRESENT VALUE	ANNUALIZED
	LOW	HIGH	LOW	HIGH		
1	$90,700,000	$101,000,000	$8,560,000	$9,490,000	$8,130	$767
2	$0	$0	$0	$0	$0	$0
3	$0	$0	$0	$0	$0	$0
4	$0	$0	$0	$0	$0	$0
5	$0	$0	$0	$0	$0	$0
Total	**$90,700,000**	**$101,000,000**	**$8,560,000**	**$9,490,000**	**$8,130**	**$767**

Note: Entries may not sum to totals reported due to rounding.

5.2 PROFILE OF REGIONAL DEVELOPMENT ACTIVITIES

163. Although the predominantly rural character of counties containing proposed critical habitat has generally kept development pressure low, pressure has been increasing as land previously managed for timber is being converted to development. Although many of the counties within proposed critical habitat contain zoning for small areas of "developable" lands, zoning designations often appear to be flexible: much of the recent development in the study area has occurred following either rezoning requests or, in some cases, lawsuits against the county planning departments when they have denied such requests.[125]

164. Exhibit 5-2 presents private land ownership in proposed critical habitat within each county in Units 1, 2 and 3, along with the total building permits issued in 2007. Private or unknown ownership of land is highest in Unit 1 (5.9 million acres) followed by Unit 3 (1.1 million acres), and finally Unit 2 (950,000 acres). These data help to identify counties where development impacts are unlikely because of limited privately owned land, no development pressure, or both (e.g., Glacier or Pondera Counties in Montana).

[125] Based on personal communication with Roger Millar, Director of the Office of Planning and Grants, Missoula County, Montana, May 28, 2008.

EXHIBIT 5-2 PRIVATE LANDS AND 2007 BUILDING PERMITS FOR SELECT COUNTIES IN PROPOSED CRITICAL HABITAT

STATE	COUNTY	AREA IN PROPOSED CRITICAL HABITAT (ACRES)	PERCENT OF COUNTY IN PCH	AREA UNDER PRIVATE AND UNKNOWN OWNERSHIP (ACRES)	BUILDING PERMITS	
					2000	2007
UNIT 1						
Maine	Aroostook	2,848,785	65.2%	2,514,330	124	122
	Somerset	1,422,352	54.3%	1,194,600	82	102
	Piscataquis	1,959,316	70.0%	1,451,758	42	83
	Penobscot	494,464	21.7%	452,393	361	444
	Franklin	79,208	7.1%	55,016	109	173
UNIT 2						
Minnesota	Koochiching	111,436	5.5%	4,315	49	73
	Cook	1,026,662	100%	22,013	110	133
	Lake	1,463,373	100%	124,802	127	92
	St. Louis	2,663,196	61.8%	390,538	518	543
UNIT 3						
Montana	Flathead	2,246,931	66.8%	132,041	209	309
	Lincoln	991,067	42.1%	61,994	6	16
	Glacier	404,946	20.8%	3,108	1	1
	Pondera	107,463	10.2%	1	1	0
	Teton	235,231	16.1%	429	3	4
	Lake	307,482	29.0%	22,012	40	100
	Lewis and Clark	933,323	41.7%	76,341	62	88
	Missoula	797,306	48.3%	290,399	339	533
	Powell	1,084,724	71.9%	397,743	0	1
	Granite	92,887	8.4%	68,760	0	0
Idaho	Boundary	32,985	4.0%	0	31	127

Sources: IEc GIS analysis. Building permit information is from U.S. Census Bureau, Estimates with Imputation. Accessed on May 26, 2008 from http://censtats.census.gov/cgi-bin/bldgprmt/bldgsel.pl

Note: A public comment number on the draft version of this analysis stated that the annual building permit activity in Koochiching County is not indicative of the annual construction activity in the time period between 2000 and 2007. This is because of retroactive permitting of existing structures that occurred in this time period. (Terry Stone to the U.S. Fish and Wildlife Service, *Public Comment on February 28, 2008 Proposal for Critical Habitat for L. Canadensis in Minnesota (Unit 2)*) Subsequent communication with Marty Cody, Koochiching County Assessor, on December 4, 2008 confirmed this. Development pressure in Koochiching County is therefore likely less than these figures imply. Regardless, these estimates are not used in the quantitative analysis of impacts, just to highlight relative levels of development pressure.

5.3 ANALYTIC METHODOLOGY

165. This analysis quantifies potential impacts to development activities where sufficient data are available, and describes these potential impacts qualitatively where such data are insufficient. Prior to discussing the analytical methodologies used in this analysis, the following section briefly discusses how this analysis of potential development impacts differs from the economic analysis of critical habitat conducted by the Service in 2006.

5.3.1 DIFFERENCES BETWEEN THE 2006 AND 2008 ANALYSES

166. Given the revised framework, several assumptions underlying the development analysis in the Service's 2006 economic analysis no longer hold. Most importantly, the 2006 analysis assumed that no more than 15 percent of any watershed could be developed within proposed critical habitat based on timber management guidelines outlined in the LCAS. However, none of the four commercial development-related consultations resulted in project modifications to commercial or residential developments, implying that this assumed outcome is improbable. Furthermore, although development has proceeded within proposed critical habitat, no additional residential or commercial development-related consultations occurred between 2006 and 2008. In terms of potential direct impacts of critical habitat, this analysis assumes that private landowners will consult – and therefore be subject to conservation efforts recommended by the Service – only on those lands that have a Federal nexus. Collectively, these changes account for a significant decrease in costs from the previous analysis, as well as a change in the distribution of costs across units.

5.3.2 DETAILED METHODOLOGIES

167. The development analysis first assesses – on a county- and project-specific level – where potential impacts to development activities may occur, and then either describes or quantifies potential impacts depending on available information according to the following steps:

1. **Assess where development is likely to occur.** The analysis identified privately owned lands within proposed critical habitat and recent building permit data. Collectively, these provide information on counties where development pressure is not significant (see Exhibit 5-2). If little or no private land exists within a given county or if a county issued only a handful of building permits for 2007, this county was not considered for further analysis.

2. **Evaluate whether and how development in the selected counties has been or will be affected.** Planning departments of those counties with sufficient privately-owned lands and 2007 building permit activity were then contacted to determine whether implementation of lynx conservation efforts had been observed or were anticipated; specifically, whether the planner: (1) was aware of any development issues relating to habitat or the lynx (baseline impact); (2) had ever observed modifications to development projects to conserve the lynx or habitat, either due to

county, State, or Federal regulations (baseline impact); (3) anticipates that critical habitat designation may affect development either directly or indirectly (incremental impact); and (4) was aware of any large scale developments or rezoning proposals within the county that may require Federal funding or permitting.

3. **Quantify or discuss potential impacts to development activities.** Where preclusion of or modification to development activities has occurred or is expected to occur, appraisal and land sales transactions data were consulted to determine the potential economic impacts of lynx conservation. Potential impacts of precluded development are expressed in terms of lost land values as described in the textbox below. Where counties or the Service have never issued conservation recommendations, and therefore information is not available to determine whether and how development may be affected, potential impacts to future development activities are discussed qualitatively.

Estimating Development Value

The conceptual framework for estimating the full development value for a parcel of land is based on the theoretical models developed by Capozza and Li (1994) and Capozza and Helsley (1990).[a] Capozza and Helsley's study demonstrates that the price of agricultural land has three components: the value of agricultural rents, the growth premium, and the option value of potential development. This analysis applies this logic to the forested lands within the study area by assuming that the price of land in the study area is comprised similarly of:

- The value of silvicultural rents - This represents the value of land as a silvicultural input and generally reflects the commercial present value of the trees.
- The growth premium - This equals the present value of expected increases in land rents after being converted to development.
- The option value of potential development - This is the value of land derived from the option of future development.

It follows that if development of a parcel of silvicultural land is restricted, it will be worth less than its value in the previously unrestricted state. This reduction in value is a cost to the landowner, with the magnitude of reduction depending on the type of land use restriction imposed. If future development is precluded from a parcel, the reduction in land value equals the sum of growth premium and option value. In some cases, land use information indicates that silviculture is not a possible land use. This may be true, for example, where the tree species mix has negligible commercial value. In such cases, this analysis assumes that the only potential future use of the parcel is for development, and therefore that the full price of the land reflects only its development option and growth premium.

[a] Capozza, D.R. and Yuming Li. "The Intensity and Timing of Investment: The Case of Land." *The American Economic Review*, Vol.84, No. 4 (Sep., 1994):889:904. Capozza, D. R. and R.W. Helsley. "The Stochastic City," *Journal of Urban Economics 2*8(1990):187-203.

5.4 PRE-DESIGNATION IMPACTS

168. Pre-designation impacts across proposed critical habitat are attributable to administrative costs of section 7 consultation only. Between 2000 and 2008, there were a total of 13 informal and one formal consultations relating to development activities in Units 2, 3, 4, and 5. Four of these related to commercial developments on private property, and none resulted in project modifications.

- In Unit 2, there were a total of five informal consultations, of which four related to commercial development projects on private lands. The remaining consultation related to an administrative office project in Superior National Forest.
- In Unit 3, there was a single informal consultation related to development of a U.S. Border Patrol Station on Federal lands.
- In Unit 4, there were two informal consultations, one of which related to a public housing project on private land, and the other to a renewal of a recreation residence permit on lands owned by the U.S. Forest Service (USFS).
- In Unit 5, there were five informal consultations relating to development projects on National Park Service (NPS) land, and one formal consultation related to a master development plan on USFS.

169. Estimated costs associated with these consultations are summarized in Exhibit 5-3.

EXHIBIT 5-3 PRE-DESIGNATION BASELINE IMPACTS

UNIT	SUBUNIT	PRESENT VALUE 7%
2	Superior National Forest	$10,000
	Other Private Landowners	$42,800
3	Department of Defense	$8,160
4	Private Land	$9,500
	U.S. Forest Service	$9,500
5	National Park Service	$50,100
	U.S. Forest Service	$21,000
Total		**$151,000**

Notes:
1. Impact estimates reflect impacts incurred from 2000 to 2008.
2. Entries may not sum to totals reported due to rounding.

5.5 POST-DESIGNATION BASELINE IMPACTS

170. Post-designation baseline impacts for development activities are estimated for Unit 1 (highlighted in Exhibit 5-7). Potential baseline impacts in Units 2 and 3 are qualitatively discussed in sections 5.5.2 and 5.5.3, respectively.

5.5.1 UNIT 1: MAINE

171. All of proposed critical habitat lands in Unit 1 are within the unorganized territories of northern Maine, which are regulated by the Land Use Regulatory Commission (LURC), a division of the Maine Department of Conservation. Since the lynx final listing in 2000, small scale development, such as single-family homes, has continued at a relatively steady pace. These developments have primarily been confined to the 0.1 percent of land within LURC territory zoned as developable. Larger scale developments, which are more likely to require a Federal permit (e.g., due to possible highway expansions or the inability to avoid filling wetlands), are also more likely to require rezoning due to the lack of developable parcels of sufficient size. LURC's 2008 draft comprehensive plan outlines clear requirements for rezoning:

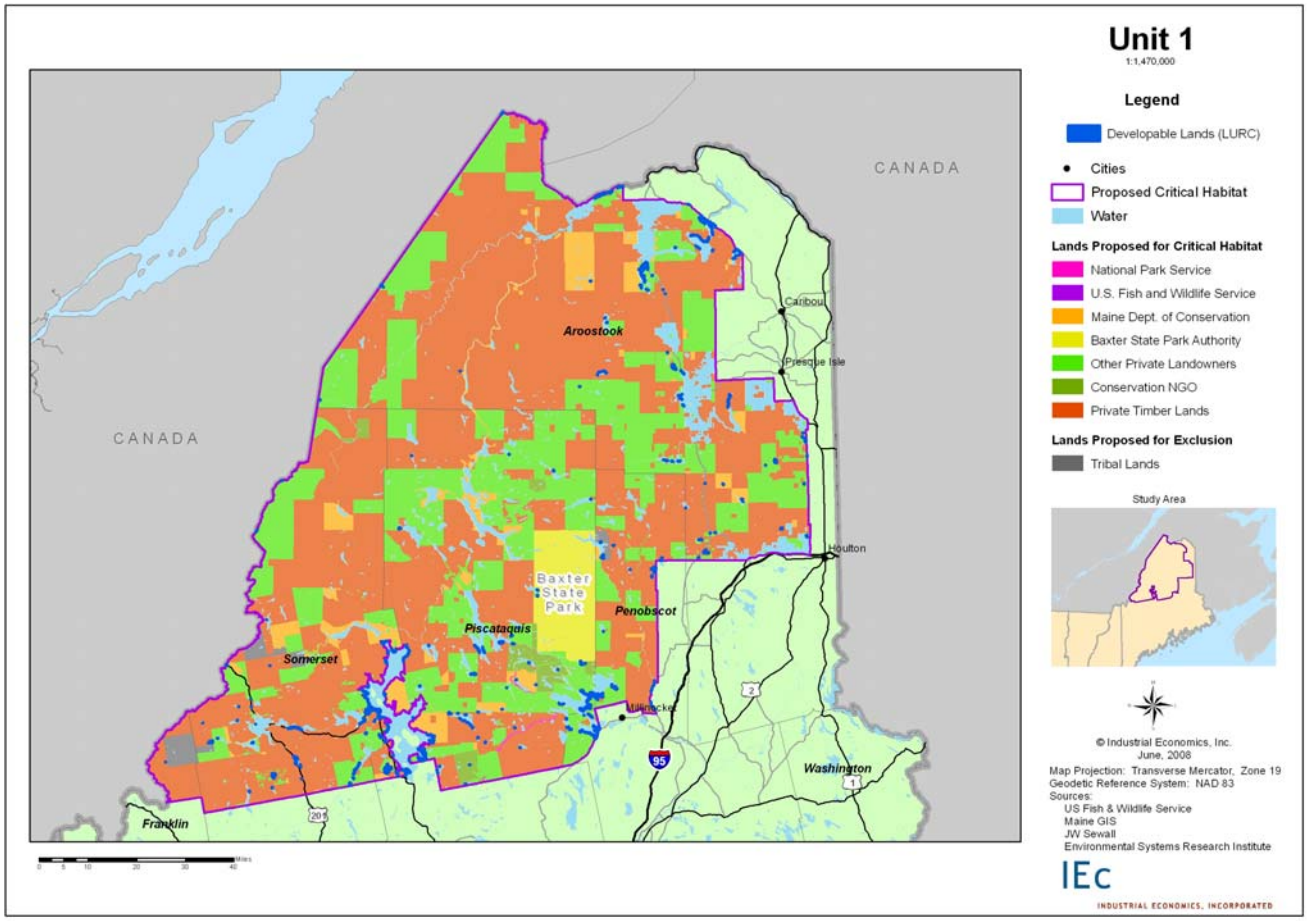
> "The Commission's enabling statute establishes criteria for zoning changes. Such changes must: be consistent with the statute, the Comprehensive Land Use Plan, and district boundary standards; satisfy a demonstrated need in the community; and, have no undue adverse impact on existing uses and resources or be more appropriate for the protection and management of existing uses and resources."[126]

172. Between 1990 and 2005, 93 transactions of greater than 10,000 acres occurred in Maine, the majority of which were in northern timberlands.[127] Several of these transactions involved Plum Creek, which has been transitioning part of its business from timber management to real estate development. In 2005, Plum Creek applied for a large-scale rezoning to allow development in the Moosehead Lake region (discussed in depth below), demonstrating the likely direction of land development in Maine in future years. Exhibit 5-4 shows the distribution of privately owned acres in Unit 1.

[126] LURC. 2008. Comprehensive Land Use Revisions. Accessed on May 28, 2008 from http://www.maine.gov/doc/lurc/reference/cluprev/CLUP_PWDraft_pg5.shtml. Page 4-10.

[127] LURC. 2008. Comprehensive Land Use Revisions. Accessed on May 28, 2008 from http://www.maine.gov/doc/lurc/reference/cluprev/CLUP_PWDraft_pg5.shtml.

EXHIBIT 5-4 DISTRIBUTION OF PRIVATELY OWNED ACRES IN UNIT 1



Source: LURC Parcel Data, January, 2008. Augusta, Maine. Maine Department of Conservation, Land Use and Regulatory Commission. Data received 1/16/2008; LURC Zoning, January, 2008. Augusta, Maine. Maine Department of Conservation, Land Use and Regulatory Commission. Data received 1/16/2008. Proposed Critical Habitat for Canada Lynx, "unit1_propCH" [Shapefile]. U.S. Fish and Wildlife Service, received March 21, 2008.

Potential Development Impacts

173. A variety of development activities in Maine may be affected by lynx conservation efforts, although the only known large scale project that clearly will be affected, based on the consultation history and conversations with LURC, is the 21,000-acre Moosehead development proposal.[128] Both the Service and LURC have responded to Plum Creek's proposal with conservation recommendations that relate specifically to the lynx. As the Service and LURC provided recommendations on the Moosehead development that do not relate to or depend on critical habitat designation, these are categorized as part of the baseline of lynx conservation.

[128] In addition to the Moosehead development, the Service recently received a request for information on an 83-acre, 27 unit subdivision within proposed critical habitat (in Tomhegan Township). At this point, insufficient information is available on the location or characteristics of this project to identify whether the Service would recommend project modifications.

The Moosehead Development Proposal

174. In April of 2005, Plum Creek submitted a proposal to LURC for a large-scale development in the Moosehead Lake region of northern Maine.[129] After several modifications, the October 2007 version of the proposal included the rezoning of roughly 21,000 acres for development and the permanent conservation of 357,000 acres (divided into the 91,000-acre Balance Conservation Easement and the 266,000-acre Legacy Conservation Easement).[130] Both LURC and the Service have since provided project modification recommendations (the Service provided these at LURC's request) intended to limit adverse impacts of the proposed Moosehead development. This analysis quantifies the impacts on Plum Creek of those recommendations from LURC and the Service that were partly or wholly intended to benefit the lynx. Note that lynx conservation was only one of several factors that both LURC and the Service considered in developing their recommendations and that some, if not all, of the recommendations considered in this analysis may have been present absent the lynx. Exhibit 5-5 displays the Moosehead development proposal, as well as conservation recommendations from LURC and the Service.

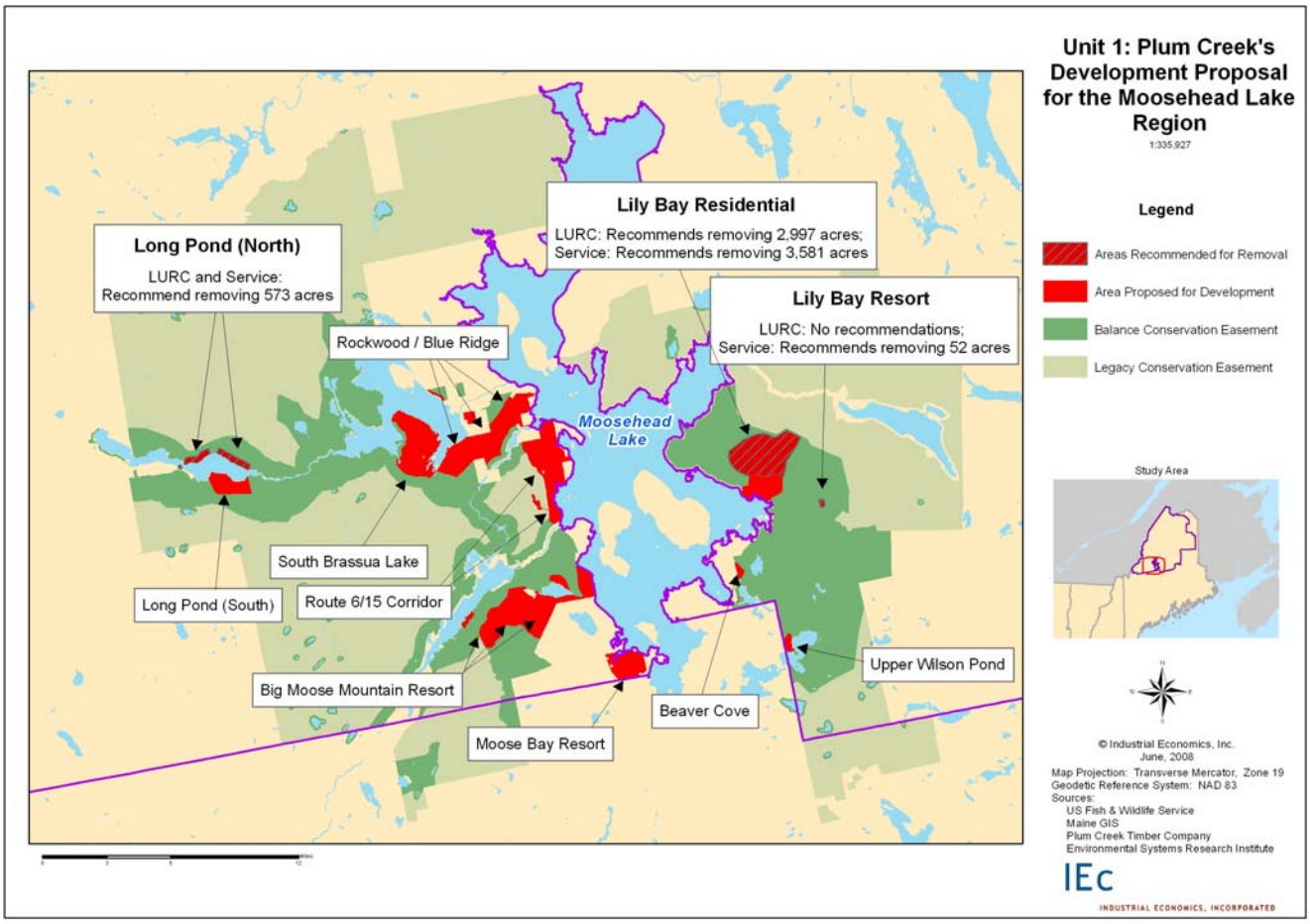
175. In a public comment provided on the draft version of this analysis, Plum Creek stated that if the Service designates critical habitat in the area of the proposed Moosehead development, Plum Creek would likely abandon the Moosehead Concept Plan.[131] This analysis does not consider a scenario in which Plum Creek abandons the Moosehead Lake Plan entirely. However, in the case that the critical habitat designation results in Plum Creek deciding against implement this plan, there are likely to be incremental impacts. This final economic analysis therefore provides the information regarding potential economic impacts of this scenario contained in Plum Creek's comment to decision-makers. While Plum Creek describes that costs (foregone benefits) to Plum Creek and to the public of abandoning the plan, there may also be economic benefits Plan that offset the cost estimates presented by Plum Creek. The alternative use scenario of these lands absent the Moosehead Lake Plan is largely uncertain. As a result, it is difficult to predict what sorts of economic costs and benefits would be associated with the alternative uses of the land. The details of Plum Creek's comments on this issue are described at the end of this section.

[129] Plum Creek. April 2006. Concept Plan for Plum Creek's Lands in the Moosehead Lake Region" Petition for Rezoning.

[130] Plum Creek, Revised Integrated Concept Plan for the Moosehead Lake Region, October 2007.

[131] Plum Creek Timber Company to U.S. Fish and Wildlife Service. 2008. Plum Creek Timber Company Comments on the Revised Canada Lynx Critical Habitat Designation – Proposed Rule.

EXHIBIT 5-5 PLUM CREEK'S DEVELOPMENT PROPOSAL FOR THE MOOSEHEAD LAKE REGION



Source: Plum Creek Data (Conservation Easements, Concept Plan, Proposed Developments) [shapefiles]. Downloaded from State of Maine ftp website (ftp://ftp.state.me.us/) on October 25, 2007. Proposed Critical Habitat for Canada Lynx, " unit1_propCH " [Shapefile]. U.S. Fish and Wildlife Service, received March 21, 2008.

176. This analysis considers the LURC and Service recommendations as the low- and high-end scenarios, respectively.

- Low-End Estimate: LURC recommendations. LURC's lynx-conservation related recommendations are less extensive than the lynx-related conservation efforts that the Service described to LURC. Accordingly, the impacts of implementing LURC's recommendations are a low-end estimate of conservation-related costs incurred on the Moosehead project. This suite of project modifications is considered in the low-end scenario because they represent, at this time, the minimal lynx conservation required of the project in order to be permitted by LURC. However, these do not include additional potential impacts resulting from, for example, any future section 7 costs if the development requires a Section 404 permit. Note that negotiations between LURC and Plum Creek are ongoing.

- High-End Estimate: Service recommendations. The Service's recommendations to LURC regarding lynx conservation associated with the proposed project represent a high-end cost estimate because they reflect the types of project modification the Service is likely to request via section 7 consultation regarding the Moosehead project.[132]

177. Broadly, the LURC and Service recommendations fall into three categories: avoidance, minimization, and mitigation. These recommendations are intended to provide general habitat benefits and protect a wide range of species, including rusty blackbirds, black ducks, bald eagles, loons, olive-sided flycatchers, and Canada lynx. Where possible, this analysis considers only those recommendations that are intended either partly or wholly to benefit the lynx.

1. **Avoidance** is considered to be the highest priority conservation category, and is focused on avoiding as many adverse impacts as possible. Both LURC and the Service recommended that several development envelopes in Plum Creek's concept plan be reduced or eliminated, partly for lynx conservation.[133] These recommended changes for LURC and the Service, along with implied reductions in Plum Creek's developed acreage, are presented in Exhibit 5-6. Although LURC and the Service recommend reducing the size of the Moosehead project by 3,570 and 4,210 acres, respectively, not all of these acres would have been developed. Assuming that Plum Creek can only develop on soils suitable for development and that each development envelope is divided into the largest lot sizes LURC allows, LURC estimates that roughly 40 percent of the 21,000 acres proposed would be developed (the remainder, after 30 years, would become part of the Balance Conservation Easement, described further below).[134] Accordingly, to estimate the acreage that will lose development option values, the analysis reduces the original avoidance recommendations based on LURC's developable acreage percentages. For example, LURC estimates that only 28.8 percent of the Long Pond North envelope is developable, so of the 573 acres where LURC and the Service recommend no development activity, the analysis assumes that only 165 acres lose their development value. Of these, 68 percent – or 113 acres – are assumed to be lakefront based on the distribution of lakefront and inland lots in the Moosehead concept plan.

[132] As these recommendations from the Service are not final or binding, they may provide more stringent recommendations in future consultations.

[133] Personal communication with Agnieszka Pinette, Senior Planner, LURC, June 5, 2008.

[134] LURC. November 5 2007. An Estimate of Excess Land in Development Zones within Plum Creek's Moosehead Lake Region Concept Plan Proposal.

EXHIBIT 5-6 SERVICE AND LURC MOOSEHEAD AVOIDANCE RECOMMENDATIONS

DEVELOPMENT ENVELOPE	OCTOBER 2007 PLUM CREEK PROPOSAL[1]			RECOMMENDED LYNX-RELATED ACREAGE REDUCTIONS		PERCENT OF PROPOSED ACRES THAT CAN BE DEVELOPED[4]	ACREAGE LOSING VALUE DUE TO LYNX-RELATED CONSERVATION EFFORTS[5]			
							LURC		SERVICE	
	PROPOSED ACRES	TOTAL NUMBER OF LOTS	PERCENT LAKE-FRONT	LURC[2]	SERVICE[3]		LAKE-FRONT	INLAND	LAKE-FRONT	INLAND
Long Pond North	573	55	68%	573	573	28.8%	113	53	113	53
Long Pond South	927	55	68%	0	0	41.5%	0	0	0	0
South Brassua Lake	2,872	250	44%	0	0	43.8%	0	0	0	0
Rockwood -- Blue Ridge	4,192	160	2%	0	0	28.0%	0	0	0	0
Route 6/15 Corridor	2,184	125	16%	0	0	36.8%	0	0	0	0
Moose Bay	1,143	110	11%	0	0	55.8%	0	0	0	0
Upper Wilson Pond	184	32	50%	0	0	39.1%	0	0	0	0
Beaver Cove	117	32	0	0	0	90.6%	0	0	0	0
Lily Bay Residential	3,581	154	0	2,997	3,581	31.0%	0	930	0	1,111
Lily Bay Resort	777	250	Unknown	0	52	58.7%	0	0	31	0
Big Moose Mountain Resort	4,446	800	Unknown	0	0	49.5%	0	0	0	0
Total	**20,996**	**2,023**	**0**	**3,570**	**4,206**	**39.9%**	**113**	**982**	**143**	**1,164**

Notes:

Entries may not sum to totals reported due to rounding.

1. Plum Creek. 2007. Revised Integrated Concept Plan. October. Accessed on May 27, 2008 from ftp://ftp.state.me.us/outgoing/PlumCreek/ReceivedFromPlumCreek/2007-10-26%20IntegratedConceptPlan/

2. LURC. 2008. Amendments to Core Elements of Plum Creek's Concept Plan Proposal Generated by the Land use Regulation Commission at its May 27-28 Deliberative Sessions. Accessed on June 19, 2008 from http://mainegov-images.informe.org/doc/lurc/reference/resourceplans/moosehead/2008-06-02amendments_text.pdf.

3. Written communication from Lori Nordstrom, Field Supervisor of the Maine Field Office, to Agnieszka Pnette of the Land Use Regulation Commission on September 13, 2007.

4. LURC. 2007. An Estimate of Excess Land in Development Zones within Plum Creek's Moosehead Lake Region Concept Plan Proposal. November 5. LURC estimates "area needed for development" by multiplying the maximum proposed lot sizes by the total number of lots proposed for each development envelope (e.g., Moose Bay). In some instances, this area exceeds the total area in each envelope that has soils suitable for development. In these instances, the suitable soils acreage is used.

5. To develop estimates of total acreage that loses value, proposed acreage is multiplied by percent of acres that can be developed. This value is divided into lakefront and inland acreages based on the "percent lakefront" value. In the case of the Big Moose Mountain resort, no information is available on lakefront percentage, so these acres are conservatively assigned to the lakefront category.

2. **Minimization.** Where impacts cannot be avoided, they can be minimized. LURC recommends 250-foot buffers surrounding certain sensitive riparian and wetland areas. Service minimization recommendations related to the Lynx include the following:

   - Lot sizes should be reduced from up to seven acres to less than one acre;

- Limit collective footprint of individual lots (house, driveway, yard) in subdivisions;
- Minimize utility line corridors to the maximum extent practicable. Employ design standards and Best Management Practices (BMPs) for all corridors; and
- Reduce design speed of new and upgraded roads (wildlife crossing signage should be employed to alert the public at wildlife crossing areas).

Although complying with these recommendations would impose costs on Plum Creek, quantification of the costs associated with these factors was not possible given best available information: reducing lot sizes and limiting the collective footprint of lots would have unknown effects on the avoidance and mitigation recommendations the Service specifies elsewhere; employing design standards and BMPs for utility line corridors may require additional funding, but only if Plum Creek had not already intended to do so; and estimating the redesign costs of reducing new and upgraded road design speeds would require more specific project design plans than are currently available. Note that if the Service's lot size recommendation were incorporated into Plum Creek's proposal, the total developable area in the Moosehead proposal would decrease from roughly 8,400 acres (i.e., 40 percent of the 21,000 acres – see Exhibit 5-6) to roughly 2,000 acres, assuming each proposed lot was one acre. This would decrease the value of the Moosehead project.

3. **Mitigation**: Once all avoidance and minimization steps have been taken, remaining adverse impacts from the Moosehead development envelopes can be mitigated by restoration, enhancement, creation, or protection of comparably valuable habitat. In the October 2007 proposal, Plum Creek proposes to offset development impacts by donating or selling roughly 357,000 to 369,000 of their acres as conservation easements assuming that their proposal is accepted. The conservation easement areas include:

   - Balance Conservation Easement: includes 91,000 to 103,000 acres donated in the vicinity of Moosehead Lake. The easement will be held by the Forest Society of Maine. Note that the high-end acreage estimates includes an additional 12,000 acres that – according to LURC's assessment – will transfer from the 21,000-acre development zone to the Balance Easement at the end of the 30-year concept plan period.[135]
   - Legacy Conservation Easement: includes 266,000 acres around Moosehead Lake that will be sold as conservation easement for $37 per acre to The Nature Conservancy (TNC) if the Concept Plan is approved.[136]

[135] LURC. November 5, 2007. An Estimate of Excess Land in Development Zones within Plum Creek's Moosehead Lake Region Concept Plan Proposal.

[136] Plum Creek and The Nature Conservancy. 2006. Real Estate Purchase and Sale Agreement No. 560-5.06-5670 and Option to Purchase Property. Accessed on May 30, 2008 from http://mainegov-images.informe.org/doc/lurc/reference/resourceplans/moosehead/2006-11-21agreement.pdf.

Both the Service and LURC have indicated that the conservation easements benefit the lynx.[137] Although Service recommendations do not specifically indicate whether the donated Balance Easement and the discounted Legacy Easement provide an acceptable protection mitigation ratio (357,000 acres over 21,000 acres is a ratio of roughly 18:1), this analysis quantifies potential impacts to Plum Creek associated with these easements assuming that LURC and the Service agree they adequately address lynx conservation. Note that if only the roughly 9,000 acres that are likely to be developed (based on LURC's assessment) are considered, the mitigation ratio is higher.[138]

178. Note that these easements were not proposed by the Service as part of a Section 7 consultation, and that the size and location of the recommended easement area could differ if such a consultation occurred. Furthermore, it is important to note that the conservation easement offsets many values that are affected by the Moosehead development, not only those that are lynx-related.

179. The analysis only quantifies avoidance and mitigation (1 and 3 above) recommendations from LURC and the Service. As described above, best available information did not allow the quantification of minimization recommendations. Next, the lost option values associated with conservation easement and acres precluded from development are examined.

Determining Development Values

180. The analysis values the impacts associated with Plum Creek based on the lynx-related avoidance and mitigation recommendations of LURC and the Service. Reducing the footprint of development to meet avoidance recommendations diminishes the value of those acres. Similarly, donating or selling (at a discounted rate) the development rights to acres in the Balance and Legacy Easements – which benefits the lynx – reduces their property values.

181. Meeting avoidance recommendations would preclude development on both lakefront and inland acres. Thus, the analysis first develops typical values for both acre types based upon Maine Revenue Service (MRS) data near Moosehead.[139] Variances in land value exist for lakefront property at different locations along the lakefront; these variances are driven by the existence of amenities such as road access and proximity to developed

[137] Personal communication with Agnieszka Pinette, Senior Planner, LURC, June 5, 2008 and Written communication from Lori Nordstrom, Field Supervisor of the Maine Field Office, to Agnieszka Pnette of the Land Use Regulation Commission, September 13, 2007.

[138] LURC. November 5, 2007. An Estimate of Excess Land in Development Zones within Plum Creek's Moosehead Lake Region Concept Plan Proposal.

[139] This analysis considers areas within a 250-foot buffer of a major lake as "lakefront", and all others as "inland." MRS provided "front-foot values" (the value of a foot of shore frontage) for all lakes near parcels zoned for development in the study area. Front-foot values are measured within 250 feet from the shoreline. Therefore, the analysis considers all land within 250 feet of a lake "lakefront" and all lands beyond 250 feet "inland." Personal communications with Bob Doirion, Maine Revenue Service, April 24, 2006.

areas.[140] As a result, the value of Moosehead lakefront varies from $126,000 to $221,000 per acre (2008 dollars). For inland acres zoned for development, the analysis applies a parcel-specific value as appraised by MRS.[141,142] Finally, because timber activities will continue on inland acres where development is precluded, the value of silvicultural rents is subtracted from the total land values to establish lost option values. The per acre value of silvicultural rents was based on MRS tax appraisal data for parcels in the northwestern portion of LURC's jurisdiction where silviculture is the only current and likely future land use. The estimated value per acre of strictly silvicultural land is $312 (2008 dollars).[143] As Maine restricts timber harvesting practices within a 250-foot buffer of lakes, absent specific information on how these restrictions affect timber, this analysis assumes that timber harvesting does not occur on lakefront properties, and that lakefront parcels therefore lose their entire market values when development is precluded.[144]

182. To value the impacts of mitigation efforts, the analysis assesses the value of Plum Creek's conservation easements. As the easements are not currently zoned as developable and are not being proposed for rezoning, they are more appropriately valued based on conservation easement sale data rather than appraisal data. Based on analysis conducted by IEc and the Open Space Institute, the Moosehead Balance Easement is most comparable to other Maine easements that have sold for between $177 and $228 per acre.[145] This analysis therefore assumes that the average of this range, or $203 per acre, represents the foregone development option value on the Plum Creek conservation easements. For the Legacy Easement, any difference between Plum Creek's sale price to TNC ($37 per acre) and this value is assumed to represent a cost associated with lynx conservation efforts.

Unit 1 Potential Development Impacts

183. Applying the methods described above, total present value impacts in Unit 1 under the low-end LURC recommendations are $90.7 million, and under the high-end Service recommendations are $101 million as highlighted in Exhibit 5-7 (discounted at seven

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[140] Personal communication with Bob Doirion, Supervisor of Unorganized Territories at the Maine Revenue Service, April 26, 2006.

[141] The LURC parcel boundary data and MRS appraisal data were joined via identical map, plan, and lot numbers. There were instances where the acreages cited in the appraisal data did not reflect the parcel acreage as mapped.

[142] LURC sent IEc a database file containing MRS appraisal data with ID numbers matching those on LURC parcel polygons, received on January 16, 2008 from Ellen Jackson, LURC GIS Coordinator.

[143] MRS appraisal data provided by LURC on April 19, 2006 provides a per acre value of timberland of $208. Subsequent communication with Bob Doirion, Supervisor of Unorganized Territories at MRS, April 26, 2006 suggested that timberland value likely ranges from $208 to $416 per acre (2008 dollars). This analysis therefore applies the average estimate of $312 per acre.

[144] Maine Forest Service. Adopted on June 15, 2005. MFS Rule – Chapter 21, Statewide Standards for Timber Harvesting and Related Activities in Shoreline Areas.

[145] Open Space Institute and Industrial Economics, Inc. November 20, 2007. Analysis of Conservation Commitments in Plum Creek's Moosehead Lake Concept Plan. Discussion Paper No. 3.

percent). Annualized, this ranges from $8.56 million to $9.49 million. All of these impacts occur in the private timberland subunit within Unit 1.

EXHIBIT 5-7 POTENTIAL POST-DESIGNATION BASELINE ECONOMIC IMPACTS OF LYNX CONSERVATION EFFORTS IN UNIT 1 (DISCOUNTED AT 7 PERCENT)

CONSERVATION EASEMENT OR DEVELOPMENT AREA	ACREAGE ESTIMATES		LOST OPTION VALUE (PER ACRE)				TOTAL LOST OPTION VALUE	
	LOW-END	HIGH-END	MARKET VALUE	LAND VALUES TO PLUM CREEK		LOST OPTION VALUE	LOW-END	HIGH-END
				SALE PRICE	TIMBER-LAND			
Precluded Lakeshore Development	113	143	$174,000	$0	$0	$174,000	$19,500,000	$24,800,000
Precluded Inland Development	982	1,160	$15,600	$0	$312	$15,300	$15,000,000	$17,800,000
Balance Easement	91,000	103,000	NA	$0	NA	$203	$18,500,000	$20,900,000
Legacy Easement	266,000	266,000	NA	$37	NA	$166	$44,100,000	$44,100,000
Totals	*433,000*	*445,000*					*$97,000,000*	*$108,000,000*
Present value							**$90,700,000**	**$101,000,000**
Annualized							**$8,560,000**	**$9,490,000**

Notes:
Entries may not sum to totals reported due to rounding.
NA = Not applicable; conservation easement values are taken as the total lost option value, so an assessment of the market value or timberland values on these properties is unnecessary. Note that the sale price of the Legacy Easement is subtracted from the lost option value of $203.

Moosehead Regional Benefits

184. As forecast above, lynx conservation efforts may restrict the size and number of dwellings in the Moosehead project, which may lessen the regional benefits that result from construction, tourism, and recreation. Changes in construction activities at Moosehead would manifest through lost construction-related jobs, and lower spending on inputs such as wood or roofing materials. Decreased tourism and recreation would result in lower spending on fuel, food, equipment, sporting goods, and lodging. Decreased expenditures in these industries would also result in secondary effects on related sectors. Some of these related sectors may be closely associated with the construction, tourism, and recreation industries; however, some sectors may be less closely associated, such as the food service industry. The magnitude of these decreases in regional benefits would accrue as additional costs of conservation, although best available information did not allow the analysis to estimate this impact.

185. The following textbox provides a summary of the regional benefits provided by the proposed Moosehead development project, as assessed by the University of Southern Maine on behalf of Plum Creek. Note that this study evaluates the regional benefits provided by the entire Moosehead project rather than the foregone regional benefits associated with meeting lynx conservation efforts, which would be significantly lower.

The Potential Benefits of the Moosehead Development [a]

In May of 2007, The Center for Business and Economic Research at the University of Southern Maine produced a report on behalf of Plum Creek that provides an overview of the anticipated regional economic benefits that will result from the Moosehead project between 2008 and 2025. The author uses a regional economic model to evaluate the economic effects of both construction activities and long-term changes to tourism and recreation in both the region directly affected by the Moosehead project – Somerset, Kennebec, Penobscot, and Piscataquis Counties – as well as in the nearby larger urban areas such as Bangor and Augusta, where suppliers of goods and services may be located.

These estimated benefits, which include increases in employment, total wage and salaries, and regional population, are summarized in the following table. In total, the authors indicate that increased construction, tourism, and recreation activities provided by the Moosehead project will generate roughly $26 million in benefits annually, and sustain an average of 740 additional jobs. If the acreage or number of dwellings in the Moosehead project is restricted, a fraction of these estimated benefits and jobs will be foregone.

Average Annual Regional economic benefits of Plum Creek's Project (2008 to 2025)

BENEFIT	CONSTRUCTION ACTIVITY		TOURISM AND RECREATION	
	AFFECTED REGION	MAINE	AFFECTED REGION	MAINE
Total Employment	254	283	431	459
Total Wages & Salaries	$9,940,000	$11,100,000	$13,100,000	$14,500,000
Population	257	317	287	325

Potential Impacts if Plum Creek Abandons the Moosehead Concept Plan

186. As noted above, Plum Creek has submitted a public comment indicating that they will likely abandon the Moosehead Concept Plan if the Service designates critical habitat as proposed within Maine. Plum Creek has expressed several concerns about the potential outcomes of critical habitat designation: (1) if LURC treats the critical habitat area as if it were a Fish and Wildlife Protection Subdistrict, proposed developments within critical habitat would require an additional permit; (2) LURC's burden of proof that proposed developments will not harm the natural environment may prohibit these developments; and (3) if Clean Water Act section 404 permits are required for development in Maine critical habitat areas, development projects may be modified or precluded as a result of section 7 consultation.

187. In the case that Plum Creek does abandon the Concept Plan and the motivations for doing so are directly related to critical habitat, both the public and Plum Creek will experience economic impacts resulting from such an outcome. These impacts are summarized by Plum Creek in their public comment:

- A recent report valued lands in the Concept Plan at $189.6 million to Plum Creek.
- Conservation easements were valued at $469,000 in benefits for the local residents and $9.2 million in benefits for Maine residents.

- In total, public benefits of the balance easement were quantified at between $10.8 and $19.2 million.

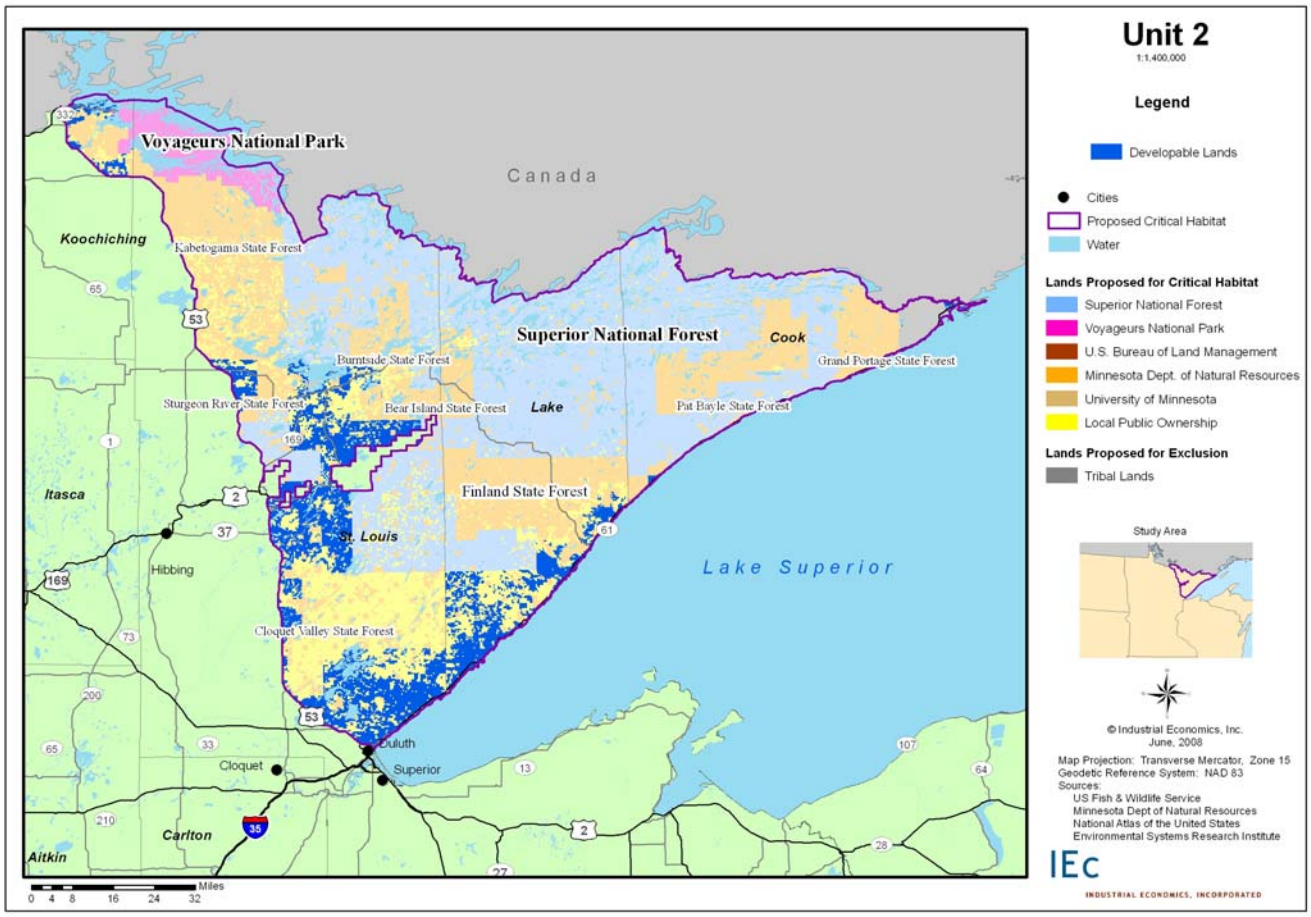
188. This analysis does not sum Plum Creek's estimated impacts with the incremental impacts of critical habitat designation but provides this information to decision-makers for consideration. These impacts are not summed with total incremental impacts for the following reasons. Correspondence with LURC has indicated that their 2007 conservation recommendations with regard to the Moosehead Concept Plan are unlikely to be affected by the designation of critical habitat. Similarly, the 2007 Service conservation recommendations are assumed to provide greater certainty regarding how the Service will consult on this project regarding effects on the lynx.[146] There may also be economic benefits of not going forward with the Moosehead Concept Plan that partly offset the cost estimates presented by Plum Creek. For example, the public benefits gained by donation of the balance easement may be partly or wholly offset by the losses to Plum Creek of restricted land uses. Similarly, any lost Plum Creek development values at Moosehead may be partly recouped through distributed developments throughout Plum Creek's land holdings in Maine. The alternative use scenario of these lands absent the Moosehead Lake Plan is largely uncertain. As a result, it is difficult to predict what sorts of economic costs and benefits would be associated with the alternative uses of the land.

5.5.2 UNIT 2: MINNESOTA

189. Based on available data, roughly 12 percent of proposed critical habitat in Unit 2 is zoned as developable. The unit is contained within four counties: Cook, Lake, St. Louis, and Koochiching, each of which issued a significant number of building permits in 2007. Exhibit 5-8 shows a map of potentially developable lands within Unit 2.

[146] Personal communication with Agnieszka Pinette, Senior Planner, LURC, June 5, 2008.

EXHIBIT 5-8 DISTRIBUTION OF POTENTIALLY DEVELOPABLE LANDS IN UNIT 2



Source: State Land Ownership - County Land Administration, "adm_ctylndpy3" (2004), GAP Stewardship - County Lands, "own_countypy2" (1998), GAP Stewardship - Miscellaneous State Lands, "own_msstapy2" (1998), State Forest Boundaries, "bdry_stforpy3" (2005), State Park Statutory Boundaries, " bdry_stprkpy3" (2002), State Land Ownership - Fisheries Land Administration, " adm_fshlndpy3" (2003), State Land Ownership - Ecological Services Land Administration, " adm_ecolndpy3" (1999), State Land Ownership - Small Holdings Land Administration, " adm_genlndpy3" (1999), State Land Ownership - Parks and Recreation Land Administration, " adm_prklndpy3" (1999), Voyageurs National Park [Shapefile]. (2003), St. Paul, Minnesota: Minnesota Department of Natural Resources (MN DNR) Available at: http://deli.dnr.state.mn.us/ [January 3, 2006]. Proposed Critical Habitat for Canada Lynx, " unit2_propCH " [Shapefile]. U.S. Fish and Wildlife Service, received March 21, 2008.

Potential Development Impacts

190. There is little evidence that development activities in Unit 2 have been restricted by lynx conservation activities. Unlike proposed critical habitat in Maine and Montana, where there has been increasing interest in converting large tracts of timberland to real estate, development in Unit 2 has been progressing steadily and on a smaller scale. In the four counties within proposed critical habitat, county planners typically work with landowners and a team of advisors from a variety of State and Federal agencies, such as the Minnesota Department of Natural Resources (MN DNR) and the U.S. Army Corps of

Engineers (USACE), to ensure that proposed development projects avoid impacts to wetlands that would require a Federal permit.[147] Given the availability of developable land in these areas and the relatively low development value associated with wetlands, such project adjustments would typically impose little costs on landowners. Furthermore, avoiding wetlands has no direct relation to lynx conservation activities. The timing or locations of specific future development projects within the developable areas highlighted in Exhibit 5-8 are unknown. Absent this information, the analysis does not quantify impacts to development activities in Unit 2.

191. Although impacts to development activities associated with lynx conservation efforts are anticipated to be low in Unit 2, St. Louis County is anticipated to have the highest likelihood of future development impacts within the unit. St. Louis County contains the largest city in proposed critical habitat – Duluth, a city of 85,000 – which is projected to grow 25 percent by 2015.[148] Large-scale developments have recently been proposed in the county, including over 20 projects planned throughout the Iron Range and a 1,400-acre development owned by U.S. Steel.[149] Whether these projects are affected by lynx conservation depends, in part, on the presence of a Federal nexus. Given the relatively dense concentration of wetlands throughout Unit 2, growth in Duluth may trigger section 7 consultations through USACE.

192. Elsewhere in Unit 2, impacts to development activities associated with lynx-conservation efforts are anticipated to be minimal.

- Koochiching County: although extensive jurisdictional wetlands allow for the possibility of section 7 consultation (roughly 68 percent of the county is wetlands and USACE has indicated that they are all jurisdictional), development pressure remains low and developments are typically small scale.[150]
- Lake County: Although the Lake County Comprehensive Plan directs developers to minimize impacts to wetlands and other natural features, there are no clear wildlife-

[147] Personal communication with Barb Hayen, Planning Director, Planning and Development Office, St. Louis County, Minnesota, May 27, 2008, and personal communication with Richard Lehtinen, Environmental Services Department, Koochiching County, Minnesota, May 27, 2008.

[148] Population from: U.S. Census Bureau. 2006. *Population Estimates: Cities and Towns*. Accessed on April 10, 2008 from http://www.census.gov/popest/cities/SUB-EST2006-4.html. Growth projection from: City of Duluth. 2008. *Population Planning – Ordinances*. Accessed on April 10, 2008 from http://www.duluthga.net/dt/planning/ordinances/CompPlan/compplantoc.html.

[149] Personal Communication with Barb Hayden, Planning Director, Planning and Development, St. Louis County, May 27, 2008; and St. Louis County Land Use Report, "Large Scale Projects Map" of Iron Range developments. Accessed on May 27, 2008 from http://www.co.st-louis.mn.us/slcportal/SiteMap/HomePage/Departments/Planning/ReportsPublications/tabid/333/Default.aspx.

[150] Personal Communication with Richard Lehtinen, Environmental Services Department, Koochiching County, May 27, 2008; and Koochiching County Draft Ordinances. 2008. Accessed on May 27, 2008 from http://www.co.koochiching.mn.us/dept/esd/Kooch%20dev%20ords%20clean%20copy.pdf.

related goals outlined in county guidance documents.[151] Furthermore, the county is 82 percent public lands and has very few new developments each year (according to the County Planner, only seven to eight new lots have been developed annually in recent years).[152]

- Cook County: Both the land use change application and mitigation plan in Cook County indicate a proactive position towards species management.[153] Additionally, recent new subdivisions in the county have been over 100 acres, large enough to potentially make filling of wetlands – and therefore acquiring Section 404 permits – unavoidable.[154] However, privately held acreage in the county is limited (92 percent of the county is publicly owned) and no information is available on where or when future developments may occur. As such, forecasting of impacts in Cook County is considered speculative.

5.5.3 UNIT 3: NORTHWESTERN MONTANA

193. Unit 3 contains 10 counties in Montana and one in Idaho, but based on private land and building permit information (shown in Exhibit 5-2), impacts to development activities were evaluated for only four of the counties in Montana: Flathead, Lake, Lincoln, and Missoula. The remaining seven counties have very little privately owned lands within proposed critical habitat, issued few building permits in 2007, or both. Exhibit 5-9 maps the potentially developable lands within Unit 3. Summaries of economic analyses by private landowners are presented at the end of this section.

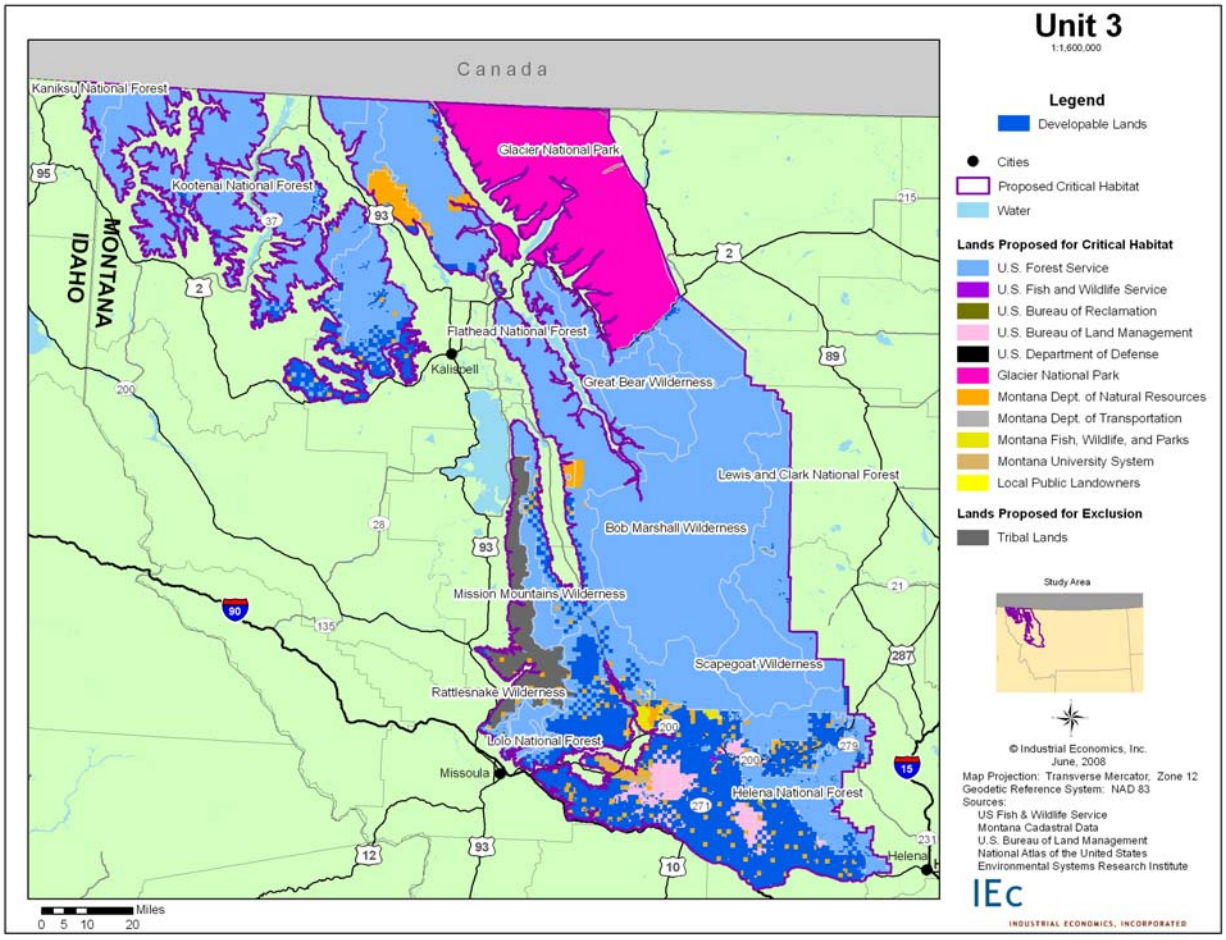
[151] Lake County Comprehensive Plan and Land Use Ordinance and Lake County Subdivision Ordinance. 2006. Accessed on May 26, 2008 from http://www.co.lake.mn.us/index.asp?Type=B_BASIC&SEC={78F39E21-95D3-4037-993E-AEE220806092}.

[152] Personal Communication with Walt VanDenHuvel, Planning and Zoning Office, Lake County, June 5, 2008.

[153] Cook County Planning and Zoning Land Use & Related Ordinances. 1997. Accessed on May 26, 2008 from http://www.co.cook.mn.us/zoning/index.html; and Lower Poplar River AUAR Mitigation Plan. Accessed on May 26, 2008 from http://www.co.cook.mn.us/zoning/lutsen_low_poplar_auar/Lower_Poplar_River_AUAR_Mitigation_Plan.pdf.

[154] Personal Communication with Tim Nelson, Planning and Zoning Department, Cook County, June 20, 2008.

EXHIBIT 5-9 DISTRIBUTION OF POTENTIALLY DEVELOPABLE LANDS IN UNIT 3



Source: Montana Cadastral Database [Shapefile]. (1999; on-going updates). Helena, Montana: Dept. of Administration/Information Services Division; with MT Dept. of Revenue and some MT. Counties. Available at: http://gis.mt.gov/ [April 16, 2006]; Proposed Critical Habitat for Canada Lynx, " unit3_propCH " [Shapefile]. U.S. Fish and Wildlife Service, received March 21, 2008.

Potential Development Impacts

194. Although northwestern Montana is sparsely populated and has had a history of relatively little building permit activity, the proposed critical habitat areas within the four counties included in this analysis contain timberland that is increasingly being rezoned to allow development projects. Impacts are most likely in Missoula and Flathead Counties; Lake and Lincoln Counties are anticipated to experience minimal impacts. Although there may be increased regulatory stringency in certain Montana Counties as a result of critical habitat designation, the locations, size, and value of future development proposals is uncertain, as is the frequency with which they will occur in future years. Absent additional information on the specific land use restrictions that may be imposed (e.g., precluded development), the cost of those restrictions, and their relation to lynx conservation, no impacts to development activities are quantified for Unit 3. The following discussion identifies potential impacts in each county within the unit.

195. Lynx conservation efforts related to development activities are anticipated in Missoula and Flathead Counties. Missoula County has used their subdivision rules to deny development proposals based on habitat conservation, although the county has never denied a permit specifically because of the lynx.[155] Between 70 and 80 percent of privately owned lands in Missoula County are timberlands owned by Plum Creek, which has recently been developing 160-acre parcels from their holdings.[156] The emphasis that Missoula County has historically placed on wildlife conservation goals indicates that future development projects of Plum Creek and others are more likely to be affected by lynx conservation.

196. Similarly, Flathead County has clear conservation goals outlined in their Subdivision Regulations and their Growth Policy.[157] For example, the stated goal in the "Natural Resources" chapter of the growth policy is to "preserve and protect wetlands and riparian areas to prevent degradation in natural resources, including but not limited to, water quality and critical wildlife habitat". [158] Additionally, several large development projects are either in progress or proposed by both Plum Creek and Stoltz (another major timberland owner in Montana) within Flathead County.[159] Both companies have conducted economic analyses indicating that designation of critical habitat will adversely affect development option values of timberlands in Unit 3. These analyses are summarized in the following textbox.

[155] Personal Communication with Roger Millar, Director, Office of Planning and Grants, Missoula County, May 28, 2008; and City Subdivision Regulation Amendments. 2008. Accessed on May 28, 2008 from http://www.co.missoula.mt.us/opgweb/UrbanInitiative/index.htm.

[156] Personal Communication with Roger Millar, Director, Office of Planning and Grants, Missoula County, May 28, 2008.

[157] Flathead County Draft Subdivision Regulations. 2008. Accessed on May 27, 2008 from http://www.co.flathead.mt.us/fcpz/drafts.html; and Flathead County Growth Policy. 2007. Accessed on May 27, 2008 from http://www.co.flathead.mt.us/fcpz/growthpolicy.html.

[158] Flathead County Growth Policy. 2007. Accessed on May 27, 2008 from http://www.co.flathead.mt.us/fcpz/growthpolicy.html.

[159] Personal Communication with the Planning and Zoning Office, Flathead County, June 27, 2008.

Summary of Plum Creek and Stolze Economic Analyses of Critical Habitat Designation, and Plum Creek Technical Comments

Stoltze and Plum Creek expressed concern that critical habitat designation would reduce the development option value of lands currently being managed for timber. Both landowners developed their own economic analysis of critical habitat designation for the lynx, which they provided in their public comments on the proposed rule (Plum Creek's economic analysis was received as a public comment on IEc's Final Economic Analysis of Critical Habitat Designation for the Canada Lynx published in 2006). Although the economic analyses provide valuable information on potential development impacts in Unit 3, they cannot be incorporated into IEc's 2008 economic analysis because they assume that the LCAS guidelines (discussed above) would be applied universally across their landholdings.

Additionally, Plum Creek submitted technical comments on the 2008 proposed critical habitat designation, some of which related to development issues. These technical comments provide information on the locations and extent of Plum Creek conservation efforts within proposed critical habitat in Unit 3. Later in 2008, Plum Creek submitted public comments on the proposed designation that provide the locations and extent of Plum Creek land holdings and anticipated development projects within Unit 3. However, absent additional information on the specific land use restrictions imposed by these plans (e.g., precluded development), the cost of those restrictions, and their relation to lynx conservation, these conservation efforts are not monetized.

Plum Creek Economic Analysis (2006)[1]

Plum Creek lands within Unit 3 are used for real estate management, development, and timber management. Plum Creek estimates that the greatest impact of critical habitat designation will be a reduced ability to develop their lands in the future. Specifically, they estimate impacts to real estate and development projects by determining the difference in land value between lands that have the potential to be developed in the future and lands that only have a timber value. Assuming that Plum Creek would sell its land over a 20-year period, it estimates the total value at risk associated with the designation of critical habitat to be approximately $138,000,000 (discounted at seven percent).

Stoltze Economic Analysis (2008)[2]

Stoltze estimates the lost development option value on its land assuming that critical habitat designation would preclude future development. Stoltze is concerned that future development may be precluded due to an inability to meet State land use planning access, fire hazard, and wildlife requirements for development projects. Stoltze estimates its lost option value to be approximately $120,000,000.

Plum Creek Technical Comments (2008)[3]

Plum Creek owns land within three ongoing land use planning efforts that address lynx conservation issues:

- 82,994 acres of Plum Creek ownership fall under the Seeley Lakes Regional Plan (near the border of Missoula and Powell Counties). 99 percent of these acres are placed in resource protection classifications partly intended to preserve wildlife and their habitat. Where known lynx habitat exists, development rights will be transferred to areas more suitable for development.
- 66,200 acres of Plum Creek ownership fall under the Thomson Chain of Lakes Neighborhood Plan (Lincoln and Saunders Counties). Given that the Chain of Lakes is largely situated just outside of proposed critical habitat in Lincoln County, it is uncertain how much of this area is within the study area. The Neighborhood Plan will identify strategies for the long-term protection of areas critical to important wildlife, and coordinates with the Montana Department of Natural Resources and Conservation and the U.S. Forest Service to improve land management through land trades, consolidations, or purchase agreements.
- An unknown area of Plum Creek ownership falls under the Ashley Lake Neighborhood Plan (Flathead County). The Plan provides greater guidance on land use than the Flathead County growth policy, and is currently in the process of being updated and expanded in coordination with various State and Federal agencies. Development potential within the planning area would be limited.

Summary of Plum Creek and Stolze Economic Analyses of Critical Habitat Designation, and Plum Creek Technical Comments (Continued)

Plum Creek Public Comments (2008)[4]

In their 2008 public comment, Plum Creek identifies several Montana county regulations that involve protection of wildlife. If critical habitat is designated in these areas, Plum Creek is concerned that development on their Montana holdings will be more heavily controlled or more stringently regulated. Specifically, development may he precluded on Plum Creek lands due to more restrictive growth policies in Missoula, Lake, and flathead counties, and subdivision regulations may become more stringent in Missoula, flathead, and Lincoln counties.

Finally, the comment letter evaluates a scenario where local land use agencies impose minimum lot sizes on subdivision developments. According to Plum Creek's analysis, requiring that future Plum Creek developments in proposed critical habitat have lot sizes greater than 20, 160, and 640 acres would result in losses of $0.44 million, $74.2 million, and $243.1 million, respectively. Communication with Montana county planners, however, indicates that few are likely to modify their minimum lot size requirements in response to critical habitat designation. Further, it is unclear whether any minimum lot size requirements would be baseline or related to critical habitat. The Seely Lake Regional Plan example (the basis for the high-end 640 acre lot size assumption) is an existing (baseline) protection and already imposes its minimum lot size. This would therefore not be considered an incremental impact of critical habitat designation in the economic analysis. As such, the final economic analysis presents the results of Plum Creek's study of impacts to development on their Montana lands but does not include these estimates in the total impacts of the critical habitat designation as they are considered too speculative.

Sources:

[1] Plum Creek Timber Company LP. 2006. Economic Comments: Proposed Designation of Critical Habitat for the Canada Lynx on Plum Creek Lands in Maine and Montana.

[2] F.H. Stoltze Land and Lumber Company. 2008. Public Comment on Proposed Canada Lynx Critical Habitat Designation.

[3] Plum Creek Timber Company LP. 2008. Plum Creek Technical Comments on the Revised Canada Lynx Critical Habitat Designation – Proposed Rule.

[4] Plum Creek Timber Company to U.S. Fish and Wildlife Service. 2008. Plum Creek Timber Company Comments on the Revised Canada Lynx Critical Habitat Designation – Proposed Rule.

197. The remaining counties within Unit 3 are unlikely to experience significant impacts associated with lynx conservation.

- Lincoln County: Because Lincoln County does not issue development permits, unless a development project requires Federal permitting, it is unlikely that there would be any regulatory mechanism to restrict future development projects to meet lynx conservation goals. Furthermore, their subdivision regulations indicate no regulatory mechanism in place to restrict development activities to avoid adverse impacts to wildlife.[160] Although Plum Creek owns large tracts of land in the southern portion of the county, the major area where they are planning development in the county (i.e., the Chain of Lakes region) is outside of proposed critical habitat.[161]

[160] Personal Communication with Lisa Oedewaldt, Planning Department, Lincoln County, May 27, 2008; and Lincoln County Subdivision Regulations. 2008. Accessed on May 28, 2008 from http://www.lincolncountymt.us/subdivision_regulations.htm.

[161] Personal Communication with Lisa Oedewaldt, Planning Department, Lincoln County, May 27, 2008.

- Lake County: According to the Lake County Planning Department, the vast majority of proposed critical habitat in the county is either on State land, in protected wilderness areas, or has topography that is unsuitable for development.[162] Although Plum Creek owns timberland within the county that may one day be developed, the majority of this land is not within proposed critical habitat.

5.6 INCREMENTAL IMPACTS

198. Incremental impacts of proposed critical habitat designation include administrative costs of considering adverse modification for a single programmatic section 7 consultation for the Moosehead project. No incremental project modification costs are anticipated. The incremental impacts associated with this consultation are roughly $8,130, anticipated to occur in the private timberlands subunit of Unit 1.

5.7 CAVEATS AND ASSUMPTIONS

199. Impacts were quantified for the Moosehead project in Unit 1 only. In other units, forecast impacts would be speculative because of uncertainty regarding: 1) how development will occur elsewhere in proposed critical habitat over the next twenty years; and 2) whether lynx conservation will affect future development projects. Lynx conservation may however, affect development activities in other areas within proposed critical habitat, particularly St. Louis County in Unit 2 and Missoula and Flathead Counties in Unit 3. County-level land management in these two counties requires consideration of the affects of development projects on wildlife and habitat. Exhibit 5-10 summarizes the major assumptions and caveats underlying the analysis of impacts to the proposed Moosehead project in Unit 1.

[162] Personal Communication with Sue Shannon, Planning Department, Lake County, May 27, 2008; and Lake County Density Map and Regulations. 2008. Accessed on May 28, 2008 from http://www.lakecounty-mt.org/planning/Lake_County_Density_Map.html.

EXHIBIT 5-10 CAVEATS AND ASSUMPTIONS UNDERLYING THE ANALYSIS OF IMPACTS TO THE MOOSEHEAD DEVELOPMENT

ASSUMPTION	POTENTIAL EFFECT ON RESULTS[1]
Lost development option values associated with both the conservation easements and LURC's and the Service's avoidance recommendations are attributable entirely to lynx conservation. In reality, lynx conservation was one of many motivations for the easements and recommendations.	+
Absent additional information, the high-end estimate in this analysis does not quantify impacts associated with meeting the Service's minimization recommendations. In particular, the recommendation that all parcels be reduced in size from up to seven acres to less than one acre may have significant impacts.	-
LURC's recommendations, which define the low-end estimate, are final. Ongoing negotiations may result in less stringent permitting requirements.	+
Recommendations from the Service, which define the high-end estimate, are final and apply universally across the proposed development. In reality, only a subset of the acres will be subject to future consultations, but more stringent project modification requests may be recommended.	+/-
Meeting LURC's and the Service's recommendations to limit the number of developed acres has no effect on the size of Plum Creek's easement. If fewer acres can be developed, Plum Creek may reduce the size of the easement.	+
Per acre development option values are constant across the conservation easements. In reality, per acre values will very between lakeshore and inland parcels	+/-

Notes:
+: This assumption may result in an overestimate of real costs.
- : This assumption may result in an underestimate of real costs.
+/-: This assumption has an unknown effect on estimates.

CHAPTER 6 | RECREATION

6.1 INTRODUCTION

200. This section describes potential impacts of lynx conservation on snowmobiling, ski area development projects, and trapping activities. Existing lynx management plans provide guidance on avoiding impacts to lynx from these activities by limiting expansion of designated groomed snowmobile trails, designing ski area expansions to maintain lynx habitat patches, and by conducting trapper education efforts to avoid accidental take of lynx.

201. Recreation is a prominent land use activity in the areas proposed for critical habitat and plays a significant role in the regional economy. Most of the proposed designation is contained within public lands with the exception of Maine, where snowmobiling and other activities are allowed on private and state lands through mutual agreements between the landowners. The contribution from the snowmobiling industry alone to respective State economies in Unit 1, Unit 2, and Unit 3 is over $500 million annually. Over one thousand miles of trail overlaps the study area, helping to sustain recreational opportunities to visitors as well as the supporting industries.

6.1.1 SUMMARY OF RESULTS

202. The majority of economic impacts associated with lynx conservation for recreation activities are expected to be baseline. That is, lynx conservation management activities related to snowmobiling, ski area expansion, and trapping have been developed based on the species' listing, and are not expected to change with the designation of critical habitat.

203. Total pre-designation impacts are estimated to be $2.12 million, representing the administrative costs of consultation. Potential post-designation impacts of $5.47 million to $5.58 million over the next 20 years are also primarily a result of administrative costs of consultation. In addition to administrative impacts, continued trapper education efforts and restrictions on the development of new snowmobile trails will contribute a relatively small portion of the total post-designation impacts. Forecast impacts to all recreation activities are summarized below and in Exhibit 6-1 and detailed in the remainder of this chapter:

- **Snowmobiling**. Snowmobiling has been the primary focus of lynx conservation with respect to recreational activities. Where lynx management plans exist that apply limits on trail expansion, it is possible that snowmobilers may have a diminished recreational experience due to increased crowding on existing trails.

- **Ski Area Expansions.** To date, lynx conservation efforts related to ski area expansions (as recommended in section 7 consultations) have not resulted in changes in the availability or quality of skiing experiences. However, they have required administrative effort (including the incorporation of lynx conservation in the development plans). With the exception of one potential private ski area development in Maine, all new ski area development and expansions are expected to occur on U.S. Forest Service (USFS) lands within the study area. The occurrence of these activities on USFS lands establishes a Federal nexus and consequently all proposed development and expansion activities are subject to section 7 consultation regarding the lynx. This analysis assumes that any associated conservation efforts would be based on the standards and guidelines described in the Northern Rockies Lynx Management Decision (NRLMD) and are therefore baseline impacts of species conservation. No incremental impacts, apart from additional administrative costs of consultation, are forecast associated with ski area developments and expansions.
- **Trapping**. Lynx conservation efforts related to trapping focus on educational programs run by State agencies designed to assist trappers in identifying and avoiding incidental take of lynx. Specifically, dissemination and enforcement of the guidelines, including an educational lynx brochure, constitute the economic impacts associated with lynx conservation for trapping activities. Costs of trapping program requirements associated with issuance of Incidental Take Permits (ITPs) in Maine and Minnesota are considered baseline impacts of lynx conservation.
- **Other recreation activities.** While approximately 73 percent of past recreation consultations (60 of 82) have considered activities such as campground modifications, hiking trail upgrades, and outfitter guide permits (projects unrelated to snowmobiling, skiing, or trapping), no project modifications related to lynx conservation have occurred for these other recreation activities. Therefore only the administrative costs of consultations are included for relevant subunits.

EXHIBIT 6-1 SUMMARY OF SCENARIO 2 (HIGH END) POTENITAL IMPACTS OF CANADA LYNX CRITICAL HABITAT DESIGNATION ON RECREATION (7 PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION				
1	$2,290,000	$216,000	$10,100	$956
2	$2,390,000	$226,000	$61,300	$5,780
3	$380,000	$26,600	$94,200	$8,890
4	$454,000	$42,900	$106,000	$10,000
5	$68,900	$6,500	$13,000	$1,220
Total	**$5,580,000**	**$518,000**	**$285,000**	**$26,900**
Note: Entries may not sum to totals reported due to rounding.				

204. The remainder of this chapter describes the extent of the three principal recreational activities within the study area in detail, outlines the analytical methodology employed to estimate the economic impacts associated with lynx conservation for each activity, and presents baseline and incremental impacts associated with the critical habitat designation.

6.2 SNOWMOBILING

6.2.1 PROFILE OF SNOWMOBILE ACTIVITY IN THE STUDY AREA

205. Recreational activities that use compacted, over-the-snow routes occur on established trails within the study area. In some areas, this type of trail may introduce competition from other carnivores such as coyotes, which lack the lynx's large furred paws that are specialized for deep snow travel.[163] Snowmobiling has been the primary focus of lynx conservation with respect to recreational activities and exist in all of the proposed units across a variety of landowners.[164] On non-Federal lands, State agencies and snowmobile clubs generally maintain the trails.[165] Although specific information and plans are not available, interest exists in developing additional trails in Units 2 and 4. The following sections describe the extent of snowmobiling activity in the proposed units, and Exhibit

[163] Note that, as described in the 2008 proposed rule, compacted snow trails are not considered a risk factor to lynx in the Northern Rockies Lynx Amendment area (source: 73 FR 10869 and NRLMD). The Lynx Conservation Assessment and Strategy still includes this as a risk factor, however (source: Ruediger, B., et. al. 2000. Canada lynx conservation assessment and strategy 2nd Edition. August 2000 (as amended Oct. 23-24, 2001, May 6-8, 2003 and Nov. 12-13, 2003). USDA Forest Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and National Park Service. Forest Service Publication #R1-00-53; 73 FR 10868).

[164] 70 FR 68294.

[165] Note that while Unit 5 contains portions of Yellowstone National Park where significant revisions to winter use, including snowmobile access, have occurred (see 2 FR 70781 Final Rule. Special regulations; areas of the National Park Service), none of the designated snowmobiling areas within the park overlaps with the study area.

6-3 highlights the areas where lynx conservation efforts may result in economic impacts to snowmobile recreation.

206. Exhibit 6-2 lists the existing conservation guidelines for snowmobile trails, all of which apply to development of new groomed, designated trails. Guidance on trail management exists for Federal lands in all units except for Unit 1 (LCAS), and State lands in Washington (the Washington Department of Natural Resources (WA DNR) management plan).

EXHIBIT 6-2 LYNX CONSERVATION STANDARDS FOR SNOWMOBILE ACTIVITIES

GUIDELINE	SOURCE
Allowing no net increase in groomed or designated snow routes and snowmobile play areas within a lynx analysis unit.	LCAS
Mapping and monitoring snow compacting activities.	LCAS
Designing trails, roads, and lifts to direct winter use away from diurnal security habitat.	LCAS
No increases in designated or groomed over-the-snow routes or snowmobile play areas will be allowed within lynx geographic range managed by WA DNR.	WA DNR management plan
Closure of some areas that are currently used will be considered if specific areas of increased concern are identified and mutually agreed upon by WA DNR and the USFWS.	WA DNR management plan
Strategies to discourage inappropriate use will include signing of gated systems and placement of physical barriers along the entrance to trail or road systems where appropriate.	WA DNR management plan
Additionally, increased organized snowmobile use within the lynx management zones (LMZs) will not be promoted.	WA DNR management plan
Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on a Lynx Analysis Unit (LAU) basis, or on a combination of immediately adjacent LAUs.	NRLMD

207. The NRLMD does not restrict trail expansions on USFS lands in Units 3 and 5. While the NRLMD contains a guideline (see Exhibit 6-2 above) that states that over-the-snow routes should not be expanded outside of areas of consistent snow compaction, this guideline is not a required standard as the USFS and the Service have both asserted that compacted snow trails are not considered a risk factor to lynx in the NRLMD area.[166,167]

208. Exhibit 6-3 highlights the distribution of snowmobile trails in the study area compared to each State's total trails. In Unit 1, the extent of snowmobile trails is greatest on private timber lands, composing a quarter of the State's snowmobile trails.[168] In Unit 3, the

[166] 73 FR 10869

[167] NRLMD, page 340.

[168] For Unit 1, this analysis only considers snowmobile trails included in Maine's Interconnected Trail Ssytem (ITS). It is recognized that there are over 10,000 miles of trails in Maine that are maintained by local and regional snowmobiling groups, however, the specific geographic locations of these trails are not available.

USFS lands in the study area contain 28 percent of the State's annually groomed trail miles. In Units 2, and 4, the majority of trails occurs on Federal and State lands, and composes a small percentage of the trails available in the State (from less than one to six percent). In the last column, the Exhibit indicates what lynx management is in place in the study area with the potential to affect snowmobile recreation. Details regarding this management are presented later in this Chapter.

EXHIBIT 6-3 SNOWMOBILE TRAILS AND MANAGEMENT FOR LYNX IN PROPOSED CRITICAL HABITAT

SUBUNIT	MILES	PERCENTAGE OF TOTAL STATE TRAILS	PERCENTAGE WITHIN THE STUDY AREA	APPLICABLE LYNX MANAGEMENT
UNIT 1 SNOWMOBILE TRAIL MILES				
TOTAL WITHIN THE STUDY AREA: 784		**TOTAL STATEWIDE :** 2,974		
National Park Service	2	<1%	<1%	No lynx management applicable to recreation activities in Unit 1.
Baxter State Park Authority	2	<1%	<1%	
Maine Department of Conservation	58	2%	7%	
Maine Department of Inland Fish & Wildlife	3	<1%	<1%	
Private Timber Land	604	20%	78%	
Conservation NGO Land	14	<1%	2%	
Unknown Landowner	95	3%	12%	
Tribal Land	6	<1%	<1%	
TOTAL	784	26%	100%	
UNIT 2 SNOWMOBILE TRAIL MILES				
TOTAL WITHIN THE STUDY AREA: 1,217		**TOTAL STATEWIDE :** 18,884		
Superior National Forest	291	2%	24%	LCAS in place, demand for new trails.
Voyageurs National Park	8	<1%	<1%	No lynx management applicable to recreation activities in these subunits.
Minnesota department of natural resources	466	2%	38%	
Private Mining Company Lands	11	<1%	<1%	
Private Timber Company Lands	16	<1%	1%	
Unknown landowner	423	2%	35%	
Tribal Land	2	<1%	<1%	
TOTAL	1,217	6%	100%	
UNIT 3 SNOWMOBILE TRAIL MILES				
TOTAL WITHIN THE STUDY AREA: 1,410		**TOTAL STATEWIDE :** 4,071		
U.S. Forest Service	1,150	28%	82%	No lynx management applicable to
State (MT DNRC, MT DFWP, MT University system)	195	5%	14%	

SUBUNIT	MILES	PERCENTAGE OF TOTAL STATE TRAILS	PERCENTAGE WITHIN THE STUDY AREA	APPLICABLE LYNX MANAGEMENT
Private Timber Land	65	2%	4%	recreation activities in Unit 3.
TOTAL	1,410	35%	100%	
UNIT 4 SNOWMOBILE TRAIL MILES				
TOTAL WITHIN THE STUDY AREA: 203		**TOTAL STATEWIDE: 3,001**		
Washington Department of Natural Resources	23	<1%	11%	WA DNR Lynx Habitat Management Plan
U.S. Forest Service	174	6%	86%	LCAS
Unknown-State	6	<1%	3%	Unknown
TOTAL	203	<1%	100%	
UNIT 5 SNOWMOBILE TRAIL MILES				
TOTAL WITHIN THE STUDY AREA: 1,155		**TOTAL STATEWIDE: ~1,455**		
U.S. Forest Service	1,155	79%	100%	No lynx management applicable to recreation activities in Unit 5.
Yellowstone National Park	453 (none in study area)	0	0%	LCAS

Note: The trail miles shown for the U.S. Forest Service lands in Units 3 and 5 are the average designated routes groomed each year.

Sources:
Unit 1: Maine Snowmobile Association. GIS of Interconnected Trail System Map. Provided by Carl Morrison via email. March 13, 2006.
Unit 2: Minnesota Department of Natural Resources. Data Deli. http://deli.dnr.state.mn.us/data_search.html Accessed March 17, 2006.
Unit 3: Personal Communication, Bob Walker, Montana Department of Fish, Wildlife and Parks, March 10, 2006; NRLMD, Table K-8. Miles of designated or groomed winter routes and acres of designated play areas. page 490
Unit 4: Washington State Parks and Recreation Commission, Winter Mapping Program. Provided by Karen Behm. March 14, 2006.
Unit 5: NRLMD, Table K-8. Miles of designated or groomed winter routes and acres of designated play areas. page 490.
Statewide trail mileage summed for groomed trails by region, accessed at http://wyotrails.state.wy.us/Snow/RegionMap.aspon June 23, 2008; Yellowstone National Park. GIS of park roads which constitute the snowmobile trails in winter. Provided by Kerry Murphy, Biologist, Yellowstone National Park, on April 28, 2008.

Unit 1 – Northern Maine

209. Snowmobiling is a popular sport in Maine, with registrations through the Maine Department of Inland Fisheries and Wildlife (IF&W) ranging between 74,000 and 100,000 machines each winter season since the mid-1990s.[169] A 1998 study estimated the economic impact of snowmobiling in Maine at $261 million annually.[170] In Unit 1, snowmobiling occurs predominantly on private and State lands. Two State agencies and

[169] In general, the number of registrations each year varies with snowpack and conditions. Despite good snowfall and conditions in the State in 2007-2008, registrations have not grown as much as expected, a decrease thought to be due to recent increases in gasoline prices. Written communication from Bob Meyers, Director, Maine Snowmobile Association, on May 2, 2008.

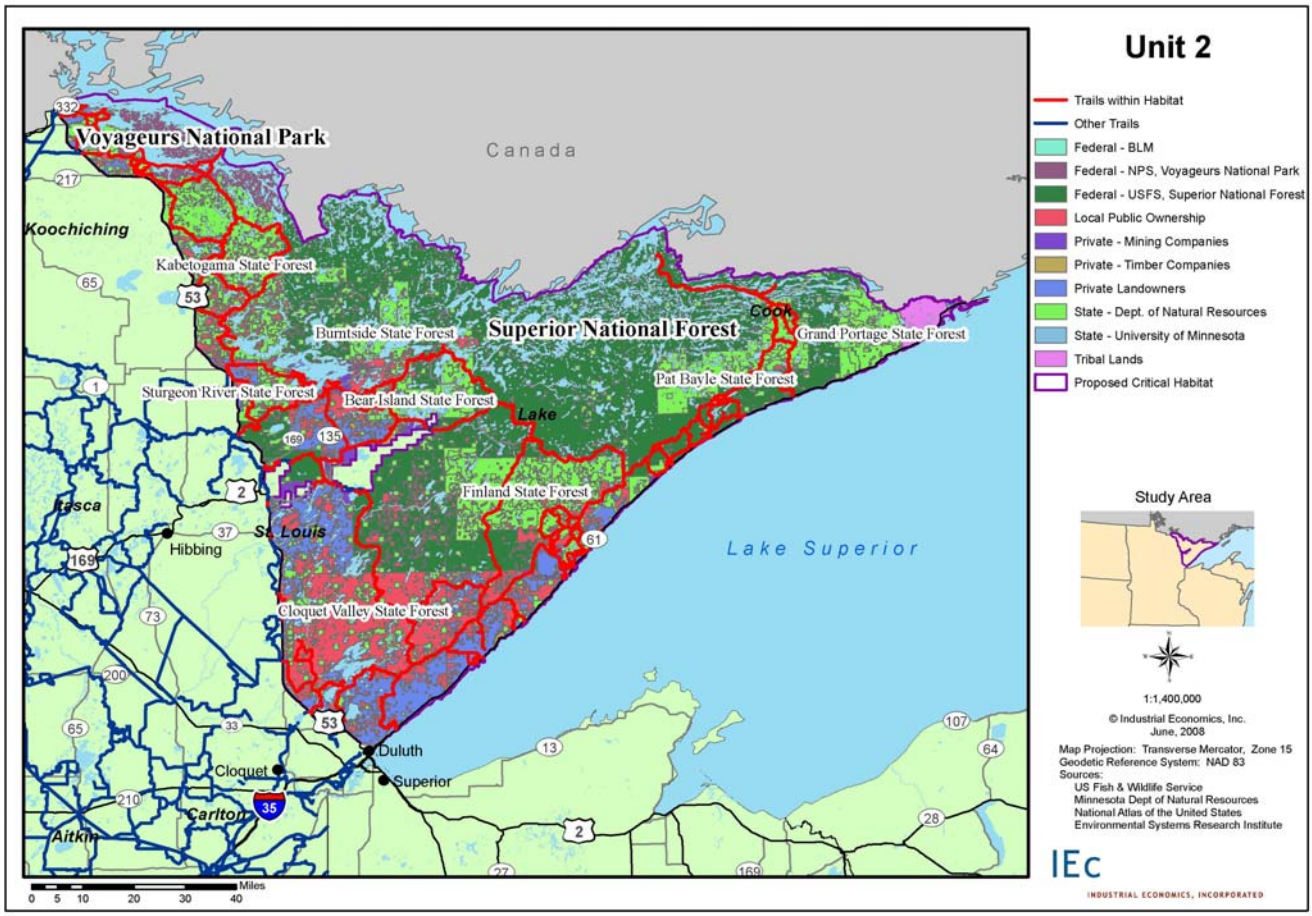
[170] An Economic Evaluation of Snowmobiling in Maine: An Update for 1997-98 Conducted by Stephen Reiling, Department of Resource Economics and Policy University of Maine, Orono, Maine 04469-5782 For: The Maine Snowmobile Association Available at: http://www.mesnow.com/Study.html

networks of private landowners manage the activity. There is currently no lynx management that would restrict creation of new snowmobile trails or extension of existing trails.

Unit 2 - Minnesota

210. Snowmobiling in Minnesota is focused in the northeast region of the State which experiences high quality snow over a long winter season (Exhibit 6-4 shows Minnesota snowmobile trails). There are 20,000 miles of trail statewide, and over 278,000 machines were registered in the State in 2007.[171] A 2005 economic impact study of snowmobiling in Minnesota found that direct snowmobiling expenditures in Minnesota totaled $199.6 million.[172]

EXHIBIT 6-4 SNOWMOBILE TRAILS IN UNIT 2

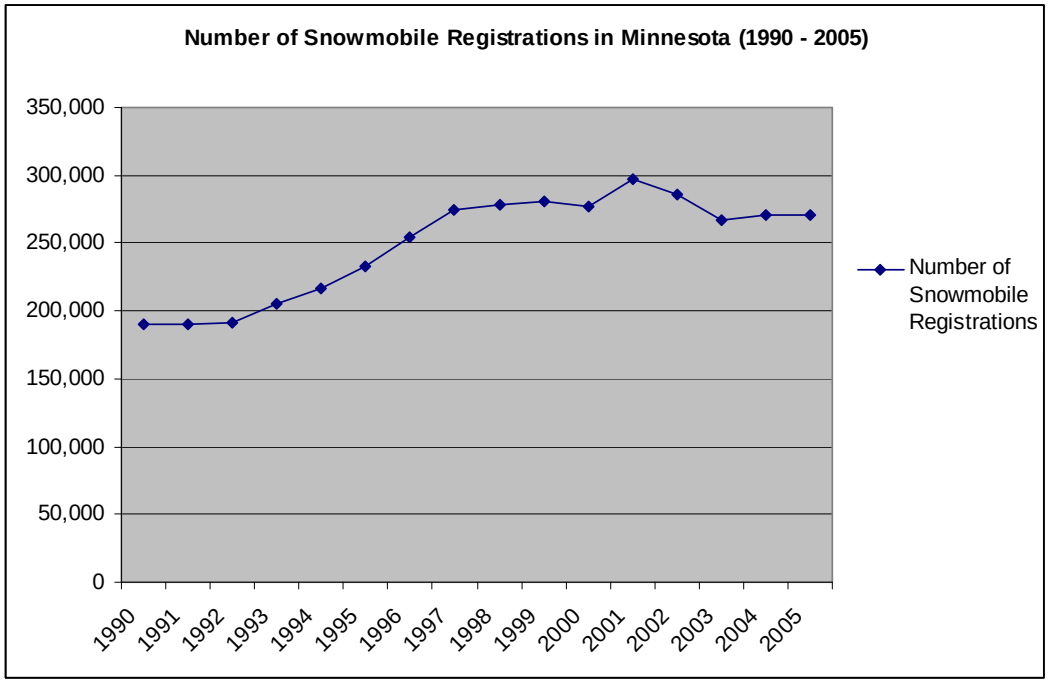


[171] Preliminary estimate provided in written communication from Nancy Hanson, Business Director, Minnesota United Snowmobile Association, on May 21, 2008.

[172] Schneider, I. E. Ph.D., P. Elisabeth, R. Salk, and T. Schoenecker. 2005. *Snowmobiling in Minnesota: Economic impact and Consumer Profile.* University of Minnesota Tourism Center, with the analytical assistance of Analysis & Evaluation at the Department of Employment & Economic Development.

211. The Minnesota Department of Natural Resources (MN DNR) produced a ten-year forecast of Minnesota adult outdoor recreation participation for the years 2004 to 2014.[173] Relying on MN DNR registration numbers, census data, and population projections, MN DNR expects a 4.3 percent decrease in snowmobile activity, expressed in terms of number of participants and annual hours of participation. The MN DNR estimates that the percentage of the Minnesota population participating in snowmobiling will decrease by 16.8 percent by 2014. Communication with MN DNR staff indicates that the demand for snowmobile trails is largely satisfied, with the majority of trail work currently related to maintenance.[174] Exhibit 6-5 highlights the number of snowmobile registrations between 1990 and 2005. Although the number of registrants increases throughout the 1990's, registrations declined from 2000 to 2005 and the MN DNR forecasts this decline in registrations to continue.[175]

EXHIBIT 6-5 SNOWMOBILE REGISTRATIONS IN MINNESOTA 1990 – 2005



212. In contrast, there may be demand for additional trails on Superior National Forest, according to the Forest's 2003 Trails Plan.[176] The Trails Plan notes that snowmobile

[173] Kelly, Tim. 2005. Ten-year forecasts of Minnesota adult outdoor recreation participation, 2004-2014. Minnesota Department of Natural Resources. Office of Management and Budget Services.

[174] Ed Quinn, Scott Kelling, Tom Peterson, Minnesota Department of Natural Resources.

[175] Kelly, Tim. 2005. Ten-year forecasts of Minnesota adult outdoor recreation participation, 2004-2014. Minnesota Department of Natural Resources. Office of Management and Budget Services.

[176] U.S. Department of Agriculture, Forest Service. 2003. Superior National Forest Trail Management Plan. Page 9.

clubs have asked to groom additional routes and roads, as well as requesting that a new loop trail be built.[177] Superior National Forest manages for lynx with the LCAS conservation standards, and therefore, restrictions on the expansion of designated groomed trails may affect snowmobiler activity in this Unit.

Unit 3 - Northern Rockies

213. Snowmobiling in the study area in Montana occurs on State and private lands.[178] A recent study estimated that statewide, in the winter 2001-2002 season, nonresident snowmobilers spent over $46.5 million, and residents spent approximately $105.8 million during the same period on snowmobiling-related expenditures (2006 dollars).[179] The majority (over 96 percent) of snowmobiling in Montana occurs on Federal lands; less than one percent takes place on private lands, and the balance occurs on State lands. During the 2005-2006 season, 4,071 miles of snowmobile trail were groomed statewide in Montana.[180] The total number of groomed trails ranges between 3,950 and 4,150 from year to year, as logging activity can affect where grooming is allowed.

Unit 4 – North Cascades

214. Snowmobiling occurs on Federal, State, and private lands within the study area in Washington State. There are a total of 3,000 to 3,500 miles of groomed snowmobile trails in Washington State. A 2003 study by the State of Washington estimates future participation in outdoor recreation in the State.[181] For snowmobiling, it estimates a 43 percent increase in the number of people participating by 2013.[182]

215. The Washington State Snowmobile Association (WSSA), which represents all Washington State registered snowmobilers and nearly 100 snowmobile-related businesses, has expressed concern that designation of critical habitat will introduce a regulatory burden and will potentially affect the snowmobiling industry and associated infrastructure, including gear and rental shops.[183] WSSA estimates that after recreation

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[177] U.S. Department of Agriculture, Forest Service. 2003. Superior National Forest Trail Management Plan. Page 9.

[178] Because snowmobiling is prohibited in Glacier National Park, no impacts are forecast. Recreation in Glacier National Park consists of hiking, camping, picnicking and wildlife viewing.

[179] Sylvester, J.T. 2002. Snowmobiling in Montana 2002. Presented to the Montana Department of Fish, Wildlife & Parks and the Montana Snowmobile Association. Bureau of Business and Economic Research, The University of Montana.

[180] Personal Communication. Bob Walker, Montana Department of Fish Wildlife and Parks, March 10, 2006.

[181] This study relies on National Survey on Recreation and the Environment projections for the Pacific Region, which includes Washington State, age group participation and age trends in Washington, estimates of resource and facility availability, user group organization and representation, and land use and land designations.

[182] Interagency Committee for Outdoor Recreation. Salmon Recovery Funding Board. Estimates of future participation in outdoor recreation in Washington State. March 2003. This would represent an additional 14,711 participants by 2013; however, there is no information on how many additional snowmobilers would become active in any given year. Due to this lack of information on snowmobile participation, the study's estimate is provided as context, but is not applied to the analysis. This analysis estimates a greater increase in the number of statewide registrations, 18,685, by 2013, based on recent trends.

[183] Personal Communication, Wayne Mohler, Past President/Legislation Committee, Washington State Snowmobile Association, March 10, 2006; Cherise Oram and Douglas J. Steding, Stoel Rives, LLP, February 23, 2006; and Gary Allard, member WSSA, February 16, 2006.

restrictions were adopted due to the lynx's listing, two snowmobile rental operations in the Okanogan region were forced to shut down and a remaining shop experienced a decline in business and lost revenues.[184] In Unit 4, the Washington State Snowmobile Association has stated that it has been advocating for several years to extend existing trails, relocate old and create new trails, particularly in the Okanogan-Wenatchee National Forest, in part to ease congestion.[185] Recently, severe wildfires in the area have significantly changed available trail areas where downed trees cross trails, and former trails have become eroded by water that has shifted course after the fires. The WSSA is concerned that designation of critical habitat will make its desired repairs and expansions to this trail system more difficult.[186]

216. The WSSA commissioned a sector assessment study of regional economic impacts of the 2008 proposed rule. The study employs a regional input/output model that yields estimated impacts calculated in that study range from $249,000 to $1,530,000, using a seven percent discount rate for impacts until 2025.[187] The WSSA study assumes that lynx conservation efforts will result in an overall loss of winter visitors and tourism spending within the region. In contrast, this analysis assumes that current trails will experience increased use, however, not to a point where congestion will deter visitors from recreating. As a result, regional economic impacts due to reduced visitation are not anticipated.

217. Snowmobiling occurs on the Loup Loup block area, and on Loomis State Forest trails that are connected to the Okanogan-Wenatchee National Forest trail network. Loomis does not maintain visitor records, though on a sunny weekend day this year, 80 to 100 snowmobilers were present on Loomis Forest lands.[188] Of the 3,000 to 3,500 miles of trail statewide, only 29 miles are in the study area. The area is remote, and most snowmobile riding in the Loomis area is on ungroomed trails.[189] In areas that will be covered by WA DNR's draft lynx management plan (i.e., Loomis State Park), creation of new snowmobile trails is precluded, and additional use of existing trails is discouraged. No increases in designated or groomed over-the-snow routes or snowmobile play areas will be allowed within lynx geographic range managed by WA DNR.

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[184] Comments on Proposed Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx. Stoel Rives, LLP for the Washington State Snowmobile Association. February 1, 2006.

[185] Written communication from Wayne Mohler, Past President/Legislation Committee, Washington State Snowmobile Association, May 14, 2008.

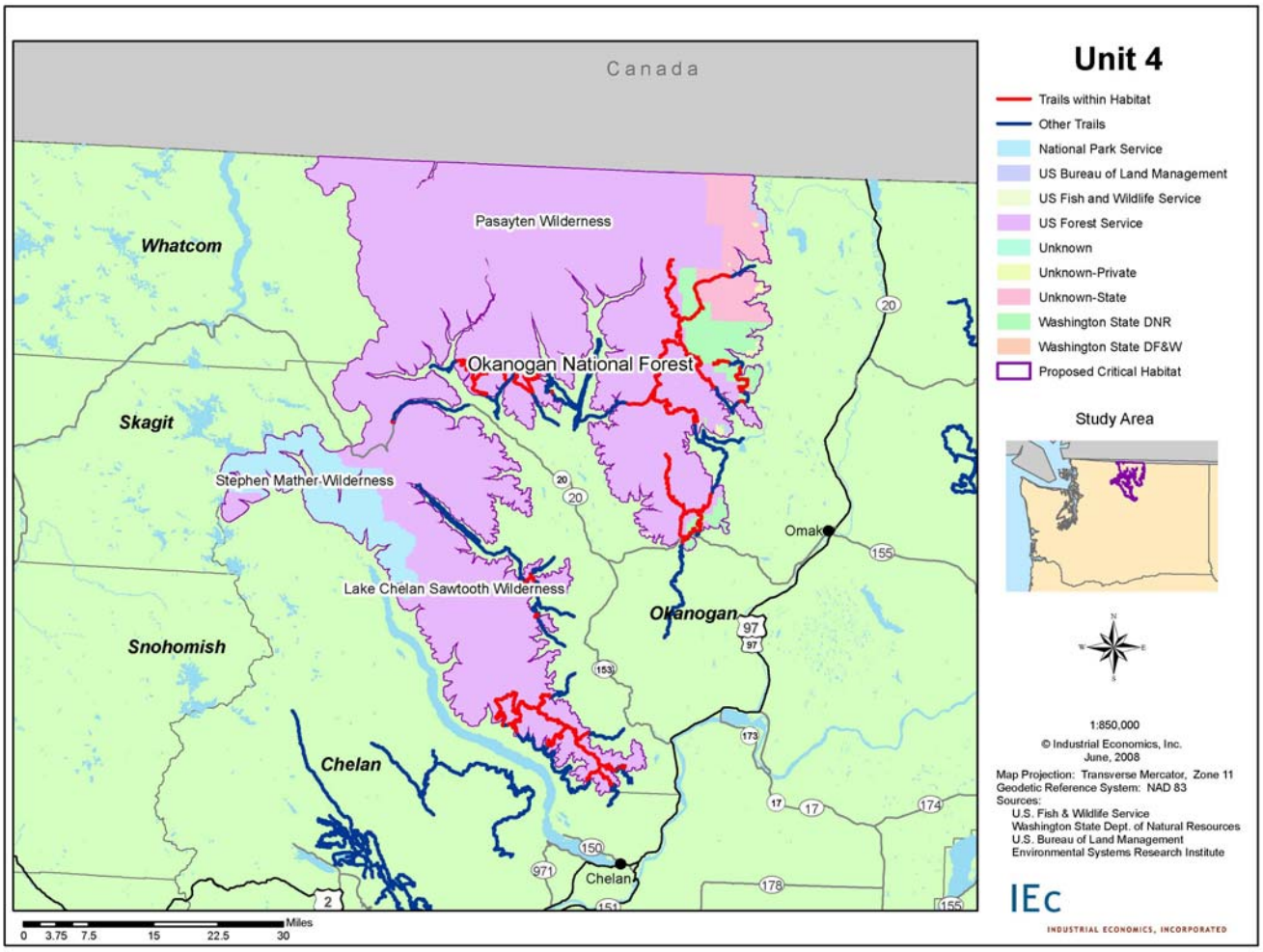
[186] *Ibid.*

[187] Gustanski, J.A., and E.A. Bergmann. 2008. Revised Critical Habitat for Contiguous United States Distinct Population Segment of the Canada Lynx. Sector Assessment of Regional Economic Impacts of Proposed Rule Associated with Snowmobiling and Winter Recreation in Unit 4: North Cascades. Resource Dimensions, LLC. Gig Harbor, Washington.

[188] Personal Communication, Scott Fisher, Northeast Region, Washington Department of Natural Resources. February 13, 2006.

[189] Personal Communication, Wayne Mohler, March 10, 2006.

EXHIBIT 6-6 SNOWMOBILE TRAILS IN UNIT 4



218. While some trails in Washington are already considered overused, and a recent increase in grooming on trails in the area east of Loomis may indicate a trend toward increased development of trails in Washington, the WA DNR lynx habitat management plan guidelines outlined above restrict such development within its LMZs.[190] These restrictions will cover the majority of trails in critical habitat. [191]

Unit 5 – Greater Yellowstone Area

219. As noted above, there are no snowmobile trails in Yellowstone National Park that overlap the study area. A majority of the snowmobile trails in Wyoming occur in the western half of the State, on USFS lands.

[190] Personal Communication, Wayne Mohler. March 10, 2006.

[191] Snowmobiling is prohibited in North Cascades National Park. The steep topography in the area precludes trail development beyond the existing 10 miles in a town within the Park, rendering the LCAS conservation measure of "no net increase in groomed or designated trails" inapplicable here. Personal communication with Roy Zipp, North Cascades National Park Complex, Environmental Protection Specialist. March 2, 2006.

6.2.2 ANALYTIC METHODOLOGY FOR SNOWMOBILING ACTIVITIES

220. Under all lynx management plans, projects to expand existing groomed designated trails are unaffected. As stated above, there is no lynx management in place to limit trail expansion in Units 1, 3, and 5, nor is there information indicating that trail expansion is in demand or planned in these proposed units. The majority of available snowmobile trails in Unit 1 are on private timber lands, where no lynx management is in place that might limit future trail expansions. As no Federal nexus exists resulting in section 7 consultation in Unit, and because the Service has indicated that compacted snow trails may not be a risk factor for lynx, this analysis does not forecast impacts to snowmobiling in Unit 1. Snowmobile areas in Units 3 and 5 are managed according to the NRLMD which, as described above, does not limit trail expansions.

221. In Units 2 and 4, there may be demand for additional groomed trails. The Superior National Forest Trails Plan notes that local snowmobile clubs have requested that additional miles on existing trails be groomed, and that a loop trail be built.[192] The WSSA has expressed concern that designation of critical habitat will hinder their efforts to expand trails on Okanogan-Wenatchee National Forest by creating additional regulatory burden and potentially leading to increased trail congestion.[193] The impacts of potentially reduced consumer surplus associated with snowmobiler experiences in Units 2 and 4 are estimated as follows.

Welfare Impacts to Snowmobilers in Units 2 and 4

222. Two scenarios are presented to bound potential impacts to snowmobilers to the lynx conservation efforts described in Exhibit 6-3. Both scenarios assume that trail expansions will be restricted where compliance with existing lynx management plans is required (i.e., Federal lands governed by the LCAS, and Washington State lands managed under the WA DNR plan). These scenarios attempt to capture the uncertainty related to crowding on snowmobiler welfare.

- **Scenario 1 –** Scenario 1 assumes snowmobilers do not experience a reduced value for snowmobiling trips due to the application of LCAS standards for a combination of reasons:

    1. Congestion levels within the study area are relatively low; thus, no substantive deterioration in quality of snowmobiling experiences occurs under a scenario of no net increase in trail mileage. In this scenario, the existing trails are assumed to be a sufficient substitute for snowmobilers that would have otherwise used new trails.

    2. Despite growing numbers of registrations in the past, the number of miles of groomed trail has remained nearly constant. Information from the State

[192] U.S. Department of Agriculture, Forest Service. 2003. Superior National Forest Trail Management Plan. Page 9.

[193] Written communication from Wayne Mohler, Past President/Legislation Committee, Washington State Snowmobile Association, May 14, 2008.

snowmobile programs in the study area units indicates that snowmobile trail networks are well-established and rarely undergo expansions or closures.[194]

3. Substitute sites for snowmobiling outside of the study area accommodate increases in snowmobiling activity.

- **Scenario 2 -** Scenario 2 assumes that precluding development of new snowmobile trails increases congestion on existing trails and there is a resulting reduction in social welfare for all snowmobilers in the study area.

223. These two scenarios are employed to account for the uncertainty regarding whether the increase in congestion reduces the value of this activity to snowmobilers. Determining whether increased congestion is discernable and generates decreased utility is difficult because information is not available regarding baseline levels of congestion across the existing trail systems in the study area. While some information is available regarding numbers of snowmobiling participants, their distribution across existing trails is unknown.[195]

224. To the extent that increased congestion is observable (Scenario 2), the economics literature has considered the reduction in social welfare that can result from congestion at a recreational site. One such study provides insight into whether snowmobilers experience a reduction in surplus in response to an increase in congestion. This study was conducted for the National Park Service (NPS) study to assess the impacts of temporary changes in snowmobiling regulations at Yellowstone National Park.[196]

225. The Yellowstone study applied a travel cost (random utility) model to assess the changes in surplus, in terms of per day willingness-to-pay values, associated with varying management regimes. The estimated reduction in willingness to pay resulting from a change from low to moderate crowding was $60-$70 per day, representing a reduction in willingness to pay of 22 percent due to greater congestion. In this study, this equates to about a 0.07 percentage point reduction in willingness to pay for each one percentage point increase in crowding. This reduction in willingness to pay is applied in this analysis.[197]

226. Scenario 2 of this analysis applies the following method to estimate the impacts of increased congestion across the study area as follows:

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[194] Personal communication with Maine Snowmobile Association, Maine Bureau of Parks and Lands Snowmobile Program, Minnesota Department of Natural Resources, Montana Department of Fish, Wildlife and Parks, Washington Snowmobile Association (Various dates).

[195] Communication with the groups cited in footnote 119 indicate that few data on trail use are available. Those data that are available come from trail counters in Minnesota that are characterized as unreliable by MN DNR staff.

[196] RTI, International 2004. Economic Analysis of Temporary Regulations on Snowmobile Use in the Greater Yellowstone Area. Final Report; and RTI, International 2005. Winter 2002-2003 Visitor Survey: Yellowstone and Grand Teton National Parks. Revised Final Report.

[197] See Appendix E for further explanation and justification of the applicability of this study to this analysis.

1. **Calculate miles of trail available for snowmobiling in each subunit -** Geographic Information System (GIS) data were used to determine the total available snowmobile trail miles within the study area.[198] Mileage estimates by subunit are presented in Exhibit 6-4.

2. **Estimate numbers of snowmobilers in the study area -** Detailed information regarding the number of snowmobilers recreating within the study area was not available. This analysis therefore applies the ratio of miles of trail in each unit to total miles of trail in the respective State to estimate the percentage of snowmobilers in the State recreating in each unit.

3. **Calculate expected growth in numbers of snowmobiling participation in the study area -** Increased participation in snowmobiling is projected using data on historical participation levels in each State. In each Unit, a State agency requires that both resident and non-resident snowmobiles be registered annually. Records of these statewide registrations in each unit informed a simple linear regression of the number of registrants by year. In Washington, additional available studies projecting recreational use are considered in forecasting future snowmobile registrations. Accordingly, future growth in registrations per year are estimated based on the following growth rates: [199]

    - Unit 4 - North Cascades: 5.2%

4. **Number of snowmobiling activity days per year currently taking place in these areas –** The analysis applies existing data regarding the number of snowmobile days in the study area units, as highlighted in Exhibit 6-7.

5. **Determine willingness-to-pay for a day of snowmobiling per participant -** Existing studies are drawn upon to estimate willingness to pay for a snowmobile activity day. These studies and the associated values are reported in Exhibit 6-8. The median willingness-to-pay for a snowmobiling day applied in this analysis is $40.75.

6. **Calculate the decreased consumer surplus associated with increased snowmobiler congestion in the study area -** Based on the Yellowstone study, a

[198] Sources: Unit 1 - Maine Snowmobile Association. Unit 2 - Minnesota Department of Natural Resources GIS data deli: http://deli.dnr.state.mn.us/data_search.html. Unit 3 - Information provided by the State snowmobile program at the Montana Department of Fish, Wildlife & Parks (MTDFWP), regarding total trail miles in the study area and percentages of total Montana trails within various ownerships. Unit 4 - Washington State Parks and Recreation Commission, Winter Mapping office.

[199] Sources: Maine: Maine Snowmobile Association (MSA). March 9, 2006. Snowmobile registrations have been increasing steadily since the mid-1990s. Communication with MSA, and Scott Ramsay of Maine Bureau of Parks and Lands (March 17, 2006) indicated that during the winter of 2003-2004 there was very little snow in Maine. To provide a more accurate estimate of future impacts, this outlier year is excluded from the analysis. Minnesota: Minnesota Department of Natural Resources, Division of Trails and Waterways, March 21, 2006. Montana: Montana Department of Fish, Wildlife, and Parks Snowmobile Program. Washington: Washington State Commission of Parks and Recreation, March 14, 2006. Communication with Wayne Mohler, Washington State Snowmobile Association (March 9, 2006), indicated that during the winter of 2004-2005 there was very little snow in Washington. To provide a more accurate estimate of future impacts, this outlier year is excluded from the past registration numbers used in this analysis.

one percent increase in congestion corresponds with a 0.07 percent decrease in an individual's welfare value per day.

EXHIBIT 6-7 SNOWMOBILING DAY ESTIMATES IN EACH UNIT

UNIT	STUDY	AVERAGE SNOWMOBILING DAYS PER YEAR PER PERSON	ESTIMATED NUMBER OF SNOWMOBILE MACHINES IN AREAS PROPOSED FOR CRITICAL HABITAT* (2009)	ESTIMATED SNOWMOBILING DAYS IN THE STUDY AREA (2009)**
4	Moore, D.L. 2000.	17.4	4,281	74,493

Notes:
* Equal to most recent year available number of statewide registrations multiplied by the percentage of State trail miles within the unit.
** Equal to the estimated number of machines in the study area multiplied by the average number of snowmobiling days per year.

Sources:
Unit 4: Moore, D.L. 2000. 2000 Survey of Registered Snowmobile Owners in Washington State. Technical Report. Survey conducted by Social and Economic Sciences Research Center, for Washington State parks, Snowmobile Program, Washington State Snowmobile Association, State of Washington.

EXHIBIT 6-8 SOCIAL WELFARE VALUE OF SNOWMOBILE TRIPS FROM PREVIOUS STUDIES

GEOGRAPHIC REGION	DESCRIPTION	SOURCE	VALUE PER DAY ($2008)*
Yellowstone and Grand Teton National Parks	Willingness to Pay (WTP) calculated using travel cost method from data collected in a Winter 2002-2003 Visitor Survey for Yellowstone and Grand Teton National Parks. Study purpose was to evaluate alternative regulations on snowmobile use in the greater Yellowstone area. Values presented here are from the baseline scenario.	1	$34.07
West Yellowstone		1	$28.75
Continental Divide		1	$29.81
Wyoming	Consumer surplus calculated using travel cost method. Study considered Wyoming State Trail System use, and focused on market segmentation by motivation for snowmobile trip. The consumer surplus presented here is from their pooled sample.	2	$47.42
Wyoming and Utah	Consumer surplus averaged from two prior studies. Both studies calculated consumer surplus using the travel cost method.	3	$85.04
Park County, Wyoming	Net economic value of snowmobiling	4	$82.59
Median value per day		**-**	**$40.75**

Notes:

* These values represent the amount that snowmobilers would pay per day over and above current cost. Values from the studies are adjusted to 2008 dollars using the NASA Cost Estimating Website. Gross Domestic Product Deflator, Table 10.1—GROSS DOMESTIC PRODUCT AND DEFLATORS USED IN THE HISTORICAL TABLES: 1940–2009. Downloaded from: http://cost.jsc.nasa.gov/inflateGDP.html on June 19, 2008.

1) RTI International. October 2004. Economic Analysis of Temporary Regulations on Snowmobile Use in the Greater Yellowstone Area: Final Report. Prepared for National Park Service, Environmental Quality Division, Dr. Bruce Peacock; MACTEC Engineering and consulting, Inc., BBL Sciences, and RTI International. July 2005. Winter 2002-2003 Visitor Survey: Yellowstone and Grand Teton National Parks: Revised Final Report. Prepared for the National Park Service, Environmental Quality Division, Dr. Bruce Peacock.

2) Coupal, R.H., C. Bastian, J. May, D.T. Taylor. 2001. Journal of Leisure Research. Fourth Quarter. 33:4. pp. 492-510.

3) Rosenberger, R.S., and J.B. Loomis. 2001. Benefit Transfer of Outdoor Recreation Use Values. A Technical Document Supporting the Forest Service Strategic Plan (2000 Revision). Gen. Tech. Rep. RMRS-GTR-72. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 59 p.

4) Taylor. 1999. Economic Importance of the Winter Season to Park County, Wyoming. University of Wyoming, Cooperative Extension Service, College of Agriculture, Department of Agricultural and Applied Economics. Report to Park County Commissioners.

6.2.3 RESULTS - SNOWMOBILING WELFARE

227. At the low end, as described in the analytical methodology section, there is assumed to be no impacts to snowmobilers' welfare. At the high end (Scenario 2), potential welfare impacts to snowmobilers in Unit 4 are associated with increased congestion on existing snowmobile trails resulting from lynx-related restrictions on trail expansions. These impacts are considered baseline as Okanogan-Wenatchee National Forest implements the LCAS.[200]

- **Baseline impacts** - $0 to $109,000 (discounted at seven percent)

[200] Unit 2: US Forest Service, Superior National Forest Plan, Appendix E: Canada Lynx. Accessed at http://www.fs.fed.us/r9/forests/superior/projects/forest_plan/2004Plan/snf/Superior_FP_Appendix_E_Canada_Lynx.pdf on July 3, 2008.; Unit 4: personal communication with Mallory Lenz, Okanogan-Wenatchee National Forest, U.S. Forest Service, July 3, 2008.

- **Incremental impacts** - $0

6.3 SKI AREA EXPANSIONS

6.3.1 BACKGROUND AND EXTENT OF SKI AREA EXPANSIONS

228. Sixteen of the 17 ski areas within the study area occupy approximately 11,400 acres on USFS lands in 3 and 5.[201] There is one proposed expansion on private lands in Maine. On USFS lands, the NRLMD Record of Decision notes that eight downhill ski areas have plans for expansion, and one new ski area is proposed within the lynx habitat covered by the NRLMD. To date, lynx conservation recommended via section 7 consultation regarding ski area expansions has not resulted in changes in the availability or quality of skiing experiences, but has required administrative effort to include lynx conservation in the development plans.[202]

229. Specifically, for the Jackson Hole Mountain Resort, planners coordinated with the USFS to develop conservation measures to avoid disturbance to lynx with the expansion of the resort.[203] Sixteen of the 17 new ski area development and expansions are expected to occur on USFS lands; therefore, a Federal nexus will be present and section 7 consultation regarding the lynx is expected. For the proposed ski area expansion in Maine, the Service anticipates a Federal nexus existing via a U.S. Army Corps of Engineers (USACE) permit. Exhibit 6-9 lists the existing lynx management plan guidance for ski area expansions and projects to avoid impacts to the lynx. These guidelines focus on planning the landscape for the expansions and developments to maintain diurnal security and foraging habitat for the lynx, and habitat for the snowshoe hare.

EXHIBIT 6-9 LYNX CONSERVATION GUIDELINES FOR SKI AREA ACTIVITIES

GUIDELINE	SOURCE
Designing trails, roads, and lifts to direct winter use away from diurnal security habitat.	LCAS
Map and monitor snow-compacting activities in relation to LAUs	LCAS
When developing or expanding ski areas, provisions should be made for adequately sized inter-trail islands that include coarse woody debris, such that winter snowshoe hare habitat is maintained.	NRLMD
When developing or expanding ski areas, lynx foraging habitat should be provided consistent with the ski area's operational needs, especially where lynx habitat occurs as narrow bands of coniferous forest across mountain slopes.	NRLMD
When developing or expanding ski areas and trails, consider locating access roads and lift termini to maintain and provide lynx security habitat, if it has been identified as a need.	NRLMD

[201] Northern Rockies Lynx Management Direction, Appendix K, Table K-10, page 492.

[202] U.S. Department of the Interior, Fish and Wildlife Service. 2004. Informal consultation on proposed activities at Jackson Hole Mountain Resort. ES-61411/W.19/WY8246, April 14, 2004.

[203] Personal communication with Bill Schreiber, Engineer and Planner, Jackson Hole Mountain Resort, May 27, 2008.

230. These existing cross-country and downhill ski areas operating under special use permits are highlighted in Exhibit 6-10. According to the NRLMD, in addition to the planned expansions shown in Exhibit 6-9, there is one proposed new ski area on Kootenai National Forest in Montana. No information regarding the details of this project is available, however.

EXHIBIT 6-10 SKI AREAS WITHIN PROPOSED CRITICAL HABITAT

PROPOSED UNIT	NATIONAL FOREST	NUMBER OF SKI AREAS IN THE STUDY AREA	ACRES OF CURRENT SKI AREAS	NUMBER OF SKI AREAS PLANNING EXPANSION IN THE STUDY AREA
1: Maine	(Private Lands)	1	1,100	1
3: Northern Rockies	Lewis & Clark	3	1,498	1
	Lolo	2	1,412	1
	Helena	2	320	1
	Idaho Panhandle (Kaniksu and Kootenai)	*	*	1
5: Greater Yellowstone Area	Shoshone	1	2	0
	Gallatin	2	956	1
	Bridger-Teton	5	4,620	0
	TOTAL	**16**	**9,908**	**6**

Note:
* Lookout Pass ski area is located on both the Idaho Panhandle and Lolo National Forests. In this table, this ski area is included under the Lolo National Forest.
Source: NRLMD, Appendix K, Table K-10, page 492.

6.3.2 METHODOLOGY FOR SKI AREA EXPANSION ECONOMIC IMPACTS

231. Absent information on the specific plans for expansion at the five ski areas on the National Forests identified from the NRLMD and the one proposed expansion in Maine, this analysis uses the information provided by Jackson Hole Mountain Resort regarding its expansion activities conducted in 2004. Jackson Hole Mountain Resort noted that development of the Biological Assessment to incorporate lynx conservation planning for the ski area expansion project cost $39,000, significantly more than the average cost of a Biological Assessment as described in Chapter 2.[204] The impacts of planning for the lynx in this case are forecast for each of the proposed ski area projects.

232. Jackson Hole Mountain Resort's project included: "new and upgraded ski lifts and skiing terrain, revised skier carrying capacity, additional snowmaking and trail grooming, new and upgraded visitor and skier services, and additional recreational opportunities…and

[204] Personal communication with Bill Schreiber, Engineer and Planner, Jackson Hole Mountain Resort, May 27, 2008.

guided backcountry skiing".[205] As noted above, three project modifications to benefit the lynx were incorporated in the planning:

- All sightings of Canada lynx will be documented and reported to the USFS within 48 hours and the areas in which they were observed would be avoided.
- Guided backcountry skiing and snowboarding operations will be conducted only during daylight hours, when Canada lynx are least active.
- Guided backcountry skiing and snowboarding operations will avoid vegetated areas along creeks or streams that may provide habitat for snowshoe hare.[206]

To date, none of these project modifications have resulted in any economic impact to Jackson Hole Mountain Resort, as there is no demand at the Resort for nighttime backcountry trips, and avoiding riparian, vegetated areas does not measurably limit the areas available for these trips.[207]

233. Another biological opinion resulting from a section 7 consultation provides additional information about potential lynx conservation efforts that may be undertaken during future ski area expansions on USFS and Bureau of Land Management (BLM) land in Montana. The recommendations made by the Service include evaluating whether nocturnal foraging opportunities and diurnal security habitat can be provided within the ski area, minimizing disturbance around potential den sites from May to August. The Service also recommended continued lynx research efforts.[208]

234. Overall, none of the ongoing or proposed projects in Montana were expected to convert lynx habitat to an unsuitable condition to a degree that would cause any LAU to surpass the 30 percent threshold prescribed in the LCAS. As a result, no projects were affected by required modifications to be compliant with the LCAS.

235. For Lookout Pass ski area in the Idaho Panhandle National Forests, an expansion project including development of 87 acres of new ski runs and chairlifts, 1.2 miles of temporary road, and 5,766 feet of new chairlifts was determined to be in compliance with LCAS standards, as both LAUs where the project occurred would remain well below the 30 percent unsuitable condition prescribed in the LCAS.[209]

236. The Big Moose Mountain ski area in Maine, approximately one mile southwest of Moosehead Lake, requested a pre-application meeting with Maine's Land Use and Regulatory Commission (LURC) in the summer of 2007 to discuss its short and long-

[205] U.S. Department of the Interior, Fish and Wildlife Service. 2004. Informal consultation on proposed activities at Jackson Hole Mountain Resort. ES-61411/W.19/WY8246, April 14, 2004.

[206] U.S. Department of the Interior, Fish and Wildlife Service. 2004. Informal consultation on proposed activities at Jackson Hole Mountain Resort. ES-61411/W.19/WY8246, April 14, 2004.

[207] Personal communication with Bill Schreiber, Engineer and Planner, Jackson Hole Mountain Resort, May 27, 2008

[208] U.S. Department of Interior, Fish and Wildlife Service. 2001. Biological Opinion on ongoing and proposed activities associated with the privately operated ski resorts on Forest and BLM land in Montana. M.19-FS R1. February 9, 2001.

[209] U.S. Department of the Interior, Fish and Wildlife Service. 2002. Informal consultation on Lookout Pass Ski and Recreation Area Expansion: FWS Ref 1-9-02-I-252. March 28, 2002.

term expansion plans for its resort.[210] Their short-term plans include construction of approximately 200 condominiums, upgrades to the existing hotel and base lodge, and lift improvements. The long-term plan includes the construction of a golf course, two new hotels and conference centers, single-family homes, and potentially a train station near the mountain.[211] It is currently unclear where Big Moose Mountain is in their pre-development phase. Should the proposal get LURC approval and a Federal nexus is established during the development phase, the Service would likely request similar conservation measures as those requested for ski area expansions in Units 3 and 5. This analysis conservatively assumes that the Big Moose Mountain expansion will go through and require the same level of effort (i.e., $39,000) to develop a Biological Assessment incorporating lynx conservation measures.

237. As project-specific information is unavailable, it is uncertain whether the same project modifications as those described above would be recommended for the five ski area expansions planned on other National Forests and whether these modifications, if adopted, would generate the same level of economic impact.[212] To the extent that project plans and geographic scopes vary, economic impacts may be different than those forecast. This analysis assumes that because past modifications to ski area projects occurred absent critical habitat, forecast project modification costs will be considered part of the economic baseline.

238. In addition to these impacts, the WSSA expressed concern that even a perceived additional regulatory burden of restrictions on snowmobiling in Unit 4 may discourage participation.[213] While this analysis recognizes this concern as a possible economic impact, data are not available regarding the extent to which regulatory uncertainty may affect individual's participation in snowmobiling and therefore does not quantify potential associated economic impacts.

6.3.3 RESULTS FOR SKI AREA EXPANSIONS

239. The post-designation estimated impacts to ski area expansion result from costly biological assessment development to plan development around the lynx habitat up front in project planning. In addition to the proposed expansion in Unit 1, this cost applies to the five ski area expansions and one new ski development planned in Units 3 and 5.

240. Incremental impacts stem from additional administrative costs associated with consideration of critical habitat in consultation. For the five ski areas planning expansion, absent information on when the projects will begin, or when consultation will

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[210] Millar, Kevin. "Resort Owner Reveals Big Plans". Bangor Daily News. August 29, 2007.

[211] Ibid.

[212] Note that we do not have information related to any economic impact associated with the project recommendations cited above for the 2001 consultation for private ski areas on Federal lands in Montana.

[213] Written communication from Wayne Mohler, Past President/Legislation Committee, Washington State Snowmobile Association, May 14, 2008.

occur, the analysis assumes an equal likelihood that consultation will occur in any of the next twenty years.

- **Baseline Impacts -** $159,000 (discounted at seven percent)
- **Incremental Impacts -** $16,000 (discounted at seven percent)

6.4 TRAPPING

6.4.1 LYNX CONSERVATION EFFORTS RELATED TO TRAPPING

241. Lynx conservation efforts related to trapping focus on educational programs run by State agencies to assist trappers in identifying and avoiding incidental take of lynx.[214] Incidental shooting or trapping and predator control are identified as possible risks factors for the lynx in the LCAS.[215] In 2003, the Service and the International Association of Fish and Wildlife Agencies produced a brochure titled, "How to Avoid Incidental Take of Lynx while Trapping or Hunting Bobcats and Other Furbearers" to assist State agencies in educating trappers and hunters.[216]

242. In Maine and Minnesota, recent lawsuits brought by conservation and animal protection groups against the States' Fish and Wildlife agencies have resulted in changes to the States' trapping regulations to restrict the use of certain trap types and sizes deemed to pose the greatest risks to lynx. The lawsuits contended that the States' licensure of trappers violated the Endangered Species Act by allowing take of lynx. As a result of the lawsuits, the States have each applied for an ITP from the Service for their trapping programs.[217] The ITP for Minnesota and its associated Habitat Conservation Plan (HCP) are currently under review by the Service. Maine's IF&W has incorporated new regulations by emergency rule in compliance with a Consent Decree issued by the United

[214] The agencies are: Unit 1: Maine Department of Inland Fisheries and Wildlife; Unit 2: Minnesota Department of Natural Resources; Unit3: Montana Department of Fish, Wildlife and Parks; Unit 4: Washington Department of Fish and Wildlife.

[215] LCAS, page 2-15.

[216] "How to Avoid Incidental Take of Lynx while Trapping or Hunting Bobcats or Other Furbearers" is available online at: http://www.fws.gov/international/animals/lynx.htm (accessed March 13, 2006).

[217] "Under certain terms and conditions, the taking of a threatened or endangered species that is incidental to the purpose of otherwise lawful activity may be allowed. 16 U.S.C. § 1539 (a)(1)(B). To avoid liability under ESA, however, the person must have received an Incident Take Permit ("ITP"). 16 U.S.C. § 1536 (b)(4), (o)(2). As a prerequisite to receiving an ITP, the applicant must submit a habitat conservation plan that specifies "(i) the impact which will likely result from such taking; (ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps; (iii) what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and (iv) such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan." 16 U.S.C. § 1539 (a)(2)(A)." Source: United States District Court, District of Minnesota. Memorandum Opinion and Order Civil No. 06-3776 (MJD/RLE); Case 0:06-cv-03776-MJD-RLE Document 144. March 31, 2008. See also, United States District Court, District of Minnesota. Memorandum Opinion and Order Civil No. 06-3776 (MJD/RLE); Case 0:06-cv-03776-MJD-RLE Document 145, Proposal of the Minnesota Department of Natural Resources to Restrict, Modify, or Eliminate the Incidental Take of Canada Lynx. April 30, 2008.

States District Court for the District of Maine in 2007.[218] Exhibit 6-11 lists the existing lynx management plan guidance for trapping.

EXHIBIT 6-11 LYNX CONSERVATION GUIDELINE FOR TRAPPING ACTIVITIES

GUIDELINE	SOURCE
Federal agencies should work cooperatively with States and Tribes to reduce incidental take of lynx related to trapping.	LCAS

243. As noted above, recent litigation in Maine and Minnesota regarding use of certain traps has resulted in changes to trapping regulation in those States. More detail is provided on the resulting economic impacts of these changes in the sections below.

6.4.2 ANALYTIC METHODOLOGY FOR TRAPPING ACTIVITIES

244. The economic impacts of lynx conservation related to trapping activities are based on communication with the State agencies that regulate trapping in the study area. This includes costs of developing and disseminating information on avoiding take of lynx, and in the case of Maine and Minnesota, additional costs of implementing the requirements of ITPs. Take of lynx is regulated under the Act with the listing of the species, and therefore costs borne by the State agencies associated with avoiding take are baseline impacts of lynx conservation.

6.4.3 RESULTS FOR TRAPPING ACTIVITIES

Unit 1 – Northern Maine

245. In Maine, the IF&W manages licensing and education programs that allow the public to participate in hunting and trapping primarily on private lands. No trapping occurs on IF&W lands, and the private timber lands provide the majority of available area for trapping within the study area.

246. IF&W formerly managed a coyote snaring program that has since been halted due to concerns about lynx (see below education programs description). IF&W has spent $50,000 to $60,000 per year since 2000 on the following efforts related to lynx conservation in its trapper education program:[219]

- Updates and changes to the 2003 brochure to incorporate Maine-specific information;
- Annual mailings to licensed trappers including information on lynx;
- Attendance at trapper association meetings; and

[218] United States District Court, District of Minnesota. Memorandum Opinion and Order Civil No. 06-3776 (MJD/RLE); Case 0:06-cv-03776-MJD-RLE Document 144. Maine Department of Inland Fisheries and Wildlife. 2008-2008 Trapper Information.

[219] Personal Communication, Ken Elowe, Maine Department of Inland Fisheries and Wildlife, February 23, 2006 and May 30, 2008.

- Operation of a 24-hour-a-day response program providing assistance to trappers who report having trapped a lynx.

In October 2007, IF&W incorporated by emergency rule restricting the types and sizes of traps that may be used in Maine. As summarized above, this change is the result of a lawsuit contending that the trapping program was allowing take of lynx. IF&W has coordinated with the Service to revise the allowable trap types that can be used on its Wildlife Management Area lands (approximately 21,900 acres) and to confirm the lynx conservation efforts associated with trapping activities, including: providing education and information about lynx to trappers; enforcing trapping regulations to avoid incidental take of lynx; operating a 24-hour-a-day hotline and response program providing assistance to trappers who report having captured a lynx, and subsequent reporting to the Service; and annual mailings to licensed trappers including information on lynx. IF&W estimates that together, these efforts will cost approximately $211,000 annually.[220] Additionally, impacts may occur from settlements paid to plaintiffs in trapping law suits as they have in the past.[221] This analysis does not, however, forecast potential settlement payments and may therefore underestimate impacts.

247. In a separate lynx-conservation related effort, IF&W has ceased a coyote control program. From 1981 to 2003, IF&W hired hunters to snare coyotes near deer wintering yards to protect them from predation during the winter. In 2003-2004, the coyote snaring program implemented by IF&W was put on hold due to concerns that the snaring efforts posed a threat to the Canada lynx and bald eagle.[222] The program typically cost $15,000 per year during its implementation. Having the program on hold, while eliminating the costs of program implementation, has resulted in significant use of staff time for IF&W to manage public concern equal to the amount of effort that was being put into the program implementation. There is therefore no cost savings estimated associated with removing program implementation costs.[223] Information is not available to correlate the effect of the coyote snaring program on deer populations; it is therefore unclear whether hunting opportunity is impacted by the cessation of the program.[224]

Unit 2 – Minnesota

248. The MN DNR has distributed the Service's and International Association of Fish and Wildlife Agencies' 2003 informational brochure to hunters and trappers. Since 2003, MN DNR estimates the total costs of this effort at approximately $300 to $500.[225] As described above, MN DNR is in the process of developing an HCP to receive an ITP

[220] Personal Communication, Ken Elowe, Maine Department of Inland Fisheries and Wildlife, May 30, 2008.

[221] Written communication from the U.S. Fish and Wildlife Service, July 29, 2008.

[222] Personal Communication, Ken Elowe, Maine Department of Inland Fisheries and Wildlife, February 23, 2006, and IF&W's 2005-2006 Trapper information, available at: http://www.state.me.us/ifw/hunttrap/trapperinfo2005-2006.htm.

[223] Personal Communication, Ken Elowe, Maine Department of Inland Fisheries and Wildlife, March16, 2006.

[224] Personal communication, Ken Elowe. Maine Department of Inland Fisheries and Wildlife, February 23, 2006.

[225] Personal Communication, Conrad Christensen, Furbearer Specialist, Minnesota Department of Natural Resources. March 13, 2006.

from the Service for its trapping program. Absent specific information about the costs of these efforts to MN DNR, this analysis estimates that MN DNR is likely to bear costs similar to those incurred in Maine related to implementing the requirements of the ITP for its trapping program.

Unit 3 – Northern Rockies

249. Similar to Unit 2, the 2003 brochure is made available to hunters and trappers by Montana Fish Wildlife and Parks (MT FWP).[226] Absent State-specific information, this analysis assumes costs to MT FWP are similar to those born by the MN DNR for the same effort. Pre-designation costs are therefore estimated at $300 to $500.

Unit 4 – North Cascades

250. The Washington Department of Fish and Wildlife (WA DFW) has developed and distributed lynx identification materials to hunters in its predator control program for cougar since 2000. The cougar program licenses 150 to 170 people per year to hunt cougar with hounds for livestock predation prevention, and human safety protection. Cougar hunters receive information as part of their training, and a once-yearly brochure mailing for differentiating between lynx, and other forest carnivore cats, including a map identifying lynx management areas. The cougar hunting season takes place when cougars are at lower elevations, and rarely in lynx habitat, as identified by the WA DFW and WA DNR's management plans. Because cougar hunting activity is not bounded by the lynx management zones, and because some areas within the study area for the lynx are not included in the lynx management zones, the total program costs, $10,000 annually since 2000, and planned until 2011 are reported in this analysis.

Unit 5 – Greater Yellowstone Area

251. No trapper education efforts have been identified within Unit 5. The consultation history for projects in Unit 5 does not suggest that trapping activities have resulted in any coordination with the Service. While other States' wildlife agencies have distributed information to trappers regarding lynx, it appears that Wyoming has not undertaken any similar efforts. In the Wyoming Game and Fish Department's (WY GFC) Comprehensive Wildlife Conservation Strategy, neither the problems or conservation actions identified for the State with regard to lynx are specific to trapping.[227]

6.5 OTHER RECREATIONAL ACTIVITIES

252. No other recreation activities have been specifically listed as risk factors for the lynx or have been considered in the existing lynx management plans. However, approximately 88 percent of past recreation consultations (64 of 82) have been for projects unrelated to snowmobiling, skiing, or trapping; these consultations have considered activities such as

[226] http://fwp.mt.gov/hunting/trapping/default.html (accessed March 15, 2006).

[227] Wyoming Game and Fish Department. 2005. A Comprehensive Wildlife Conservation Strategy for Wyoming. Approved by the Wyoming Game and Fish Commission.

campground modifications, hiking trail upgrades, and outfitter guide permits. No project modifications related to lynx conservation have occurred for these other recreation activities. The administrative costs of these consultations are included for relevant subunits.

6.6 SUMMARY AND RESULTS FOR ALL ACTIVITIES

253. Total pre-designation impacts are describes in Exhibits 6-12. Exhibit 6-13 presents the total post-designation impacts by subunit to all recreation activities, including both low and high estimates reflecting the two scenarios employed for the analysis of snowmobile welfare impacts.

- Pre-designation impacts stem from section 7 consultations for a wide variety of recreational activities, and from State agency trapper education efforts.
- Post-designation baseline impacts result from forecast section 7 consultations, continued trapping program related expenditures to avoid incidental take of the lynx, and reduced snowmobile welfare in Unit 4.
- Post-designation incremental impacts result entirely from section 7 consultations.

EXHIBIT 6-12 PRE-DESIGNATION IMPACTS TO RECREATION ACTIVITIES (SEVEN PERCENT DISCOUNT RATE)

SUBUNIT	BASELINE IMPACTS
Unit 1: Maine	
National Park Service	$12,300
Private Timber Lands	$815,000
Unit 2: Minnesota	
Superior National Forest	$159,000
MN Department of Natural Resources	$222,000
Unknown	$40,100
Unit 3: Northern Rockies	
U.S. Forest Service	$276,000
U.S. Bureau of Land Management	$24,300
MT Department of Fish Wildlife and Parks	$2,860
Unit 4: North Cascades	
U.S. Forest Service	$368,000
WA Department of Fish and Wildlife	$120,000
Unit 5: Greater Yellowstone Area	
U.S. Bureau of Land Management	$10,700
U.S. Forest Service	$18,700
National Park Service	$51,400
TOTAL	**$2,120,000**
Note: Entries may not sum to totals reported due to rounding.	

EXHIBIT 6-13 POTENTIAL POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO RECREATION ACTIVITIES (SEVEN PERCENT DISCOUNT RATE)

SUBUNIT	PRESENT VALUE BASELINE IMPACTS		ANNUALIZED BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS		ANNUALIZED INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION								
UNIT 1: MAINE								
National Park Service	$8,390	$8,390	$792	$792	$2,800	$2,800	$264	$264
ME Department of Conservation	$40,600	$40,600	$3,830	$3,830	$7,320	$7,320	$691	$691
Private Timber land Owners	$2,240,000	$2,240,000	$211,000	$211,000	$0	$0	$0	$0
UNIT 2: MINNESOTA								
Superior National Forest	$128,000	$128,000	$12,000	$12,000	$42,600	$42,600	$4,020	$4,020
MN Department of Natural Resources	$2,230,000	$2,230,000	$211,000	$211,000	$7,470	$7,470	$706	$706
Other Unknown landowners	$33,600	$33,600	$3,170	$3,170	$11,200	$11,200	$1,060	$1,060
UNIT 3: NORTHERN ROCKIES								
U.S. Forest Service	$358,000	$358,000	$24,600	$24,600	$88,500	$88,500	$8,350	$8,350
U.S. Bureau of Land Management	$17,200	$17,200	$1,630	$1,630	$5,740	$5,740	$542	$542
Montana Department of Fish Wildlife and Parks	$4,240	$4,240	$400	$400	$0	$0	$0	$0
UNIT 4: NORTH CASCADES								
U.S. Forest Service	$319,000	$413,000	$30,100	$38,900	$106,000	$106,000	$10,000	$10,000
WA Department of Natural Resources	$0	$15,600	$0	$1,470	$0	$0	$0	$0
WA Department of Fish and Wildlife	$26,200	$26,200	$2,480	$2,480	$0	$0	$0	$0
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$8,390	$8,390	$792	$792	$1,580	$1,580	$149	$149
National Park Service	$43,700	$43,700	$4,130	$4,130	$8,210	$8,210	$775	$775
U.S. Forest Service	$16,800	$16,800	$1,580	$1,580	$3,160	$3,160	$298	$298
Total	**$5,470,000**	**$5,580,000**	**$507,000**	**$518,000**	**$285,000**	**$285,000**	**$26,900**	**$26,900**

Entries may not sum to totals reported due to rounding.

EXHIBIT 6-14 SUMMARY OF CAVEATS TO RECREATION ANALYSIS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS
Snowmobiling – This analysis assumes that the National Forests covered by the NRLMD in Units 3 and 5 will not require trail expansions in the foreseeable future to accommodate demand for snowmobiling based on information on trail extent and usage.	-
Ski Area Development Projects – To the extent that plans for the five ski area expansions and one proposed new area vary from past projects in the study area, this analysis may over- or underestimate baseline or incremental impacts associated with lynx conservation.	+/-
Trapping – Impacts of compliance with Minnesota's future HCP regarding trapping activities are based on those incurred in Maine for similar efforts. To the extent that Minnesota's HCP conditions vary from Maine's, this analysis may over- or underestimate baseline or incremental impacts associated with lynx conservation.	+/-
Trapping – Impacts of distributing trapper education materials in Montana are based on those incurred in Minnesota for similar efforts. To the extent that Montana's efforts vary from Minnesota's, this analysis may over- or underestimate baseline or incremental impacts associated with critical habitat designation.	+/-
+: This assumption may result in an overestimate of real costs. - : This assumption may result in an underestimate of real costs. +/-: This assumption has an unknown effect on estimates.	

CHAPTER 7 | MINING AND OIL AND GAS ACTIVITIES

254. This chapter addresses the potential baseline and incremental economic impacts to mining and oil and gas activities in the study area. Exploration and development activities may affect lynx habitat by changing or eliminating native vegetation, contributing to habitat fragmentation, and increasing the potential for human-caused mortality. Major open pit mines are located in Unit 2 and Unit 5 (three mines in Unit 2 and two in Unit 5) and oil and gas activities are primarily concentrated in Unit 5 (eight permitted wells are currently in operation).

255. Mining activities on both public and private lands are likely to generate section 7 consultations. Mines on public lands are subject to a Federal nexus through Bureau of Land Management (BLM) and U.S. Forest Service (USFS) permits and sales contracts.[228] Private mines are subject to State and, in some cases, Federal (U.S. Army Corps of Engineers (USACE) or Environmental Protection Agency (EPA)), permits which regulate water quality, water discharge, wetlands, air emissions, and mine safety.[229] In addition to the potential direct effects of section 7 consultation for the lynx, State agencies may also mandate that mining activities consider lynx conservation even absent a Federal nexus.[230] Similar to mining, oil and gas activities on public lands are subject to a number of Federal permits and tax breaks, and therefore must consider the lynx and its habitat.[231] Oil and gas activity does not occur on private lands within the study area. Due to Federal permitting of these projects, this analysis assumes that all mining and oil and gas activities will be subject to section 7 consultation regarding the effects of their projects on the lynx and its habitat.

256. The Lynx Conservation Assessment and Strategy (LCAS) and the Northern Rockies Lynx Management Direction (NRLMD) define similar conservation efforts for the species with respect to these activities. Specifically, they advise: restricting vehicular

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[228] Bureau of Land Management, Solid Minerals Program. U.S. Department of the Interior. Accessed at: http://www.blm.gov/wo/st/en/prog/more/non-energy_minerals/solid_minerals_brochure.html on April 15, 2008.

[229] *Ibid.*

[230] For Maine, the Natural Resources Protection Act (PL 1987, c. 809, §2 (new); 2007, c. 290, §14) doesn't allow the state to "permit, license, fund or carry out" activities that would otherwise alter habitat or violate the ESA.

[231] The most recent tax breaks and direct Federal subsidies to the oil and gas industry were introduced in the 2005 Domenici-Barton energy Policy Act of 2005: H.R. 6, 109th Cong. (2005) (enacted) § 1504. The Minerals Lands Leasing Act of 1920 authorizes the Secretary of the Interior to issue permits for the exploration of oil and gas on public lands: Mineral Lands Leasing Act of 1920, ch. 85, 41 Stat. 4373 (1920), codified at 30 U.S.C. § 181 et seq. Parties seeking exploration permits must submit an Application for a Permit to Drill (APD) to BLM for each oil or gas well. These permits are subject to USFS oversight where such permits are issued on Forest Service lands.

travel to designated routes; minimizing snow compaction when authorizing and monitoring developments; developing a reclamation plan for abandoned sites and roads; closing newly constructed roads to public access and upon project completion; and limiting the timing of certain activities to limit surface disturbance.[232]

257. The lynx conservation direction in these existing plans represents the best available information regarding the management of mining and oil and gas projects with respect to the lynx. This analysis therefore assumes these conservation efforts will be recommended via section 7 consultation for the lynx and quantifies the associated economic impacts. Because these conservation efforts are outlined in existing lynx management documents and consultation for the species is required regardless of the critical habitat designation, impacts of their implementation are quantified as baseline impacts of lynx conservation. That is, these potential impacts will occur regardless of the designation. No incremental impacts were identified outside of additional administrative costs associated with the consultations. Exhibit 7-1 summarizes the projected economic impacts related to changes to mining and oil and gas activities.

EXHIBIT 7-1 BASELINE AND INCREMENTAL POTENITAL IMPACTS OF CANADA LYNX CRITICAL HABITAT DESIGNATION ON MINING ACTIVITIES

UNIT	BASELINE IMPACTS PRESENT VALUE (7%)	BASELINE IMPACTS ANNUALIZED (7%)	INCREMENTAL IMPACTS PRESENT VALUE (7%)	INCREMENTAL IMPACTS ANNUALIZED (7%)
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION				
2	$1,290,000	$122,000	$94,600	$8,930
4	$6,630	$626	$2,210	$209
5	$135,000	$12,700	$18,500	$1,750
Total	**$1,430,000**	**$135,000**	**$115,000**	**$10,900**

Note: Entries may not sum to totals reported due to rounding.

258. The remainder of this chapter provides additional detail on development of the impact estimates presented in Exhibit 7-1.[233] To provide context for the analysis, the following section presents a profile of the mining and oil and gas industry in Unit 2 and Unit 5, with a brief mention of the other units. Following this discussion, the second section describes the data and methods from which the impact estimates are derived. The third section summarizes the projected economic impacts to mining activities and highlights major assumptions and caveats that may affect the results of the analysis.

[232] Ruediger, Bill, et al. 2000, p. 100; USDA Forest Service. 2007. Final Environmental Impact Statement: Northern Rockies Lynx Management Direction. USDA Forest Service.

[233] Impacts to Unit 4 are limited to administrative costs (based on a 2000 informal consultation). Impacts are highlighted in Exhibit 7-1, however, this section gives only cursory mention to Unit 4.

7.1 PROFILE OF POTENTIALLY AFFECTED MINING AND OIL AND GAS INDUSTRIES

259. Active mines exist in Units 1, 2, 3, and 5. Small scale stone quarries and gravel pits are the predominant mining activity across the study area, with the exception of large, open pit metal mines in the Unit 2 (Minnesota) and Unit 5 (Greater Yellowstone). The only active oil and gas well are located in the Unit 5.[234] Eight active natural gas wells are located in the southern portion of the unit as well as nine "shut-in" gas wells and one "shut-in" oil well.[235]

7.1.1 UNIT 1: MAINE

260. Although pit metal mining has not occurred in the State since 1977, the study area encompasses known metal deposits of gold, zinc, lead, and copper and a potential for copper-zinc sulfide deposits in the northern portion of the State.[236, 237] There is limited exploratory activity on-going and full scale mining operations are not expected to occur in the foreseeable future. [238]

261. All active mining operations in the study area are small-scale crushed stone quarries and sand and gravel pits. Most sites are on private, dry land that has been cleared expressly for the intent of mining operations. No Federal permits (e.g., surface water discharge permits, wetland permits, or stormwater permits) are typically required for these operations and none of the operations are located on Federal land or receive Federal funding.[239] Additionally, no oil and gas operations were identified in Unit 1.

7.1.2 UNIT 2: MINNESOTA

262. The mining industry is a significant contributor to Minnesota's economy. The estimated value of Minnesota's non-fuel mineral production was $1.89 billion in 2004, which ranked 7th in the United States.[240] That same year, Minnesota was the nation's top-ranked iron ore producer and contributed over 75 percent of the nation's total domestic

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[234] Although oil and gas exploration has occurred within the boundaries of Unit 3, all existing wells have been abandoned and current permits lie outside proposed critical habitat.

[235] Shut-in wells are wells capable of producing but have been closed down for an indefinite period of time for repair, clean out, workover, lack of market, etc. It is currently unclear when or if these "shut-in" wells will return to production.

[236] Maine Geologic Survey, History of Metal Mining in Maine. Department of Conservation. Accessed at: http://maine.gov/doc/nrimc/mgs/explore/mining/minehist.htm on May 27, 2008.

[237] Personal communication with Mark Stebbins, Maine DEP Pit and Quarry Coordinator, June 10, 2008.

[238] *Ibid.*

[239] Note that while the Maine performance standards explicitly state that stormwater permits are not required for mineral extraction operations, stormwater control standards must be adopted for operations that are not internally drained. See 38 M.R.S.A. § 490-Z, part 9.

[240] Minnesota DNR Division of Lands and Minerals/U.S. Geological Survey, "The Mineral Industry of Minnesota," U.S. Geological Survey Minerals Yearbook, 2003. Accessed at: http://minerals.usgs.gov/minerals/pubs/state/2004/mnstmyb04.pdf on May 27, 2008.

iron ore exports.[241] The State's iron ore mining industry primarily extracts taconite, a low-grade iron ore, which is processed into taconite pellets for steel production.[242] All current taconite mining and exploration occurs in the Mesabi Range, which extends in a narrow band from Grand Rapids in Itasca County to Babbitt in St. Louis County. Over half of the Mesabi Range is located within Unit 2.

263. Six taconite producing mines in Minnesota employed 3,170 workers and produced 41.4 million tons of usable crude ore in 2005.[243] According to the Iron Mining Association of Minnesota, taconite mining contributes over $1.5 billion annually to the State's economy in the form of purchases, wages and benefits, royalties and taxes.[244] Taconite mines also contribute approximately $100 million annually in State tax revenue and provide funding to surrounding townships and school systems.[245]

264. Currently, three operating taconite mines exist that partially overlap the study area in Unit 2: the Laurentian Mine and East Reserve, operated by Minorca Mine Inc. (owned by ArcelorMittal Steel), and the Northshore Mine, operated by Northshore Mining Company, a subsidiary of Cleveland Cliffs. In 2004, the Laurentian Mine and Northshore Mine produced 2.8 and 4.7 million metric tons, respectively, representing 6.8 and 11.4 percent of the taconite industry in the State.[246] The corresponding production value was $106 million and $178 million, respectively.[247] Minorca Mine Inc. was recently granted a permit to mine for their East Reserve Mine, which is projected to allow the company to maintain operations of their taconite processing facility until 2024.[248]

265. The State also maintains over 48,200 acres of active mining leases within the study area. Approximately 280 acres are leased to companies that are actively mining taconite. The other 48,000 acres are leased to a variety of mining interests that are at various stages of pre-development for mining the non-ferrous deposits (i.e., non-iron metals) in the area. Recent increases in commodity prices for non-ferrous metals, the decline in the U.S. dollar, and discovery of viable deposits has spurred exploration of northern Minnesota's

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[241] Minnesota DNR Division of Lands and Minerals/U.S. Geological Survey, "The Mineral Industry of Minnesota," U.S. Geological Survey Minerals Yearbook, 2003 Accessed at: http://minerals.usgs.gov/minerals/pubs/state/2004/mnstmyb04.pdf on May 27, 2008.

[242] Minnesota DNR website. Accessed at http://www.dnr.state.mn.us/education/geology/digging/taconite.html on May27, 2008.

[243] Jorgenson, John. U.S. Geological Survey Mineral Commodity Summary: Iron Ore, 2005. Accessed at: http://minerals.usgs.gov/minerals/pubs/commodity/iron_ore on May 28, 2008.

[244] Iron Mining Association of Minnesota. Minnesota's Iron Mining Operations**.** Accessed at http://www.taconite.org/who_we_are/producing.html on May 29, 2008.

[245] Personal communication with Dennis Martin, Senior Geologist, MNDNR Division of Lands and Minerals, February 17 and April 6, 2006.

[246] Iron Mining Association of Minnesota. Production capacity information, Accessed at: http://www.taconite.org/who_we_are/producing.html on February 22, 2006.

[247] Production values calculated by multiplying 2004 company production capacity times 2004 commodity price of iron ore.

[248] Personal communication with Steve Mekkas, Engineer for Pit Operations, ArcelorMittal Steel, June 11, 2008.

"Duluth Complex Deposit." This mineral complex follows the Mesabi Range and holds significant copper, nickel, and platinum group deposits. Currently, there are a number of on-going exploratory drilling efforts along the Duluth Complex. Although there is no active mining occurring on these lands, the Minnesota Department of Natural Resources (MN DNR) anticipates that these interests will continue through the pre-development process and actively mine these areas in the coming years.[249]

266. In addition to taconite mines, the location of non-ferrous deposits and MN DNR mineral lease areas is highlighted in Exhibit 7-2. Exhibit 7-2 also outlines a two-mile buffer around known non-ferrous deposits along the Duluth Complex. This buffer is intended to depict potential "auxiliary" lands surrounding the deposits which may be disturbed in developing the mineral resource. These auxiliary lands may include areas for deposit expansions, stockpiles, tailings basins, blast buffers, environmental setbacks, haulage routes, and mine infrastructure.[250] In essence, the two-mile buffer represents areas where non-ferrous deposit expansions have occurred or will likely occur (though it is possible that it does not include all areas of intensive exploration and drilling work).[251] Approximately 98,700 acres of the two-mile buffer overlaps the study area (associated with 22 known non-ferrous deposits).

267. The iron ore industry in Minnesota has been strong in recent years. As highlighted in Exhibit 7-3, the price per metric ton of iron ore has risen sharply since 2002, driven by the increased global demand for construction steel.[252] Sustained demand and the development of new steel production plants in the Great Lakes area are expected to expand the domestic taconite mining industry.[253]

268. No oil and gas operations were identified within Unit 2.

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[249] Personal communication with John Engesser, Assistant Director at the Division of Lands and Minerals, Minnesota Department of Natural Resources, May 26, 2008.

[250] Written communication from Tim Pastika, Mining Engineer and GIS Specialist, Minnesota Department of Natural Resources, on June 5th and June 6th, 2008.

[251] *Ibid.*

[252] Jorgenson, John. U.S. Geological Survey Mineral Commodity Summary: Iron Ore, 2005. Accessed at: http://minerals.usgs.gov/minerals/pubs/commodity/iron_ore on May 28, 2008.

[253] *Ibid.*

EXHIBIT 7-2 LOCATION OF MINING OPERATIONS IN UNIT 2

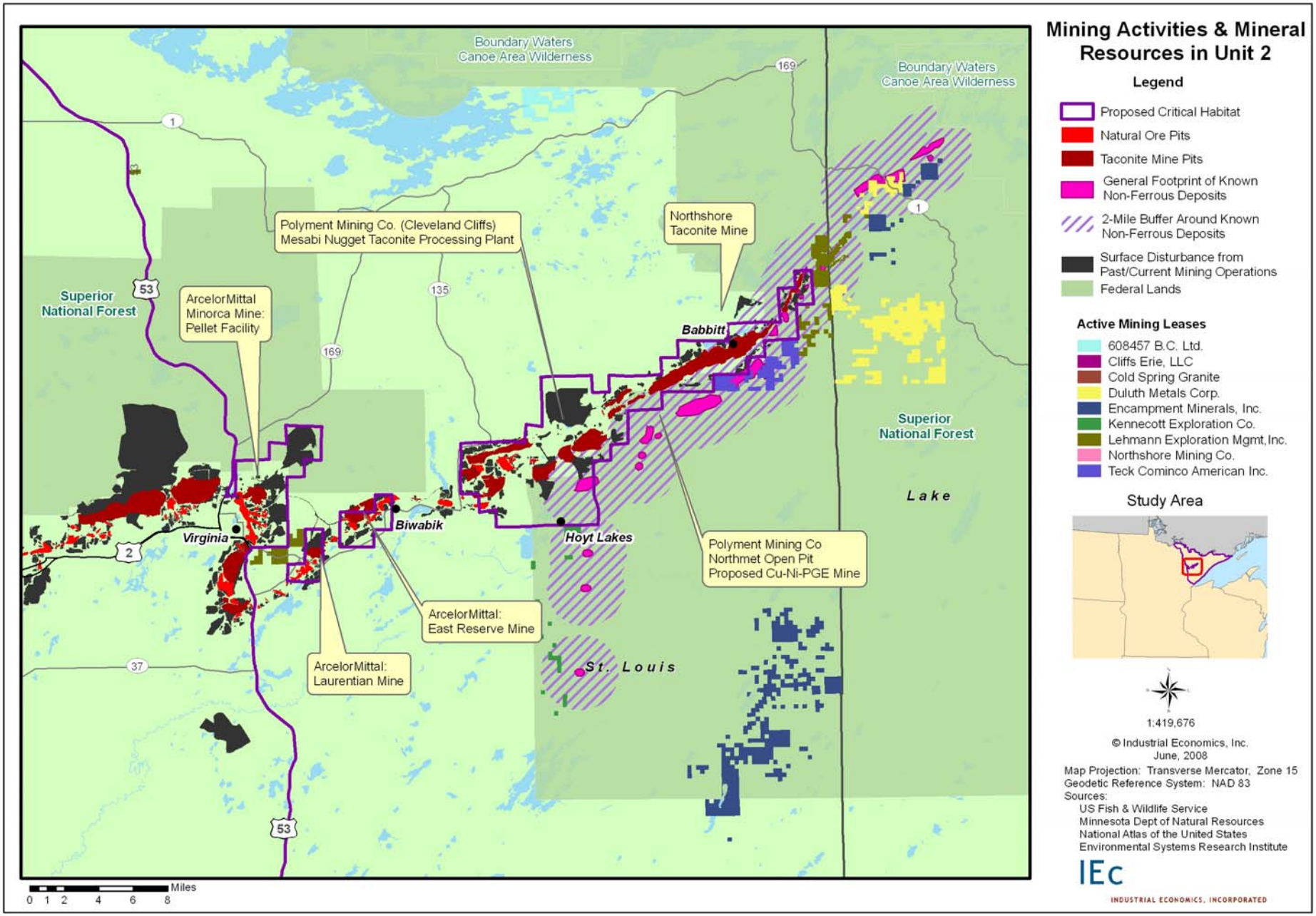
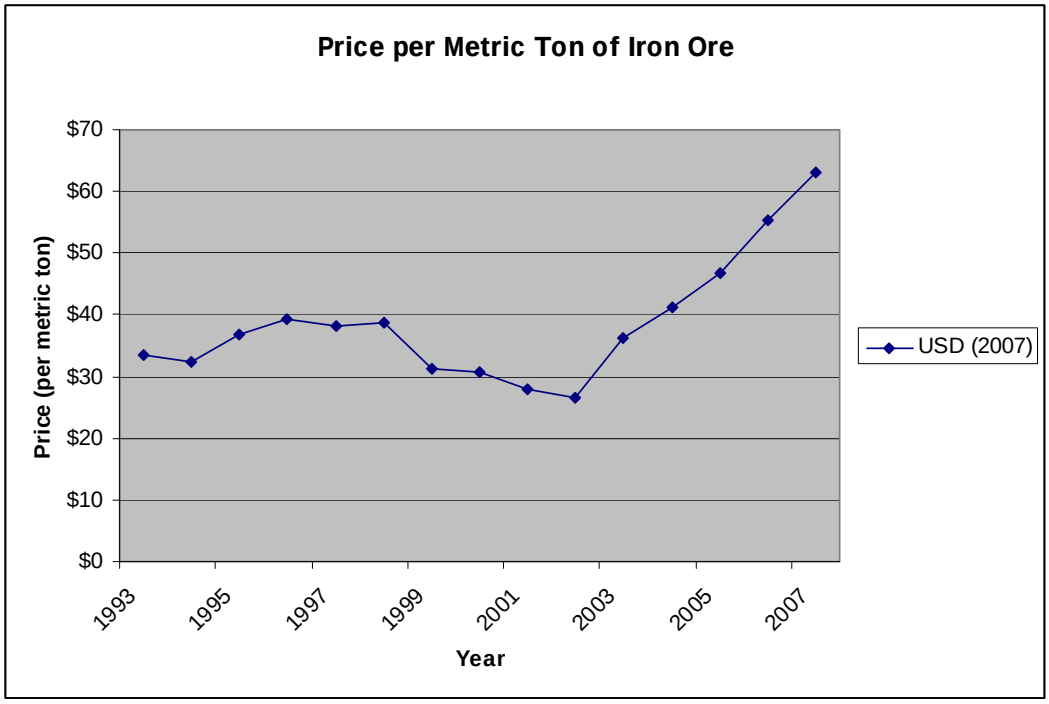


EXHIBIT 7-3 HISTORICAL PRICE OF IRON ORE IN MINNESOTA[254]



7.1.3 UNIT 3: NORTHERN ROCKY MOUNTAINS

269. The estimated value of Montana's non-fuel mineral production in 2003 was $492 million, which ranked 26th in the U.S.[255] The last mine permit in the State for a major metals mine was issued in 1989.[256] Currently, there are no major mines planned in the study area nor are there any anticipated in the foreseeable future.[257] All active mining operations in Unit 3 are small-scale crushed stone quarries, sand and gravel pits, or placer mines operating on private lands.[258] Several small quarries operate in the southern portion of the study area.[259]

270. No oil and gas operations were identified in Unit 3.

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[254] Jorgenson, John. U.S. Geological Survey Mineral Commodity Summary: Iron Ore, 2005. Accessed at: http://minerals.usgs.gov/minerals/pubs/commodity/iron_ore on May 28, 2008.

[255] Minnesota DNR Division of Lands and Minerals/U.S. Geological Survey, "The Mineral Industry of Minnesota," U.S. Geological Survey Minerals Yearbook, 2003. Accessed at: minerals.usgs.gov/minerals/pubs/state/mn.html on May 27, 2008.

[256] Personal communication with Robin McCulloch, Associate Research Engineer, Montana Bureau of Mines and Geology, February 14, 2006.

[257] Personal communication with Ryan Harris, MT DEQ Energy Minerals Bureau, Reclamation Specialist, February 28, 2006.

[258] *Ibid.*

[259] *Ibid.*

7.1.4 UNIT 4: NORTH CASCADES

271. No active mining or oil and gas operations were identified within Unit 4.

7.1.5 UNIT 5: GREATER YELLOWSTONE

272. Mining and oil and gas extraction industries represent a significant portion of the regional economy in Wyoming and Montana. In 2005, the mining and oil and gas industry contributed over $15 billion, or 63 percent, of the Wyoming's Gross Domestic Product (GDP).[260] That same year, oil and gas production in Wyoming yielded nearly $11 billion worth of petroleum, representing a three-fold production increase in the past 25 years.[261] The mining and oil and gas industries in Montana contributed $1.5 billion, or 6 percent, of the State's GDP in 2005.

273. Mining in Wyoming is largely based on bentonite, coal, trona, and uranium extraction whereas the Montana industry is based on other metals, including copper, gold, palladium, coal, and sapphire.[262] Oil and gas operations in Montana are located in the north-central and east-central portions of the State. In Wyoming, these operations are concentrated in the west and southwestern regions of the State.[263, 264]

274. County-level employment in the mineral and oil and gas industries are significant (greater than five percent) for two counties in Unit 5, Sublette, Wyoming and Stillwater, Montana. Exhibit 7-4 highlights the level of employment within these industries as a percent of total county employment in 2006.

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[260] Bureau of Economic Analysis, U.S. Department of Commerce. Regional Economic Account, Gross Domestic Product by State. Accessed at: http://www.bea.gov/regional/gsp/ on May 20, 2008.

[261] Wyoming Department of Employment, "Oil and Gas Production and the Relationship Between Prices and Employment in Wyoming" Research & Planning, Wyoming Labor Force Trends Vol. 42 No. 9. Accessed at http://doe.state.wy.us/lmi/0905/a1.htm on April 15, 2008.

[262] Wyoming Mining Association. Accessed at http://www.wma-minelife.com/ on May 21, 2008; Robin B. McCulloch, Montana Bureau of Mines and Geology. THE MINERAL INDUSTRY OF MONTANA. Accessed at: http://minerals.usgs.gov/minerals/pubs/state/983099.pdf on May 21, 2008.

[263] Based on the location of oil and natural gas wells as highlighted on an interactive map, WebMapper, maintained by the Montana Department of Natural Resources. Accessed at http://www.bogc.dnrc.mt.gov/website/mtcbm/viewer.htm on June 4, 2008.

[264] Based on a review of a GIS layer highlighting existing wells published by the Wyoming Oil and Gas Conservation Commission. Accessed at http://wogcc.state.wy.us/ on May 23, 2008.

EXHIBIT 7-4 COUNTY-LEVEL EMPLOYMENT FIGURES FOR OIL AND GAS INDUSTRY

STATE	COUNTY	MINING AND OIL & GAS EMPLOYMENT	TOTAL COUNTY EMPLOYMENT	PERCENT OF COUNTY EMPLOYMENT
WY	Park	479	11,870	4.0%
WY	Teton	22	17,223	0.1%
WY	Fremont	639	15,147	4.2%
WY	**Sublette**	**1,004**	**4,811**	**20.9%**
WY	Lincoln	659	6,700	9.8%
MT	Sweet Grass	0	1,641	0.0%
MT	Gallatin	220	44,057	0.5%
MT	Park	52	5,892	0.9%
MT	**Stillwater**	**1,093**	**3,174**	**34.4%**
MT	Carbon	40	2,504	1.6%

Notes: 2006 averages obtained from U.S. Census QWI online database (http://lehd.did.census.gov/led/datatools/qwiapp.html). Estimates reflect jobs in "Oil and Gas Extraction" (NAICS code 211), "Mining (Except for Oil and Gas)" (NAICS code 212) as well as "support activities" (NAICS code 213).

275. Although these industries constitute a significant portion of the regional economy, the level of activity within the Unit 5 boundary is relatively small. Only two active mines exist in Unit 5: the East Boulder Mine in Sweetgrass County, Montana and Stillwater Mine in Stillwater County, Montana.[265] Both mines are operated by the Stillwater Mining Company and produce palladium, platinum, and rhodium.

Stillwater Mining Company

276. Stillwater Mining Company is the only primary producer of platinum group metals (PGMs) in the western hemisphere.[266] PGMs are considered to be strategic minerals that play a role in the country's national and economic security. Among other things, they are used in fuel cells, electronics, hydrogen purification, and medicine.[267] The company is one of top five employers in Montana (approximately 1,625 employees at the end of 2007) and Stillwater County enjoys one of the highest per-capita incomes in the

[265] Based on geographic overlay of GIS mining data published from the Mineral Resource Database System (MRDS), USGS and Unit 5. All "producer" mines were located and mining activities were corroborated by aerial photography available in Google Earth™ (http://earth.google.com/).

[266] U.S.-Russian Commercial Investments Fact Sheet. The Whitehouse- Office of the Press Secretary. Accessed at http://www.whitehouse.gov/news/releases/2003/09/20030927-3.html, June 4, 2008.

[267] Congressional Testimony from Charles G. Groat, Director, USGS before the subcommittee on Energy and Mineral Resources. U.S. House of Representatives on July 17, 2003. "The Role of Strategic and Critical Minerals in Our National and Economic Security." Accessed at http://www.usgs.gov/congressional/hearings/testimony_17july03.asp on June 4, 2008.

State.[268,269] In addition, they pay over $13 million in taxes every year and provide over $100 million in goods and services to the local and regional economy.[270] The company's property covers a 27 square-mile parcel that encompasses both the Stillwater and East Boulder mines and the underlying ore body. Their revenue exceeded $619 million in 2007. Given the strategic importance of the PGMs, it is likely that Stillwater Mining Company will be in operation in the long-term.[271] The location of Stillwater and East Boulder mine is highlighted in Exhibit 7-5.

Oil and Natural Gas Wells

277. According to Wyoming's Oil and Gas Conservation Commission, there are eight natural gas wells are in operation and eight other natural gas wells and one oil well that have been "shut-in". Of the eight active natural gas wells, seven are owned by Exxon Mobil Corporation in the southern portion of Bridger National Forest in Sublette County. The other well is owned by Fidelity Exploration and Production Company and lies just east of Yellowstone National Park in the North Absaroka Wilderness. The "shut-in" wells are owned by various companies including, True Oil LLC., Black Diamond Energy of Delaware Inc., Cimarex Energy Co., Exxon Mobil Corp., and Humble Oil and Refining. The location of these wells is highlighted in Exhibit 7-5.

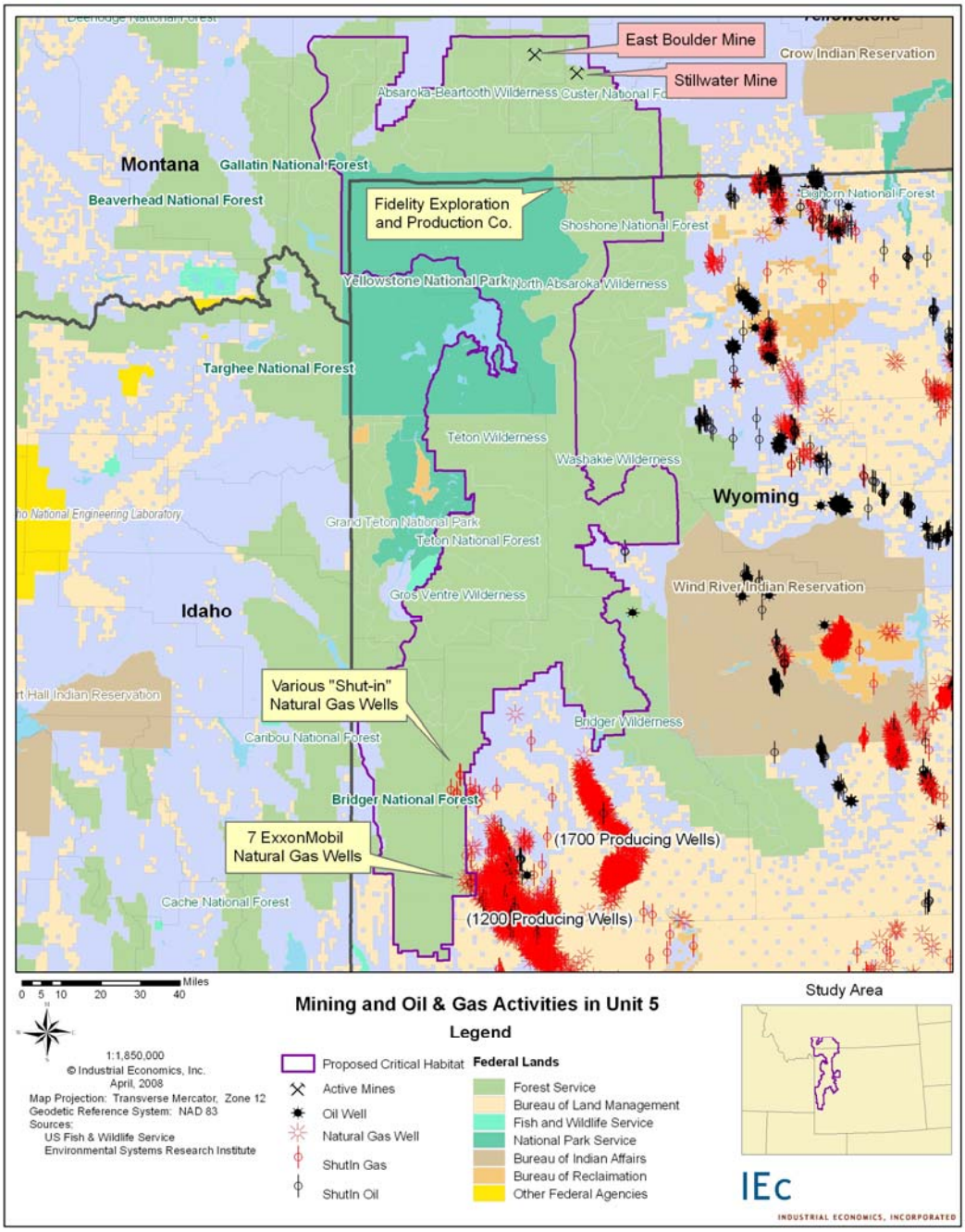
[268] Stillwater Mining Company. Annual Report 2007. Accessed at http://media.corporate-ir.net/media_files/irol/99/99837/2007AR.pdf on May 21, 2008.

[269] Personal communication with Bruce Gilbert, Director Environmental and Governmental Affairs, Stillwater Mining Company, June 3, 2008.

[270] Personal communication with Bruce Gilbert, Director Environmental and Governmental Affairs, Stillwater Mining Company, June 3, 2008.

[271] Stillwater Mining Company. Annual Report 2007. Accessed at http://media.corporate-ir.net/media_files/irol/99/99837/2007AR.pdf on May 21, 2008.

EXHIBIT 7-5 MINING AND OIL AND GAS ACTIVITIES IN UNIT 5



7.2 ANALYTIC METHODOLOGY

278. This section describes the methods employed to estimate economic impacts to the mining and oil and gas industry of lynx conservation. To begin, this section identifies mines and oil and gas well locations in the study area for which Federal funding, permitting, or other oversight may result in section 7 consultation regarding the lynx and its habitat. The methodology for quantifying impacts associated with section 7-related project modifications is then outlined in detail.

7.2.1 FEDERAL PERMITTING FOR MINING AND OIL & GAS ACTIVITIES

279. In Minnesota, a permit to mine requires both State and Federal oversight. The MN DNR is the lead State agency issuing mining permits, and the USACE is often the lead Federal agency. Given the abundance of wetlands in northern Minnesota, almost all proposed mining activities require USACE 401 or 404 permits.[272] Depending on the level of concern regarding compliance with the Clean Air Act of Clean Water Act, the EPA may also become involved in the permitting process. If the proposed mining action occurs on USFS land, the USFS will cooperate with BLM (the permitting agency for mining and oil and gas activities on USFS lands) to ensure that the proposed action is consistent with USFS policy.[273]

280. In Montana and Wyoming, the BLM is responsible for administering oil and gas and mineral resources. The BLM's Surface Management regulations, or "3809" regulations, govern the operations and reclamation process for mining "locatable" minerals (such as gold, silver, copper, uranium, lead, zinc and molybdenum) in accordance with the Mining Law of 1872.[274] On USFS lands, the BLM works in conjunction with the USFS to issue permits for both mineral and oil and gas extraction.[275] In all states, oil and gas operators must apply for an "Application for Permit to Drill" before engaging in any exploratory or extraction activities.

281. This permitting authority afforded by these Federal agencies constitutes a Federal nexus, resulting in consultation between the Federal agency involved and the Service. Thus, this analysis assumes that all current and forecast mining and oil and gas operations are subject to a Federal nexus and will undertake consultation considering the lynx and its habitat.

7.2.2 ANTICIPATED MODIFICATIONS TO MINING AND OIL & GAS ACTIVITIES

282. Since the species listing, the Service has engaged in 25 section 7 consultations regarding mining and oil and gas activities within the study area. Specifically, there have been 13 consultations in Unit 2 (seven formal; six informal) and 11 in Unit 5 (one formal; 10

[272] Personal communication with John Engesser, Assistant Director, Division of Land and Minerals, Minnesota Department of Natural Resources, May 22, 2008.

[273] *Ibid.*

[274] 46 FR 36142, July 14, 1981. ESA compliance listed in § 228.108

[275] 36 CFR 228.

informal). Only in Unit 2 did the Service request project modifications for large metals mining projects. None of the consultations in Wyoming regarding oil and gas activities were deemed to "affect" or "likely jeopardize" the lynx.

Mining Projects

283. Project modifications to the mining industry outlined in previous consultations included:

- Limiting the number of vehicle trips along certain mining haul roads;
- Developing a monitoring and reporting plan;
- Conducting winter track surveys; and
- Promptly removing carrion killed by vehicles on haul roads to limit the likelihood of lynx feeding on carrion on or near the road.

284. These modifications are consistent with the conservation measures outlined in the LCAS and NRLMD and are quantified in this analysis. In addition, the LCAS and NRLMD outline the following conservation direction that has not been requested by the Service, and is already consistent with Federal and State law or established Best Management Practices (BMPs) in the industry even absent the presence of the lynx. These include:

- **Reclamation of abandoned mines and oil and gas wells.** Since before the listing of the lynx, regulations have existed in each State containing proposed critical habitat that mandate the reclamation of mine sites, oil and gas wells, and associated roads post-production.[276] Therefore, this analysis does not quantify the costs of reclamation as an impact of lynx conservation.
- **Closing mining roads to the public.** None of the mine projects within the study area allow for public access. This analysis does not quantify the costs of closing roads as an impact of lynx conservation.
- **Minimize snow compaction when authorizing and monitoring developments.** Vehicle travel for mining is generally restricted to designated haul roads and ExxonMobil already uses technology that allows them to remotely monitor the operating characteristics of their oil and gas wells. Rarely is it necessary to visit wells for reasons beyond maintenance.[277] Over-the-snow travel is also not standard procedure during exploration and development

[276] The following regulations govern mine reclamation in the four units in this analysis: Maine Statutes Title 38 Ch 3 § 490, accessed at http://janus.state.me.us/legis/statutes/38/title38sec490.html on May 13, 2008; Minnesota Rule 6130.36, accessed at http://www.revisor.leg.state.mn.us/arule/6130/3600.html on May 13, 2008; Montana Code Annotated 2005 Title 82 Ch 4 Reclamation, accessed at http://data.opi.state.mt.us/bills/mca_toc/82_4_3.htm on May 13, 2008; Revised Code of Washington , Title 78 Ch 4 § 091 Surface Mining, accessed at http://apps.leg.wa.gov/RCW/default.aspx?cite=78.44.091 on May 13, 2008; Code of Federal Regulations (CFR Application for a Permit to Drill). 2004. 43 CFR § 3162.3-1 (2004), accessed at http://www.blm.gov/nhp/news/regulatory/3100/3162.3-1.html on May 13, 2008; and Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. §§ 1201-1328, as amended. Reclamation for oil and gas activities are mandated under the Code of Federal Regulations (CFR Oil & Gas Bonding). 2004. 43 CFR § 3104.1-3104.8 (2004).

[277] Personal communication with John Knoll, Environmental Department, ExxonMobil Corporation, June 9, 2008.

activities. Because of the relatively extreme terrain, travel (especially during the winter) is primarily restricted to designated routes and designated over-the-snow routes.[278]

- **Develop stipulations for limiting timing of activities and surface use.** Mining pits are not movable and must occur where the iron ore deposits exist. Other major components of mining operations that contribute to the surface footprint include the location of waste rock stockpiles, roads, and processing facilities. According to the MN DNR and various mining companies operating in the Mesabi Range, moving any component of the mining operation (i.e., waste rock stockpiles, processing facilities) would "very likely" render the entire mining operation economically unviable.[279] Inherent to mine design and operation is the assumption that waste stockpiles remain adjacent to the pit operations and minimizing the distance to haul ore to the processing facility.

  Where possible, mining operators in Unit 2 move their waste stockpiles back into the pit areas. This practice becomes economical when the pit area is mined to an extent where there is sufficient room to store waste rock, thus reducing the mine's overall surface footprint. This practice has been on-going at the Northshore and Laruentian Mine and ArcelorMittal plans to manage the East Reserve mine in the same manner once the open pit is large enough.[280]

Oil and Gas Activities

285. In a 2005 Programmatic Biological Opinion regarding all BLM activities in the State of Wyoming, the Service concluded that oil and gas (and mining) activities "will not likely adversely affect or have no effect" on the lynx given the BLM's commitment to implementing the conservation measures outlined in the LCAS.[281] Specifically, the BLM is committed to the restriction of over-the-snow travel to designated routes, minimization of snow compaction while authorizing and monitoring developments, and encouraging the remote monitoring of sites within lynx habitat. Other conservation efforts related to the lynx include the restriction of public access to designated routes and reclaiming roads and project footprints upon completion. As stated above, these conservation efforts are either consistent with current Federal and State oil and gas regulations or standard practices within the industry.

286. To date, ExxonMobil (owner and operator of seven of the eight active natural gas wells) has confirmed that they have not undertaken any conservation efforts related to the

[278] Personal communication with John Knoll, Environmental Department, ExxonMobil Corporation, June 9, 2008.

[279] Personal communication with Steve Mekkas, Engineer for Pit Operations, ArcelorMittal Steel, June 11, 2008. Personal communication with Dave Skolasinski, Northshore Mining Company, June 10, 2008. Personal communication with Tim Pastika, Mining Engineer and GIS Specialist at Minnesota Department of Natural Resources, June 2, 2008.

[280] Personal communication with Steve Mekkas, Engineer for Pit Operations, ArcelorMittal Steel, June 11, 2008.

[281] U.S. Fish and Wildlife Service. Consultation for the Impacts from the Wyoming Bureau of Land Management's Resource Management Plans to the Canada Lynx (Lynx canadensis). Consultation with U.S. Bureau of Land Management. August 9,2005. Reference number: ES-6 14 1 I/W.O2/WY9669.

species since its listing.[282] Although they are subject to the terms and conditions outlined in the 2005 programmatic consultation, their standard operating procedures absent the presence of the lynx are consistent with the conservation efforts outlined in the consultation (based on the LCAS) and there is therefore no opportunity cost associated with their implementation. Therefore, this analysis does not anticipate any impacts of lynx conservation associated with oil and gas activities beyond administrative impacts of consultation.

7.2.3 METHODS APPLIED TO QUANTIFY IMPACTS OF PROJECT MODIFICATIONS

287. This analysis focuses on the costs of lynx conservation related to metal mining activities in Unit 2 and Unit 5. This Section first describes the differences between the assumptions and methods from the 2006 Economic Analysis of Critical Habitat Designation for the Canada Lynx.

Methodological differences between the current and 2006 Economic Analysis

288. Impacts associated with modifications to mining and oil and gas activities were estimated to be less in the 2006 for a number of reasons. First, the Greater Yellowstone unit had not been proposed, therefore omitting impacts associated with the Stillwater and Boulder Mines in Montana. Second, in 2006, it was unclear as to how the proposed expansions of the East Reserve Mine and Northshore Mine would be affected by critical habitat. Therefore, the only impacts reported in the 2006 report included the costs of conducting winter track surveys and monitoring and the costs of acquiring land to move tailings stockpiles outside critical habitat. Lastly, as opposed to 2006 analysis, this analysis forecasts the development of a number of non-ferrous deposits within the study area. The additional consideration of this exploration activity increases the forecast conservation and administrative efforts. Another difference is that the current analysis does not assume that stakeholders will move stockpiles. Three formal consultations have occurred (two since the previous critical habitat designation in 2006) and none resulted in the recommendation to move stockpiles. Subsequent discussions with mining operators and the MN DNR indicate that such a project modification has never been recommended and would make operations at any large-scale metal mine prohibitively expensive.[283]

Quantifying Species Conservation Costs

289. Based on communication with mining and oil and gas stakeholders and GIS analysis of those activities within Unit 2 and Unit 5, this analysis quantifies the costs associated with implementing the lynx conservation efforts outlined in previous section 7 consultations

[282] Personal communication with John Knoll, Environmental Department at ExxonMobil's Shute Creek Facility, June 9, 2008.

[283] U.S. Fish and Wildlife Service. Biological Opinion of the Northshore Mine Expansion, St. Louis County, Minnesota. Twin Cities Field Office, Bloomington, Minnesota. June 30, 2006; U.S. Fish and Wildlife Service. Biological Opinion of the Mittal Steel USA- Minorca Mine, Inc. East Reserve Project. St. Louis County, Minnesota. Twin Cities Field Office, Bloomington, Minnesota. February 20, 2007; U.S. Fish and Wildlife Service. Consultation for the Impacts from the Wyoming Bureau of Land Management's Resource Management Plans to the Canada Lynx (Lynx canadensis). Consultation with U.S. Bureau of Land Management. August 9,2005. Reference number: ES-6 14 1 I/W.O2/WY9669.

related to mining. Cost information was obtained through interviews regarding past and on-going conservation efforts as well as forecast mining expansions.

290. Not all of the project modifications requested by the Service have resulted in economic impacts. ArcelorMittal Steel, the only mining operator required to restrict daily vehicle trips and remove of carrion from haul roads, confirmed that these modifications constitute a relatively trivial financial burden.[284] Other modifications requested by the Service have resulted in significant costs; specifically, conducting winter track surveys and monitoring and reporting for the species. This analysis therefore assumes that the only baseline impacts of lynx conservation on metal mining activities include efforts to conduct winter track surveys and monitoring and reporting for the species. Beyond additional administrative impacts, this analysis does not quantify any incremental impacts of the critical habitat designation to the mining or oil and gas industry.

Quantifying Administrative Costs

291. This analysis forecasts consultations costs based on known, forecast mining projects as well as the frequency of past section 7 consultations. Administrative costs of consultation are described in Exhibit 2-2. Given the anticipated increase in non-ferrous mining activity in Unit 2, as well as known expansions to existing taconite mines, and the frequency of past consultations over the areas proposed for critical habitat, this analysis assumes the potential for 58 section 7 consultations may occur over the next twenty years (34 formal and 24 informal). Over the time horizon for the analysis (2009-2028), this analysis estimates that there will be 47 section 7 consultations in Unit 2 (34 formal; 13 informal), two in Unit 4 (all informal), and 9 in Unit 5 (all informal).

7.3 RESULTS

292. The following section describes pre-designation impacts, post-designation baseline impacts, and post-designation incremental impacts of lynx conservation on mining activities.

7.3.1 PRE-DESIGNATION IMPACTS

293. Pre-designation impacts occurred in Unit 2 and Unit 4. Unit 2 experienced impacts from species conservation efforts and administrative costs while impacts in Unit 4 were only attributable to administrative costs.

Unit 2: Northshore Mining Company

294. Northshore Mining Company recently received a permit from the USACE to expand an existing taconite mine pit by filling a 20 acre wetlands area.[285] In 2006, the Service published a Biological Opinion for this project, which required establishing a monitoring

[284] Personal communication with Steve Mekkes, Engineer for Pit Operation, ArcelorMittal Steel, June 11, 2008.

[285] Personal communication with Dave Skolasinski, District Manager on Environmental Affairs, Northshore Mining Company, May 23, 2008.

and reporting program for the species. The costs associated with fulfilling the lynx monitoring requirements (i.e., training, recordkeeping, and reporting) was less than $1,000 annually.[286]

Unit 2: Wildlife Habitat Fragmentation Study

295. Three mining companies with mines in the Mesabi Range contributed funds to a wildlife habitat fragmentation and wildlife migration corridor cumulative impact assessment in 2006. The $15,000 cost of the study was equally shared by PolyMet Mining Company, ArcelorMittal Steel and Minnesota Steel.[287]

Unit 2: Winter Track Surveys

296. In addition, as a result of a 2005 consultation, the Service recommended that PolyMet conduct a study of species' population density in the area around their proposed Northmet Mine expansion. PolyMet subsequently conducted a track survey in the winter of 2005-2006 at a cost of $70,000 (2005 dollars).[288] The company also conducted a previous lynx survey in the winter of 2000. Cost information for this survey was unavailable at the time of this analysis, therefore, the present value for the survey was assumed to be $70,000 (2000 dollars).[289]

Unit 4: Administrative Costs

297. Pre-designation baseline costs for Unit 4 included one informal section 7 consultation from 2000.

EXHIBIT 7-6 PRE-DESIGNATION BASELINE IMPACTS

UNIT	SUBUNIT	PRESENT VALUE 7%
2	Private Mining Companies	$449,000
4	U.S. Forest Service	$12,900
Total		**$462,000**

Notes:
1. Impact estimates reflect impacts incurred from 2000 to 2008.
2. Entries may not sum to totals reported due to rounding.

[286] Written communication from Dave Skolasinski, District Manager on Environmental Affairs, June 13, 2008.

[287] Personal communication with Jon Ahlness, District Engineer, USACE Regulatory Branch in St. Paul, MN, March 2, 2006. Minnesota Steel is developing a mine site near the town of Naushwauk, approximately 20 miles west of the study area.

[288] Personal communication with Jim Scott, Assistant Project Manager, PolyMet Mining Corp., March 7 and March 16, 2006.

[289] PolyMet Assistant Project Manager Jim Scott was unable to cite costs for the winter track survey conducted in 2000.

7.3.2 POST-DESIGNATION BASELINE IMPACTS

298. Post-designation baseline impacts for mining activities are anticipated to occur in Unit 2, Unit 4, and Unit 5. Impacts are highlighted in Exhibit 7-7 below.

EXHIBIT 7-7 POST-DESIGNATION BASELINE IMPACTS

UNIT	SUBUNIT	PRESENT VALUE 7%	ANNUALIZED 7%
2	Private Mining Companies	$1,290,000	$122,000
4	U.S. Forest Service	$6,630	$626
5	Private Mining Companies	$135,000	$12,700
Total		**$1,430,000**	**$135,000**

Notes:
1. Impact estimates reflect a 20-year time horizon (2009-2028) over which impacts are discounted at an annual rate of 7 percent.
2. Entries may not sum to totals reported due to rounding.

Unit 2: Potential Impacts to ArcelorMittal Steel

299. ArcelorMittal Steel plans to begin the process for applying for a permit to mine for the "Central Reserve Mine" in the next few years.[290] The company hopes to have a permit to mine and begin producing from the Central Reserve in 2025. The Central Reserve would be roughly half the size of the East Reserve (approximately 475-500 acre footprint) and will be located north of the Town of McKinley, between the East Reserve and Laurentian Mines. As with the proposed Northmet Mine, this analysis assumes that ArcelorMittal Steel will establish a monitoring and reporting program for the lynx and conduct a winter track survey. Costs for these conservation efforts will be incurred in 2025.

Unit 2: Potential Impacts to Polymet Mining Co.

300. Another major mining company in the area, Polymet Mining Corporation (see Exhibit 7-2), has proposed plans for the NorthMet Mine, a major open pit mine for copper and nickel. The company expects to publish their Draft Environmental Impact Statement sometime in July of 2008 and have all of the necessary permits and administrative materials to begin mining activities in at the NorthMet Mine at the end of the year.[291] Approximately 40 acres within proposed critical habitat is planned as a stockpile site.[292] The USACE is still in consultation with the Service with regards to potential modifications to the project.[293] Absent information regarding the Service's conclusion, this analysis assumes that the Service will recommend that Polymet Mining Corporation

[290] Personal communication with Steve Mekkes, Engineer for Pit Operation, ArcelorMittal Steel, June 11, 2008.

[291] Personal communication with Jim Scott, Assistant Project Manager, PolyMet Mining Corp., March 23, 2008.

[292] *Ibid.*

[293] Personal communication with Jon Ahlness, District Engineer, USACE Regulatory Branch in St. Paul, MN, March 2, 2006.

establish a monitoring and reporting program for the lynx (annual cost of $1,000) and conduct a winter track survey (one-time cost of $70,000).[294]

Forcast Increase in Mining Activity along Mesabi Range

301. The Minnesota DNR anticipates a significant increase in both taconite and non-ferrous mining activities along the Mesabi Iron Range and Duluth Complex as a result of rising global metal prices. As highlighted in Exhibit 7-2, there are approximately 22 known non-ferrous deposits along the Mesabi Iron Range. This analysis assumes that each of these deposits will be developed over the next 20 years. This assumption is partly based on Polymet Mining Corporation receiving a permit to mine for the NorthMet Mine and consequently retrofitting their taconite processing facility to process non-ferrous metals. The processing facility and regulatory precedent will likely make mining more economical and less risky for other potential non-ferrous operators in region.[295]

302. It is difficult to forecast the year in which a company will attempt to develop each of the 22 known deposits. This uncertainty withstanding, this analysis assumes that there will be one permit to mine approved per year over the next 20 years (with two permits approved in 2009 and 2010). This analysis also assumes that a formal section 7 consultation will accompany the permit to mine each deposit. Each formal consultation will request the permittee to conduct a winter track survey and establish a monitoring and reporting program.

Unit 5: Greater Yellowstone

303. Stillwater Mining Company has an on-going permit to mine on the Stillwater Mine and East Boulder Creek mines. Although most of the mining operations are underground, each time they expand the over 100 miles of underground shafts and drifts (vertical and horizontal routes used to access the ore body) they must also establish surface vents and egresses that disturb the surface. Since production first began at the Stillwater Mine in 1985, the company has produced five Environmental Impact Statements (their sixth is currently in preparation). They have also amended their permit to mine ten times; each time warranting approval from the USFS.

304. To date, Stillwater Mining Company has not been asked to modify their activities specifically for the lynx. They have put in culverts and other wildlife corridors to accommodate the grizzly bear.[296] As with the major pit mines in Minnesota, this analysis assumes that Stillwater Mining Company will be required to establish a monitoring and

[294] Estimate for the monitoring and reporting program based on the high-end of monitoring and reporting costs reported by Northshore Mining Company. Written communication from Dave Skolasinski, District Manager on Environmental Affairs on June 13, 2008. Cost for the winter track survey is based on previous survey done by Polymet Mining Company in 2005-2006. Personal communication with Jim Scott, Assistant Project Manager, PolyMet Mining Corp., March 7 and March 16, 2006.

[295] Personal communication from Tim Pastika, Mining Engineer and GIS Specialist, Minnesota Department of Natural Resources, June 2, 2008.

[296] Personal communication with Bruce Gilbert, Director Environmental and Governmental Affairs, Stillwater Mining Company, June 3, 2008.

reporting program for the lynx and conduct one winter track survey. This analysis also assumes that they will consider the lynx during section 7 consultations related any amendments to their existing permit to mine. Based on 10 amendments to their permit to mine over the past 23 years, this analysis assumes that they will amend their permit nine more times over the next 20 years. This analysis assumes that each amendment to mine will be accompanied by an informal consultation and will not result in any additional conservation efforts for the species.

Forecast Administrative Impacts

305. In addition to project modifications outlined above for Unit 2 and Unit 5, Exhibit 7-7 also includes the post-designation baseline impacts related to administrative costs. While this analysis does not anticipate specific conservation measures for mining or oil and gas operators in Unit 4, based on the frequency of past section 7 consultations in the unit (one informal in 2000), three more informal consultations are expected in the unit over the next twenty years. There will also be 33 section 7 consultations in Unit 2 (18 Formal; 15 informal) and 25 in Unit 5 (all informal).

7.3.3 POST-DESIGNATION INCREMENTAL IMPACTS

306. As project modification recommendations are forecast to be consistent with the existing lynx management direction on these activities, the only forecast incremental impacts attributable to critical habitat are additional administrative effort associated with section 7 consultation, as quantified in Exhibit 7-8.

EXHIBIT 7-8 POST-DESIGNATION INCREMENTAL IMPACTS

UNIT	SUBUNIT	PRESENT VALUE 7%	ANNUALIZED 7%
2	Private Mining Companies	$94,600	$8,930
4	U.S. Forest Service	$2,210	$209
5	Private Mining Companies	$18,500	$1,750
Total		**$115,000**	**$10,900**

Notes:
1. Impact estimates reflect a 20-year time horizon (2009-2028) over which impacts are discounted at an annual rate of 7 percent.
2. Entries may not sum to totals reported due to rounding.

7.3.4 CAVEATS AND ASSUMPTIONS

307. Exhibit 7-9 summarizes the major assumptions and caveats underlying the analysis of impacts to mining and oil and gas activities. It is uncertain how metals and natural gas prices will behave over the next twenty years. An increase in ore and energy prices could drive a number of expansions and construction of new mines and ultimately make metals mining more economically viable in Maine and Montana. In Minnesota, there is already a large footprint over which companies currently hold a permit to mine (especially for non-ferrous deposits) and exploratory drilling has resulted in the discovery of a number of rich deposits. If prices continue to rise, mining companies are likely to invest

significant resources to develop these deposits. In the case that there is increased pressure to develop potential deposits, additional uncertainty is associated with whether the Service may request additional conservation efforts, above and beyond those recommended in the past as quantified in this report (i.e., establishment of monitoring and reporting programs and conducting winter track surveys for all new mine expansions).

308. Oil and gas operations are relatively limited within the study area and this analysis assumes there will not be any impacts to oil and gas operators due to critical habitat designation (beyond administrative impacts). Oil and gas operators already adhere to State and Federal regulations that require reclamation of roads and project sites, restrict their travel to designated routes during the leasing and development process, and follow standard operating procedures that discourage over-the-snow travel on non-designated routes. These are all part of the companies' normal operations and would occur regardless of the presence of the lynx or its critical habitat.

EXHIBIT 7-9 CAVEATS AND ASSUMPTIONS

ASSUMPTION	POTENTIAL EFFECT ON RESULTS[1]
Sand and gravel mining activities are excluded from the analysis. The Proposed Rule and LCAS do not highlight this activity or offer guidance regarding how lynx conservation may be incorporated. Further, these activities have not been subject to section 7 consultations or otherwise incorporated lynx conservation in the past. In the case that sand and gravel mining is targeted as a risk factor to the lynx in the future, this analysis may underestimate economic impacts.	-
This analysis assumes that mining operators will develop all known non-ferrous deposits along the Duluth Complex in Unit 2 over the next 20 years. Absent more specific information about the timing of when these prospective operators will apply for and receive a permit to mine, this analysis assumes a relatively constant rate of development of the ore body (i.e., one per year with two in years 2009 and 2010). It is possible that mining operations will not commence on all 22 known deposits over the next 20 years. It is also possible that permits to mine may be granted for all known deposits at a over the next decade (as opposed 20 years). Depending on the timing of this activity, this analysis may under- or overestimate associated economic impacts.	+/-
Absent information regarding the future timing of projects and associated consultations, this analysis forecasts section 7 consultations based on the frequency with which they have occurred since the species listing in 2000.	+/-
Notes: +: This assumption may result in an overestimate of real costs. - : This assumption may result in an underestimate of real costs. +/-: This assumption has an unknown effect on estimates.	

CHAPTER 8 | OTHER ACTIVITIES

309. This chapter describes the economic impacts associated with other activities that may be affected by lynx conservation. These are fire management, wind energy development projects, livestock grazing, and species research and active management. Changes in the management of these activities as a result of lynx conservation, and the resulting economic impacts are discussed in separate, activity-specific subsections of this chapter and summarized below. Total forecast baseline and incremental impacts for all of these activities are summed and summarized in Exhibit 8-1.

- **Fire Management.** Fire management activities occur throughout the study area. On Federal lands, these activities follow existing lynx management plans. Communication with land managers indicates that lynx conservation has not measurably affected their ability to manage the forests for fire. Impacts are therefore expected to be minor and primarily baseline administrative costs of consultation.
- **Wind Energy Projects.** While wind energy is an emerging activity within the study area, limited information exists to forecast the location and scale of potential future projects. As a result, this analysis forecasts impacts associated only with projects for which some level of planning has occurred. Specifically, impacts are associated with three potential projects in Maine and include administrative costs of consultation and project modification. In addition, Section 8.2 highlights other portions of the study area which may be attractive for wind energy developments in the future.
- **Livestock Grazing.** Existing lynx management plans provide standards and guidelines related to livestock grazing activities. As described in Section 8.3, the conservation efforts described in these plans and historically through section 7 consultation have not constrained grazing activities. Accordingly, impacts of lynx conservation are limited to additional planning effort captured as administrative impacts of section 7 consultation.
- **Transportation.** Because of the rural, forested character of the majority of the study area, few major roads intersect the units. A handful of consultations have been undertaken regarding transportation projects across the study area. With respect to these projects, the Service requested the following lynx conservation efforts: monitoring wildlife crossings, installing infrastructure to promote habitat continuity; constructing attendant fencing; and lengthening bridges. This

analysis forecasts consultations based on frequency of past consultations and State planning documents, and quantifies the costs of associated project modifications based on their likelihood of occurrence, as described in Section 8.5.

- **Species Research and Active Management.** Section 8.5 highlights past and ongoing research related to lynx conservation across the study area. Baseline impacts of species research are significant, as these studies have informed lynx conservation recommendations since the species listing.

EXHIBIT 8-1 SUMMARY OF POTENTIAL IMPACTS OF CANADA LYNX CRITICAL HABITAT DESIGNATION ON OTHER LAND USE ACTIVITIES (7 PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE BASELINE IMPACTS		ANNUALIZED BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS		ANNUALIZED INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
AREAS PROPOSED FOR CRITICAL HABITAT DESIGNATION								
1	$6,420,000	$6,830,000	$606,000	$645,000	$22,000	$22,000	$2,070	$2,070
2	$2,740,000	$4,550,000	$258,000	$430,000	$194,000	$194,000	$18,300	$18,300
3	$494,000	$494,000	$46,600	$46,600	$165,000	$165,000	$15,500	$15,500
4	$434,000	$434,000	$40,900	$40,900	$145,000	$145,000	$13,700	$13,700
5	$759,000	$759,000	$71,600	$71,600	$235,000	$235,000	$22,100	$22,100
Total	**$10,800,000**	**$13,100,000**	**$1,020,000**	**$1,230,000**	**$760,000**	**$760,000**	**$71,700**	**$71,700**
AREAS PROPOSED FOR EXCLUSION FROM CRITICAL HABITAT								
1	$0	$0	$0	$0	$0	$0	$0	$0
2	$4,720	$4,720	$446	$446	$1,570	$1,570	$149	$149
3	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$4,720**	**$4,720**	**$446**	**$446**	**$1,570**	**$1,570**	**$149**	**$149**

Note: Entries may not sum to totals reported due to rounding.

8.1 FIRE MANAGEMENT

310. The purpose of fire management is to reduce the risk and severity of potential future wildland fires and maintain natural forest ecosystems by restoring historic fire regimes.[297] In general, fire management includes removing potential forest fuels such as snags and deadwood through the use of prescribed fire, mechanical thinning, herbicides, and grazing. Many fire management projects focus on reducing the density of forests,

[297] Healthy Forests and Rangelands. 2007. Overview: National Fire Plan. Accessed online at http://www.forestsandrangelands.gov/overview/index.shtml on June 16, 2008.

particularly in the understory.[298] Dense stands are more likely to spread a wildfire than more open stands. High stem densities also increase competition for limited resources leading to smaller, weaker trees that are more susceptible to disease or insect infestation.[299] Given that suitable lynx habitat comprises stands with high stem density, forest management activities such as mechanical thinning and prescribed fire that reduce stem density can potentially convert suitable lynx habitat to unsuitable habitat.[300,301]

8.1.1 EXTENT OF FIRE MANAGEMENT

311. Fire management activities are focused in Wildland-Urban Interface (WUI) areas where man-made structures meet or intermingle with wildland vegetation.[302] The potential for damage to humans (i.e. loss of lives or property) caused by wildland fires is greatest within WUI areas. Fire management activities are therefore concentrated in the WUI areas, as highlighted in Exhibit 8-2.

312. As highlighted in the Exhibit, the study area in Maine includes approximately 53,000 acres of WUI. Despite this, fire management activities are not prevalent in Unit 1 due to the low risk of forest fires (Maine's historical fire regime is estimated to be between 330 and 1,253 years).[303, 304] This analysis accordingly focuses on fire management activities in Units 2, 3, 4, and 5 where the risk of wildland fires is greater. Further, no consultations have occurred related to fire management activities on non-Federal lands.[305] Further, no clear Federal nexus exists that may result in section 7 consultation to consider the lynx. Thus, this analysis does not anticipate that fire management activities on non-Federal will be affected by lynx conservation efforts, and focuses on fire management activities occurring on Federal lands.

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[298] Based on a review of the consultation history for Wyoming, Montana, Idaho, and Washington from 2000 to 2008.

[299] Harrod, R.J., Povak, N.A. and D.W. Peterson. 2007. Comparing the effectiveness of thinning and prescribed fire for modifying structure in dry coniferous forests. USDA Forest Service Proceedings RMRS-P-46CD.

[300] McCollough, M. 2007. Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[301] Ruediger, B., Claar, J., Gniadek, S., Holt, B., Lewis, L., Mighton, S., Naney, B., Patton, G., Rinaldi, T., Trick, J., Vandehey, A., Wahl, F., Warren, N., Wenger, D. and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and National Park Service. Forest Service Publication #R1-00-53, Missoula, Montana.

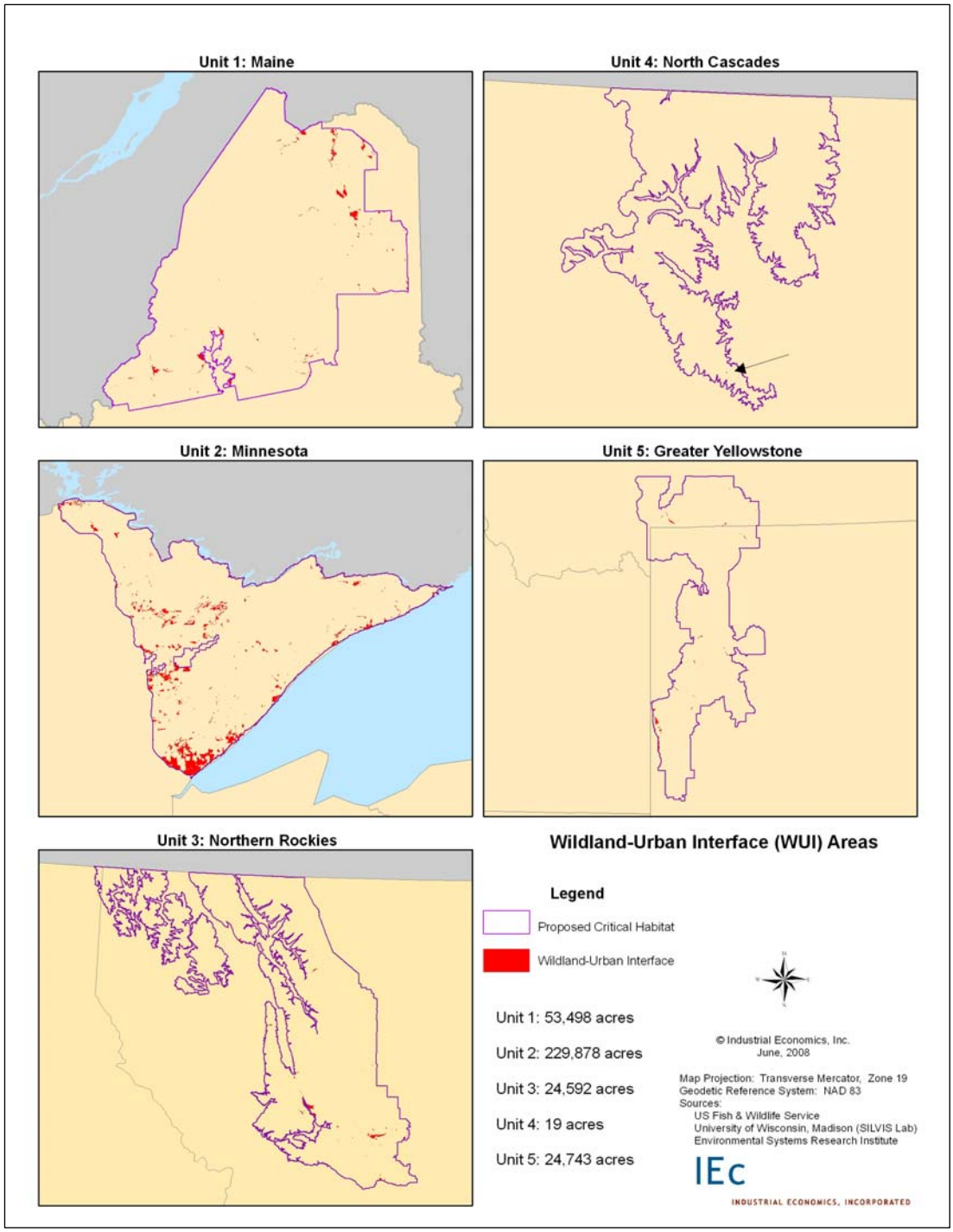
[302] University of Wisconsin - SILVIS Lab. The Wildland-Urban Interface. Accessed online at http://silvis.forest.wisc.edu/projects/WUI_Main.asp on June 16, 2008.

[303] Personal communication with Patrick Strauch of the Maine Forest Products Council, May 2, 2008.

[304] McCollough, M. 2007. Canada lynx habitat management guidelines for Maine. U.S. Fish and Wildlife Service, Maine Field Office. Old Town, Maine.

[305] Based on a review of the consultation history for Minnesota, Montana, Idaho, Wyoming, and Washington from 2000 through 2008.

EXHIBIT 8-2 WUI AREAS WITHIN PROPOSED CRITICAL HABITAT



313. Fire management plans have been developed for the majority of forested Federal land in Units 2, 3, 4, and 5. In general, fire management plans for Federal lands in these areas include the use of mechanical thinning, prescribed fires, and naturally occurring wildland

fires to reduce forest fuels, maintain natural communities, restore historical fire regimes, and meet forest management objectives. The Canada Lynx Conservation Assessment and Strategy (LCAS) is currently implemented on a number of Federal lands engaging in fire management activities including: Superior National Forest, portions of Okanogan-Wenatchee National Forest, Yellowstone National Park, Glacier National Park, and Bureau of Land Management (BLM) lands in Units 3 and 5.[306] The LCAS fire management standards and guidelines include: 1) minimizing the creation of new temporary or permanent roads; 2) designing burns to regenerate or create habitat for prey species; 3) avoiding constructing permanent firebreaks on ridges or saddles; 4) conducting activities in a manner that maintains ten percent of lynx denning habitat per lynx analysis unit (LAU). [307]

314. In place of the LCAS, the Northern Rockies Lynx Management Direction (NRLMD) is currently implemented on National Forests in Units 3 and 5. Lynx conservation with respect to fire management is similar in the NRLMD to the LCAS. The exception to this is that the NRLMD specifies that fire management activities within WUI areas should not be constrained by lynx conservation. The NRLMD further specifies, however, that fuel treatment projects within the WUI that do not incorporate lynx conservation may occur on no more than six percent (cumulatively) of lynx habitat in each National Forest or result in more than three adjacent LAUs exceeding the 30 percent threshold of lynx habitat disturbance (as described in Chapter 4).

8.1.2 PRE-DESIGNATION IMPACTS

315. Land managers applying the LCAS and NRLMD have indicated that, to date, implementing the LCAS and NRLMD standards and guidelines has not increased the costs of fire management.[308] That is, complying with the standards and guidelines in the plans has not resulted in a measurable change in behavior of land managers thus far, and none of the lynx habitat thresholds described above has been exceeded. As a result, the only past impacts associated with fire management activities are administrative costs resulting from section 7 consultation on fire management projects. Consultations on fire management activities have occurred in Units 2, 4, and 5. None of these past consultations has resulted in project modification.[309] Exhibit 8-3 describes the pre-

[306] The LCAS is not incorporated into Glacier National Park's Management Plan, however, the park uses the LCAS as a management guide when reviewing the effects of proposed projects. Based on personal communication with Steve Gniadek of Glacier National Park, January 11, 2006.

[307] Ruediger, B., Claar, J., Gniadek, S., Holt, B., Lewis, L., Mighton, S., Naney, B., Patton, G., Rinaldi, T., Trick, J., Vandehey, A., Wahl, F., Warren, N., Wenger, D. and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, and National Park Service. Forest Service Publication #R1-00-53, Missoula, Montana.

[308] Personal communication with: Kerry Murphy of Yellowstone National Park, April 25, 2008; Mary Shedd of Superior National Forest, June 11, 2008; Steve Gniadek of Glacier National Park, January 11, 2006; and Mallory Lenz of Okanogan-Wenatchee National Forest, March 6, 2006.

[309] Based on a review of the consultation history for Minnesota, Montana, Idaho, Wyoming, and Washington from 2000 through 2008.

designation impacts of lynx conservation on fire management activities in the study area (the model describing administrative costs per consultation is described in Exhibit 2-2 of this report).

316. Under the 50 CFR 402.04 Counter Regulations National Forests are able to forgo section 7 consultation with the Service on forest fuels management projects if a biological assessment leads to a no adverse effects finding.[310] The administrative costs associated with developing biological assessments for such projects are relevant to this analysis. Within the study area, only the Idaho Panhandle National Forests (located in Unit 3) currently apply the Counter Regulations.[311] To date, no forest fuels removal projects occurring in the portion of the Idaho Panhandle National Forests contained within the study area have utilized the Counter Regulation consultation process.[312] Further, there are no planned forest fuels reductions projects in this area, which would be applicable for the Counter Regulations consultation process. Thus, this analysis does not quantify administrative costs related to the Counter Regulations consultation process.

EXHIBIT 8-3 PRE-DESIGNATION IMPACTS OF LYNX CONSERVATION ON FIRE MANAGEMENT ACTIVITIES (7 PERCENT DISCOUNT RATE)

SUBUNIT	IMPACTS
AREAS PROPOSED FOR DESIGNATION	
UNIT 4: NORTH CASCADES	
U.S. Forest Service	$45,600
Subtotal Unit 4	*$45,600*
UNIT 5: GREATER YELLOWSTONE AREA	
U.S. Bureau of Land Management	$26,800
National Park Service	$54,500
U.S. Forest Service	$47,500
Subtotal Unit 5	*$129,000*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$174,000**
AREAS CONSIDERED FOR EXCLUSION	
UNIT 2: MINNESOTA	
Tribal Lands	$5,630
Subtotal Unit 2	*$5,630*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$5,630**
OVERALL TOTAL	**$180,000**
Note: Entries may not sum to totals reported due to rounding.	

[310] Personal communication with Brett Lyndaker, Wildlife Biologist for the Idaho Panhandle National Forests on August 14, 2008.

[311] Based on a comment from the U.S. Fish and Wildlife Service on the Draft Economic Analysis of Critical Habitat Designation for the Canada Lynx on August 7, 2008.

[312] Personal communication with Brett Lyndaker, Wildlife Biologist for the Idaho Panhandle National Forests on August 14, 2008.

8.1.3 POST-DESIGNATION IMPACTS

317. This analysis assumes the land managers implementing the LCAS and NRLMD will continue to conduct fire management activities according to these plans in the future, regardless of the critical habitat designation for the lynx. This is because the plans, as written, already incorporate the best available information regarding lynx habitat conservation. As a result, post-designation impacts associated with fire management activities mirror the pre-designation impacts (i.e., future impacts of lynx conservation will be limited to administrative costs associated with planning burns around lynx habitat in section 7 consultation). Future consultation numbers and locations are based on past consultation rates and locations as available information does not indicate a change in level of fire management activity across the study area. Exhibit 8-4 describes the baseline and incremental impacts associated with these forecast consultations.

318. While implementation of the LCAS and NRLMD has not resulted in changes fire management activities in the past, it is possible that this may change in the future. For example, while land managers at Yellowstone National Park have stated that implementing the LCAS on their fire management has not yet generated economic impacts, they expressed concern that the 15 and 30 percent LAU thresholds (as discussed in Chapter 4 of this analysis) might constrain the Park's use of prescribed fire and naturally occurring wildland fire to reduce forest fuels and restore historical fire regimes in the future.[313] Forest managers are currently unsure whether future projects will exceed the 15 and 30 percent LAU thresholds and therefore whether alternative burn plans will be required. As this has not occurred in the past, and because of the uncertainty regarding the future fire management projects in Yellowstone National Park, this analysis is not able to identify where and to what extent threshold effects may be met and lynx conservation implemented.

[313] Personal communication with Kerry Murphy of Yellowstone National Park, April 25, 2008.

EXHIBIT 8-4 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS OF LYNX CONSERVATION ON FIRE MANAGEMENT ACTIVITIES (7 PERCENT DISCOUNT RATE)

SUBUNIT	PRESENT VALUE BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	PRESENT VALUE INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION				
UNIT 4: NORTH CASCADES				
U.S. Forest Service	$47,100	$4,450	$15,700	$1,480
Subtotal Unit 4	*$47,100*	*$4,450*	*$15,700*	*$1,480*
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$23,900	$2,260	$7,970	$752
National Park Service	$50,500	$4,770	$16,800	$1,590
U.S. Forest Service	$36,300	$3,430	$12,100	$1,140
Subtotal Unit 5	*$111,000*	*$10,500*	*$36,900*	*$3,480*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	$158,000	$14,900	$52,600	$4,970
AREAS CONSIDERED FOR EXCLUSION				
UNIT 2: MINNESOTA				
Tribal Lands	$4,720	$446	$1,570	$149
Subtotal Unit 2	*$4,720*	*$446*	*$1,570*	*$149*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	$4,720	$446	$1,570	$149
OVERALL TOTAL	**$163,000**	**$15,300**	**$54,200**	**$5,120**
Note: Entries may not sum to totals reported due to rounding.				

8.2 WIND ENERGY DEVELOPMENT

319. This section describes potential impacts of lynx conservation efforts on wind energy projects in the study area. These projects may adversely affect the lynx by reducing habitat (e.g., through construction of roads, windmill towers, or transmission towers), increasing road mortality risk, generating wind turbine noise that disrupts behavior, or increasing access to recreation, timber, or hunting activities. Additionally, electricity access may be introduced into areas which currently do not have electricity. This, in turn, could change the nature and interest in developing remote areas. Such projects may also benefit the lynx by creating snowshoe hare habitat in the project footprint areas, or by reducing the likelihood that the areas will be converted to residential or commercial development projects in future years. This section quantifies the impacts of section 7 consultation and project modifications (including research and reporting) associated with potential future wind energy projects. As information is available for only three projects, forecast impacts are minimal ($51,000 baseline and $14,000 incremental) as described in Exhibit 8-4.

8.2.1 EXTENT AND MANAGEMENT OF ACTIVITY

320. Although the Service has completed only one lynx-related consultation on a wind energy project within proposed critical habitat (in Wyoming), this emerging industry may result in more frequent consultations in future years. One additional consultation has occurred in Maine outside of the study area, and the Service has been contacted regarding three other potential wind energy projects in the State.[314]

321. Of the six States that contain proposed critical habitat, four (Maine, Minnesota, Montana, and Washington) have Renewable Portfolio Standards (RPS), and at least two of these (Maine and Minnesota) have indicated that a large fraction of the RPS should be met with wind energy.[315,316] How increases in wind energy development will progress is highly uncertain, but these standards provide a basis for assuming that wind development may be a future issue with respect to lynx conservation in these States.

322. For Maine, the map of suggested "expedited areas" for wind power development produced by the governor's council indicates that there is significant overlap with privately owned proposed critical habitat areas.[317] Absent a specific forecast providing the magnitude and distribution of future wind development for each State, however, this analysis provides maps overlaying proposed critical habitat with wind speed data. Average annual wind speeds of 7.0 meters per second (Class IV wind speed at a height of 50 meters) are considered necessary to ensure that sufficient energy is generated to justify utility-scale project construction, however, smaller projects may be feasible at Class III wind speeds.[318] Exhibit 8-5 presents the distribution of areas within Units 1 through 5 that have wind speeds exceeding the Class III threshold. Note that the suitability of a particular acre for wind development is subject to a wide variety of factors, including slope, land use, and proximity to transmission lines, each of which would decrease the footprint of the areas presented in Exhibit 8-5.[319]

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[314] Personal communication with Mark McCollough, Maine Field Office, Fish and Wildlife Service, May 29, 2008.

[315] A Renewable Portfolio Standard specifies that a certain percentage of a State's or utility's power production will be from renewable energy by a certain date. Absent Renewable Portfolio Standards or other indicators of renewable energy growth in Idaho and Wyoming, these States are not included in this assessment.

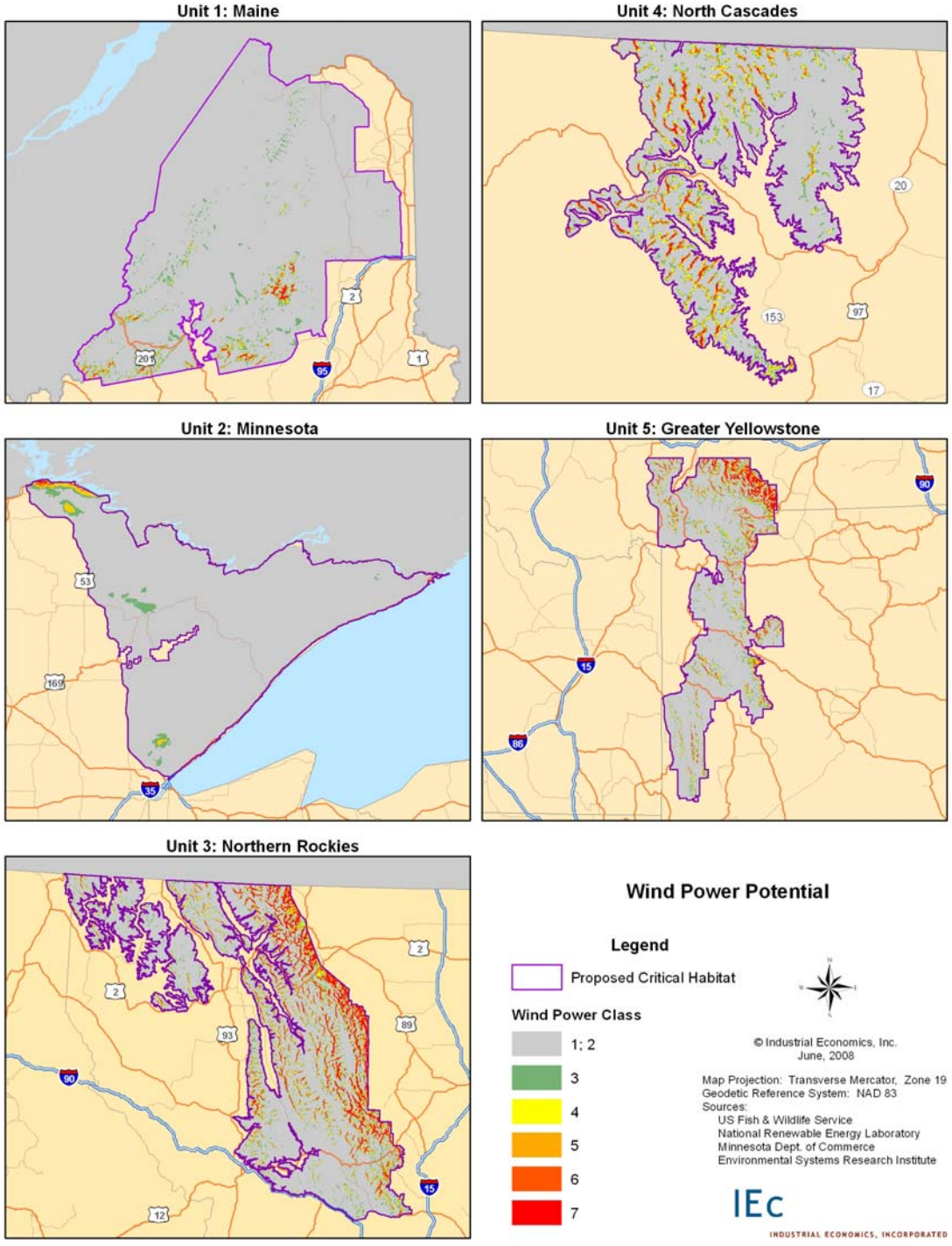
[316] Maine has apparently set a goal of 3,000 megawatts of wind energy by 2020, which is considerably higher than their RPS. Source: Giffen, R. Alec, et al. 2008. Report of the Governor's Task Force on Wind Power Development: Finding Common Ground For a Common Purpose. Accessed on May 26, 2008 from http://mainegov-images.informe.org/doc/mfs/windpower /pubs/report/wind_power_ task_force_rpt_final_021408.pdf. In Minnesota, 7,340 MW of wind energy are forecasted to be in place by 2020 (larger than the RPS): Bailey, J. and D. Morris. 2006. Renewable Electricity Mandates in Minnesota: Status and Impact. Accessed on May 26, 2008 from http://www.newrules.org/de/mnrenewable.pdf.

[317] Giffen, R. Alec, et al. 2008. Report of the Governor's Task Force on Wind Power Development: Finding Common Ground For a Common Purpose. Accessed on May 26, 2008 from http://mainegov-images.informe.org/doc/mfs/windpower /pubs/report/wind_power_ task_force_rpt_final_021408.pdf.

[318] American Wind Energy Association. Basic Principles of Wind Resource Evaluation. Accessed on August 25, 2008 from http://www.awea.org/faq/basicwr.html.

[319] Cape Cod Times. 2004. Forest Service Turns Down Land Swap for Wind Project. Accessed on May 26, 2008 from http://archive.capecodonline.com/special/windfarm/windswap8.htm.

EXHIBIT 8-5 LANDS WITHIN THE STUDY AREA WITH WIND SPEEDS THAT MAY BE SUFFICIENT TO SUPPORT FUTURE WIND ENERGY PROJECTS



8.2.2 PRE-DESIGNATION IMPACTS

323. Pre-designation impacts include a single informal consultation in 2001 regarding a small wind farm in Wyoming in Unit 5. Accordingly, total pre-designation administrative costs are $11,400 (discounted at seven percent) in the "Other Private Landowners" subunit of Unit 5. The Service did not recommended any project modifications as a result of this consultation.

8.2.3 POST-DESIGNATION IMPACTS

324. Aside from the single consultation within proposed critical habitat in Wyoming, one lynx-related consultation has been completed for a wind energy project located outside of the study area in Maine. This consultation indicates that conservation recommendations in future years may include pre-construction tracking surveys, post construction research and monitoring, restrictions on access road traffic speeds during and after construction, and gating of access roads to minimize access to remote lynx habitat.[320] Although this consultation is located outside of the study area, the analysis assumes that conservation recommendations resulting from future consultations on projects within the study area would be similar. These costs are discussed further below.

325. Gating of access roads to protect the lynx from road mortality or further disturbance may affect both landowners and individuals who would use the remote areas for recreation, hunting, or forestry activities. In Maine, landowners who have a policy to maintain open access to any roads within their forestry lands may face public disapproval at making these new roads inaccessible. Additionally, gating off these roads may affect recreationists and others who would have used the newly accessible areas, although measuring the extent of these impacts would require a forecast of both road construction and potential future usage that is currently unavailable.

326. Based on past costs, a single lynx presence survey costs $2,500 for a 29,600-acre area, translating to roughly $0.085 per acre per survey.[321] This impact is assumed to occur in the year prior to construction. In Superior National Forest, Minnesota, inventory and monitoring work cost roughly $15,000 per year ($11,700 for labor and $3,300 for supplies), on 1.81 million acres (roughly $0.0083 per acre per year).[322] These impacts are assumed to occur each year after project construction.

327. To forecast cost impacts to wind activities, this analysis assumes that the three potential wind energy projects (just now in the initial scoping phases) within the study area in Unit 1 will be subject to section 7 consultation considering the lynx, and the project

[320] U.S. Fish and Wildlife Service. 2008. Informal Consultation on TransCanada Energy Ltd.'s Kibby Wind Power Project in Franklin County, Maine. 53411-2008-I-0263. August 14.

[321] Written communication from Jensen Bissel, Director, Baxter State Park, May 30, 2008.

[322] Written communication from Mary Shedd, Biologist, Superior National Forest, June 11, 2008.

modifications and associated economic impacts described above.[323] Absent information on the timing or location of the three Maine projects, the analysis assumes that construction commences at the end of 2009 and that they are situated in the private timberland subunit, which provides the most likely location for leasing arrangements. Although future projects that may be affected by lynx conservation efforts are likely to be more numerous across the study area, the locations and timing of potential other projects are unknown.

328. This analysis further assumes that the spatial extent of each project is similar to other operating or proposed wind projects in Maine.[324] On average, these projects are 300 MW, which translates to roughly 18,000 acres per project.[325] At 18,000 acres, each of the three projects is expected to experience $1,520 in surveying costs during the year prior to construction, and $149 in annual monitoring and research costs thereafter.

329. Because forecast surveying, monitoring, and access restrictions are based on an ongoing consultation in an area that is not critical habitat, this analysis anticipates these conservation efforts would be recommended regardless of critical habitat designation. Impacts of implementing these project modifications are therefore considered part of the baseline. The baseline and incremental administrative costs of consultation are also included in these post-designation costs presented in Exhibit 8-6.

[323] Written communication to Mark McCollough, Maine Field Office, Fish and Wildlife Service, from: Dana Valleau, TRC Engineering, May 27, 2008; Erika Roberts, Project Manager, TetraTech EC, Inc., May 8, 2008; and Irina Gumennik, Environmental Scientist, TetraTech EC, Inc., August 30, 2007.

[324] These projects include: (1) Stetson Ridge Wind Project (57 MW), which is under construction in Washington County; (2) Aroostook County Wind (roughly 800 MW), which is being developed in Aroostook County; and (3) Mars Hill Wind Farm (42 MW), which is currently operating in Aroostook County. (Source: U.S. Department of Energy, Department of Energy Efficiency and Renewable Energy. 2008. Maine Wind Activities. Accessed on June 10, 2008 from http://www.eere.energy.gov/windandhydro/windpoweringamerica/ne_astate_template.asp?stateab=me.

[325] Land requirement assumed to be 60 acres per megawatt of electricity for the project, of which only three percent is required for the physical footprint. American Wind Energy Association. 2008. Wind Web Tutorial: Wind Energy and the Environment. Accessed on June 10, 2008 from http://www.awea.org/faq/wwt_environment.html.

EXHIBIT 8-6 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS OF CANADA LYNX CRITICAL HABITAT DESIGNATION ON WIND DEVELOPMENT ACTIVITIES (7 PERCENT DISCOUNT RATE)

SUBUNIT	BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION				
UNIT 1: MAINE				
Private Timber Lands	$51,100	$4,820	$14,000	$1,320
Subtotal: Unit 1	*$51,100*	*$4,820*	*$14,000*	*$1,320*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	$51,100	$4,820	$14,000	$1,320
Note: Entries may not sum to totals reported due to rounding.				

8.3 LIVESTOCK GRAZING

330. Livestock grazing is identified in the LCAS as a risk factor for Canada lynx productivity. Domestic livestock or wild ungulates may change the structure or composition of native plant communities, thus changing their ability to support lynx and their prey. Lynx management plans contain guidance related to grazing. There is, however, uncertainty about the degree of risk posed to snowshoe hares and lynx by livestock grazing. The Service has found "no evidence that grazing was a factor threatening lynx,"[326] and section 7 consultations for grazing activities under the LCAS have resulted in few conservation recommendations, and no required project modifications.[327]

8.3.1 EXTENT AND MANAGEMENT OF ACTIVITY

331. This analysis provides information on the extent and management of grazing in the study area. Livestock grazing occurs on Federal, State, and conservation group lands in Units 3, 4, and 5. Exhibit 8-7 describes the extent of grazing activity within each of the subunits in the study area. As highlighted in this Exhibit, the majority of grazing activity occurs in Unit 4, specifically on U.S. Forest Service (USFS) lands.

[326] U.S. Department of Interior, Fish and Wildlife Service. 2007. Biological Opinion on the effects of the Northern Rockies Lynx Amendment on the Distinct Population Segment of the Canada Lynx (*Lynx canadensis*) in the United States. Page 57.

[327] Based on a review of the consultations for grazing activities within the proposed critical habitat designation, five of 25 consultations conducted since the species' listing in 2000 have been formal consultations.

EXHIBIT 8-7 EXTENT OF GRAZING IN THE STUDY AREA

SUBUNIT	NUMBER OF ALLOTMENTS	ACRES IN GRAZING ALLOTMENTS	AUMS SUPPORTED
UNIT 3: NORTHERN ROCKIES			
U.S. Forest Service	267	Unknown	Unknown
Montana Department of Natural Resources	Unknown	Unknown	Unknown
The Nature Conservancy	16	21,566	1,958
Unit 3 Total	-	-	-
UNIT 4: NORTH CASCADES			
Washington Department of Natural Resources	9	101,027	18,421
Okanogan National Forest	72	951,439	58,000
Wenatchee National Forest	76	203,500	27,517
Unit 4 Total	*157*	*1,255,966*	*103,938*
UNIT 5: GREATER YELLOWSTONE AREA			
U.S. Forest Service	399	Unknown	Unknown
U.S. Bureau of Land Management	3	596	85
Unit 5 Total	*401*	-	-

Sources:
Unit 3:
NRLMD, Table K-7. Grazing allotments. Page 489.
Personal Communication, Steve Kloetzel, Land Steward, The Nature Conservancy - Montana Chapter, March 7, 2006. AUMs estimated as of summer 2005.
Unit 4:
Personal Communication, Scott Fisher, Washington Department of Natural Resources, March 16, 2006.
U.S. Department of Agriculture, Forest Service. 1989. Final Environmental Impact Statement, Land and Resource Management Plan for the Okanogan National Forest, Page III-62.
U.S. Department of Agriculture, Forest Service. 1990. Final Environmental Impact Statement, Land and Resource Management Plan for the Wenatchee National Forest, Page III-84.
Unit 5:
NRLMD, Table K-7. Grazing allotments. Page 489.
Written communication from Jeff Carroll, Threatened & Endangered Species Coordinator, Bureau of Land Management, Wyoming State Office on June 18, 2008.

332. The existing lynx management plans contain the standards and guidelines presented in Exhibit 8-8 that are applicable to grazing activities. The Federal landowners permit grazing allotments for use by livestock ranchers. Section 7 consultation is therefore also required for reissuance or updates of grazing permits on these lands.

333. The LCAS standards apply to BLM lands and to the Forest Service lands in Unit 4. With respect to livestock grazing, the NRLMD provides guidelines, and not standards, for the lands under its purview. In effect, the NRLMD guidelines are adopted from the LCAS standards but do not carry the same requirements as standards.[328] The NRLMD

[328] NRLMD, pg. 341.

guidelines are applicable to the USFS lands in Units 3 and 5. The Washington Department of Natural Resources (WA DNR) guidance adopts existing State guidance that is not specific to lynx, but is believed to be sufficient for its conservation.

EXHIBIT 8-8 GRAZING GUIDELINES AND STANDARDS IN LYNX MANAGEMENT PLANS

GRAZING GUIDELINES AND STANDARDS
LCAS STANDARDS
1. Do not allow livestock use in openings created by fire or timber harvest that would delay successful regeneration of the shrub and tree components.
2. Manage grazing in aspen stands to ensure sprouting and sprout survival sufficient to perpetuate the long-term viability of the clones.
3. Within the elevational ranges that encompass forested lynx habitat, shrub-steppe habitats should be considered as integral to the lynx habitat matrix and should be managed to maintain or achieve mid seral or higher condition.
4. Within lynx habitat, manage livestock grazing in riparian areas and willow carrs to maintain or achieve mid seral or higher condition to provide cover and forage for prey species.[329]
NRLMD GUIDELINES
1. In fire- and harvest-created openings, livestock grazing should be managed so impacts do not prevent shrubs and trees from regenerating.
2. In aspen stands, livestock grazing should be managed to contribute to the long-term health and sustainability of aspen.
3. In riparian areas41 and willow carrs, livestock grazing should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.
4. In shrub-steppe habitats, livestock grazing should be managed in the elevation ranges of forested lynx habitat in LAUs, to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes.[330]
WA DNR GUIDANCE
Guidance for grazing activities adopts Washington's Ecosystem Standards for State-owned Agricultural and Grazing Land.[331] The State standards require that Resource Management Plans be developed for allotments on State lands. They are developed on a site-specific basis, and are designed to maintain the native plant communities and plant species diversity, but not to address the specific needs of individual species, including snowshoe hare, and lynx. [332]

[329] Ruediger, B., et. al. 2000, pg. 7-11.

330 U.S. Department of Agriculture, Forest Service. 2007. Northern Rockies Lynx Management Direction Record of Decision. National Forests in Montana, and parts of Idaho, Wyoming, and Utah.

[331] HB 1309. 1994. Ecosystem Standards for State-owned agriculture and grazing land. State of Washington Conservation Commission.

[332] Draft WA DNR lynx habitat management plan, pgs. 51-52.

8.3.2 PRE-DESIGNATION IMPACTS

334. A Federal nexus is present for livestock management where it occurs on permitted allotments on National Forests and on BLM lands, in Units 3, 4, and 5. Grazing activities on Federal lands that have resulted in section 7 consultation considering the lynx in the past include grazing allotment permit issuance, allotment reorganization, and fencing.

335. The Service's conservation recommendations for the lynx associated with these activities have included: managing sheep and cows to prevent grazing concentration in areas that might contain lynx and snowshoe hare habitat by locating water developments and salt as attractants away from these areas; using fencing instead of woody debris as a more permanent boundary between grazing areas and lynx and hare habitat; and monitoring and reporting on foraging conditions.[333]

336. Opportunity for grazing has not been affected by the implementation of the lynx management plans and conservation recommendations made during section 7 consultation. Livestock managers in Washington have stated that they have not experienced any change in their ability to graze livestock due to their lynx management guidance.[334] In addition, in Wyoming, the BLM has developed a statewide Biological Assessment for the lynx that evaluates its Field Office Resource Management Plans. To date, there have been no changes to the number of Animal Unit Months (AUMs) grazed on BLM lands in Unit 5 due to implementation of the LCAS or otherwise for lynx conservation.[335] The pre-designation impacts are therefore limited to the administrative costs of consultation, as described in Exhibit 8-9.

[333] U.S. Department of Interior, Fish and Wildlife Service. 2004. Biological Opinion for proposed issuance of special use permits for the Cayuse, Siwash, Haley, Phoebe, and Lost livestock allotments and Harkness grazing project on the Tonasket Ranger District, Okanogan and Wenatchee National Forests, and effects to Canada lynx (*Lynx canadensis*); U.S. Department of Interior, Fish and Wildlife Service. 2004. Biological Opinion for the Manatash Complex Allotment Management Plan (Project) on the Cle Elum and Naches Ranger Districts, Okanogan and Wenatchee National Forests, and effects to Canada lynx (*Lynx canadensis*).

[334] Personal communication with Jerry Barnes, Washington Cattlemen's Association, April 4, 2006.

[335] Written communication from Jeff Carroll, Threatened & Endangered Species Coordinator, Bureau of Land Management, Wyoming State Office, June 18, 2008.

EXHIBIT 8-9 PRE-DESIGNATION IMPACTS TO GRAZING ACTIVITIES (7 PERCENT DISCOUNT RATE)

SUBUNIT	IMPACTS
AREAS PROPOSED FOR DESIGNATION	
UNIT 3: NORTHERN ROCKY MOUNTAINS	
U.S. Forest Service	$27,800
Subtotal: Unit 3	*$27,800*
UNIT 4: NORTH CASCADES	
U.S. Bureau of Land Management	$12,300
U.S. Forest Service	$122,000
Subtotal: Unit 4	*$134,000*
UNIT 5: GREATER YELLOWSTONE AREA	
U.S. Bureau of Land Management	$135,000
U.S. Forest Service	$21,000
Subtotal: Unit 5	*$156,000*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	$318,000
Note: Entries may not sum to totals reported due to rounding.	

8.3.3 POST-DESIGNATION IMPACTS

337. Post-designation impacts are expected to result only from the administrative costs of section 7 consultation for grazing allotment permit issuance. Based on previous consultations, it is estimated that permit renewals and associated section 7 consultation will occur at a similar rate in each subunit.[336] With the designation of critical habitat, a portion of these consultation costs will be incremental, as the Service and action agencies consider critical habitat. Continued implementation of management for lynx under the LCAS, NRLMD, and WA DNR plans is not expected to result in economic impacts.

338. On USFS lands to be managed under the NRLMD, the majority of the grazing acres (all those on the western side of the Continental Divide) already have management direction similar to that in the NRLMD for protection of riparian areas (snowshoe hare habitat).[337] Further, the Final Environmental Impact Statement (FEIS) for the NRLMD notes that "existing management generally provides enough direction to manage grazing so it does not adversely impact lynx habitat. Little change would be needed to meet the standards or guidelines proposed" in the NRLMD.[338] The FEIS notes that any changes to current grazing practices for allotments east of the Continental Divide would likely be minor

[336] U.S. Department of Interior, Fish and Wildlife Service. 2006. Informal consultation on the Tieton-Complex Allotment Management Plan, for authorization of continued livestock grazing. USFWS Reference: 13260-2007-I-W0024; and U.S. Department of Interior, Fish and Wildlife Service. 2006. Informal consultation on the Big Canyon Allotment Management Plan, for authorization of continued livestock grazing. USFWS Reference: 13260-2007-I-0177.

[337] These plans apply primarily to the allotments west of the Continental Divide, and include the Inland Native Fish Strategy (INFISH), and the Interim Strategy for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). NRLMD, page 277.

[338] NRLMD, Range, pg. 277.

adjustments in "timing, intensity, duration, or frequency of livestock use in a specific area", but rarely structural improvements (e.g., fences) of any type.[339]

339. The Washington Cattlemen's Association (WCA) has expressed concern that designation of critical habitat on WA DNR lands, and in the Kettle Range where they hold grazing permits, may require additional effort on their part.[340] Their primary concerns are that current management of grazing lands might change, and no longer allow the use of transitory range. WCA estimates that of DNR lands within the study area, ten to 15 percent of the grazing acres are currently in transitory range areas. The development of this kind of range would be governed by the WA DNR's timber practices, or the unpredictable occurrences of fires. Ranchers in the area have been operating under the WA DNR's requirement for Resource Management Plans since 2002, and to date, the lynx plan has not affected their grazing activities.[341]

340. While a perceived change in the regulation of these lands may affect the desire of ranchers to use critical habitat lands for grazing, this analysis does not forecast a change in the management of these areas as a result of the designation. Exhibit 8-10 summarized post-designation baseline and incremental administrative impacts of consultation for grazing activities.

[339] NRLMD, Range, pg. 277.

[340] Personal Communication, Jerry Barnes and Jack Field, Washington Cattlemen's Association. February 13, 2006.

[341] Personal Communication, Jerry Barnes, April 4, 2006; and Public Comment on the Proposed Rule to designate critical habitat for the lynx, submitted by Jack Field, Executive Vice President, Washington Cattlemen's Association, April 24, 2008.

EXHIBIT 8-10 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS TO GRAZING ACTIVITIES BY SUBUNIT (7 PERCENT DISCOUNT RATE)

SUBUNIT	BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION				
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$26,000	$2,460	$8,690	$820
Subtotal: Unit 3	*$26,000*	*$2,460*	*$8,690*	*$820*
UNIT 4: NORTH CASCADES				
U.S. Bureau of Land Management	$8,390	$792	$2,800	$264
U.S. Forest Service	$111,000	$10,500	$37,000	$3,490
Subtotal: Unit 4	*$119,000*	*$11,300*	*$39,800*	*$3,760*
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$110,000	$10,400	$36,700	$3,460
U.S. Forest Service	$17,700	$1,670	$5,890	$556
Subtotal: Unit 5	*$128,000*	*$12,000*	*$42,600*	*$4,020*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	$273,000	$25,800	$91,100	$8,600
Note: Entries may not sum to totals reported due to rounding.				

8.4 TRANSPORTATION, UTILITY, AND MUNICIPAL PROJECTS

341. Transportation activities affecting lynx or its habitat include bridge construction, repair, or replacement, and road construction, repair, widening, or improvement. These activities reduce connectivity within the boreal forest landscape and increase the species' vulnerability to vehicle collision. Lynx are highly mobile and frequently cross roads during dispersal, exploratory movements, or travel within home ranges. Highway projects may also directly affect the amount of feeding and denning habitat for the species by converting natural forests into road surface, rights-of-ways, or associated facilities such as maintenance areas or gravel pits.[342]

342. Utility and municipal activities may be a risk factor for the lynx by disrupting connectivity of lynx habitat. Utility corridors located adjacent to highways and railroads can further widen the right-of-way and increase the likelihood of impeding lynx movement.[343] Other municipal activities, such as dam construction and inundation (influenced by size, type, and surrounding land use) may also interrupt movement of the lynx.[344]

[342] Ruediger, B., et. al. 2000, pg. 142.

[343] Ruediger, B., et. al. 2000, pg. 32.

[344] Ruediger, B., et. al. 2000, pg. 28.

8.4.1 EXTENT AND MANAGEMENT OF ACTIVITY

343. Because of the rural, forested character of the majority of the study area, few major roads intersect the units. Approximately 288 miles of road falls within Unit 1, 510 miles in the Unit 2, 276 miles in Unit 3, and 394 miles in Unit 5. Only ten major road miles intersect with Unit 4.[345] The Service has engaged in section 7 consultation with Federal land managers and the Federal Highways Administration (FHWA) regarding transportation projects across the study area. With respect to these projects, the Service has sought to monitor wildlife crossings along major roads via tracking beds and remote cameras, install infrastructure to promote habitat continuity (i.e., highway underpasses and overpasses), construct attendant fencing, and lengthen bridges. In some areas, large GIS-based mapping efforts have been undertaken to prioritize the location of highway crossings to support habitat connectivity and reduce lynx mortality. This analysis assumes consultation will occur across the study area on future transportation projects and quantifies the potential impacts of implementing these lynx conservation efforts.

344. Utility projects that may occur within the study area include Federal Emergency Management Agency (FEMA) funded projects, FERC dam licensing, and pipeline installation or repair projects which require a Clean Water Act 401 or 404 permit from the U.S. Army Corps of Engineers (USACE). Past utility and municipal activities have not been burdened with lynx conservation efforts in the study area. In addition, existing lynx management plans, such as the LCAS and NRLMD, do not specifically prescribe conservation efforts for these types of projects. Although many utility and municipal projects have occurred within the study area since the listing of the lynx in 2000, few resulted in section 7 consultation and none resulted in project modification for lynx conservation. For example, approximately 161 USACE permitted utility and municipal projects occurred from 2000 to 2005 in the study area. Of these, only five projects triggered informal consultation, and no lynx conservation efforts were recommended. Utilities and municipal projects are therefore not expected to be a major issue with respect to lynx conservation in the future, and this analysis assumes that these types of projects will not incur economic impacts related to lynx conservation.

345. This focus of this section is therefore on quantifying lynx conservation efforts with respect to transportation projects. To this end, this analysis applies the following five steps.

1. **Forecast the number of transportation and utility projects over the next twenty years.** Estimates of project numbers are based on a combination of: a) direct communication with land managers and Departments of Transportation; and b) the frequency and location of past consultations on transportation projects within the study area. No consultations have occurred for transportation projects

[345] U.S. Major Highways [shapefile]. Geographic Data Technology, Inc., ESRI. Includes Interstates, U.S. Highways, State Highways and major roads. Redlands, California. 2004.

in Unit 3 and, therefore, no consultations are forecast in this analysis. Impacts are forecast for all other units.

2. **Determine potential lynx conservation efforts associated with transportation and utility projects and associated costs.** Review of the consultation history and LCAS guidelines for transportation projects determined the likely project modifications that may result from section 7 consultation. These are highlighted in Exhibit 8-11. Of note, many of these conservation efforts were implemented for the benefit of multiple species and not solely for the lynx.

3. **Estimate the probability of a future project incorporating the various lynx conservation efforts.** The probability of a project requiring the various lynx conservation efforts, described in Exhibit 8-11, is based on the frequency that these efforts were recommended during section 7 consultation on transportation projects in the study area in the past. The conservation efforts described in the Exhibit are only forecast to be implemented on transportation projects in Units 1 (Maine) and 2 (Minnesota). Past consultations on transportation projects in Units 4 (North Cascades) and 5 (Greater Yellowstone Area) have not resulted in project modification. The probability of these conservation efforts occurring for projects in these units in the future is therefore assumed to be zero.

4. **Calculate costs per project.** Exhibit 8-11 describes the per project costs of transportation activities, calculated by multiplying the costs of conservation efforts by their probability of occurrence.

5. **Derive estimated impacts by subunit**. Subunit level impacts are estimated by multiplying the expected level of activity by per project costs. Pre-and post-designation impacts by subunit are presented in Exhibits 8-12 and 8-13, respectively.

EXHIBIT 8-11 LYNX CONSERVATION EFFORTS ASSOCIATED WITH TRANSPORTATION ACTIVITIES IN UNITS 1 AND 2

	CONSERVATION EFFORT	COST OF MODIFICATION (PER PROJECT)	PROBABILITY OF OCCURRENCE	COST ESTIMATE APPLIED TO FORECAST PROJECTS
1	Erect wildlife crossing structures (highway underpass) [a, c, d]	$130,000- $255,000 [1,2]	0.21	$27,900- $54,600
2	Erect wildlife crossing structures (highway overpass) [a]	$1.98- $2.67 million	0.07	$141,000 - $191,000
3	Erect attendant fencing (based on an average of 6 miles per project) [a, c, d]	$192,000 [1,3]	0.07	$13,700
4	Monitor wildlife crossings before, during, and after construction of the project [c,e,f]	$60,500- $86,100 [1]	0.79	$47,500 - $67,600
5	Prepare monitoring plan that documents the number and type of dead and injured wildlife and develop program for evaluating levels of wildlife use [b,e,f]			
6	Provide the Service with a comprehensive final report [d]			
7	Upon locating dead or injured lynx, notify Service within 24 hours [a,b]			
8	Bridge lengthening [c]	$96,500- $322,000 [1,2]	0.71	$68,900 - $230,000
9	**TOTAL PER PROJECT COST OF LYNX CONSERVATION EFFORTS**			**$299,000 - $557,000**

Notes:
Probabilities of occurrence are based on consultation history review.
To determine possible project modifications, consultations regarding the lynx both within and outside of the study area were reviewed.

Sources:
(a) U.S. Fish and Wildlife Service. Biological Opinion for proposed reconstruction of US Highway 93 in Missoula and Lake counties, Montana. October 19, 2001.
(b) U.S. Fish and Wildlife Service. Biological Opinion for ongoing effects of median barriers already installed along Interstate 90 east of Lookout Pass in Mineral County, Montana. March 29, 2004.
(c) U.S. Fish and Wildlife Service. Biological Opinion for proposed Trunk Highway 53 project located in St. Louis County, Minnesota. February 4, 2005.
(d) U.S. Fish and Wildlife Service. Biological Opinion for proposed upgrade of a segment of Trunk Highway 1 in Lake County, Minnesota. December 23, 2004.
(e) U.S. Fish and Wildlife Service. Biological Opinion for Route 161 Reconstruction and Widening Project Cross Lake, T17 R4, Aroostook County, Maine. March 13, 2007.
(f) U.S. Fish and Wildlife Service. Biological Opinion for Forest Road 424 (Denley Road) Reconstruction, Lake and St. Louis Counties, MN. November 29, 2006.

(1) Written communication with Pat Basting, Wildlife Biologist, MTDOT, March, 15, 2006
(2) Written Communication with Mike Tardy, Assistant Engineer for Program Delivery, District 1, MNDOT, February 22, 2006.
(3) This estimate is based on the $85,000 cost to erect attendant fencing for the Clearwater Junction North Project in Missoula, Montana. According to the 2006-2008 State Transportation Improvement Program, the project is 1.64 miles long.

346. While consultations have also recommended ensuring right-of-ways incorporate cleared, vegetated areas around curve to improve visibility, this is not expected to increase the cost of the project.[346] Previous lynx conservation efforts have not resulted in constraints on size or location of past transportation projects as a result of lynx conservation and therefore no impacts on traffic congestion are estimated. This analysis assumes that post-designation transportation activities may experience impacts related to lynx conservation similar as described in Exhibit 8-11, but that these activities will not be precluded so as to impair regional mobility.

8.4.2 PRE-DESIGNATION IMPACTS

347. Total pre-designation impacts of lynx conservation on transportation projects in the study area is $411,000. Consultations regarding the lynx occurred in all units except Unit 3 (Northern Rocky Mountains). Specifically, the pre-designation impacts include:

- **Unit 1 (Maine) –** One formal consultation from 2007. This consultation resulted in administrative impacts and also the high-end monitoring costs described in Exhibit 8-11.
- **Unit 2 (Minnesota) –** One formal consultation occurred in 2006 which incorporated lynx monitoring.
- **Unit 4 (North Cascades) -** Five informal consultations have occurred in Unit 4. No project modifications resulted from these consultations.
- **Unit 5 (Greater Yellowstone Area) -** Ten consultations in Unit 5 (four formal and six informal). No project modifications were recommended for the lynx in any of these consultations.

[346] For example: U.S. Fish and Wildlife Service. Biological Opinion for Route 161 Reconstruction and Widening Project Cross Lake, T17 R4, Aroostook County, Maine. March 13, 2007.

EXHIBIT 8-12 PRE-DESIGNATION IMPACTS OF LYNX CONSERVATION ON TRANSPORTATION (7 PERCENT DISCOUNT RATE)

SUBUNIT	IMPACTS
UNIT 1: MAINE	
Private Timber Lands	$108,000
Subtotal Unit 1	*$108,000*
UNIT 2: MINNESOTA	
U.S. Forest Service	$116,000
Subtotal Unit 2	*$116,000*
UNIT 4: NORTH CASCADES	
U.S. Forest Service	$32,200
U.S. Bureau of Land Management	$7,130
Subtotal Unit 4	*$39,300*
UNIT 5: GREATER YELLOWSTONE AREA	
U.S. Bureau of Land Management	$32,500
National Park Service	$84,800
U.S. Forest Service	$30,400
Subtotal Unit 5	*$148,000*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	$411,000
Note: Entries may not sum to totals reported due to rounding.	

8.4.3 POST-DESIGNATION IMPACTS

348. Total post-designation baseline and incremental impacts of lynx conservation efforts on forecast transportation projects are summarized in Exhibit 8-13. Consultation numbers are based on historic frequency and location of consultations, and communications with land managers and permitting agencies. Total baseline impacts of $2.95 million include administrative costs of consultation for all units, and the cost of lynx conservation efforts described in Exhibit 8-11 for Units 1 and 2. Approximately 75 percent of baseline impacts are from projects forecast within Minnesota. Incremental impacts of critical habitat designation are only expected to result from additional administrative costs of consultation, approximately $191,000 over the next 20 years. No impacts are forecast in areas being considered for exclusion from critical habitat (Tribal lands in Maine, Minnesota, and Montana).

349. Based on the historic frequency of transportation consultations in Maine (one formal in the last eight years), this analysis assumes that there will be three formal consultations on transportation projects within the Maine critical habitat unit over the next 20 years. This analysis assumes that each forecast project will incorporate lynx conservation efforts as described in Exhibit 8-11 and fall within the same subunit of the recent project.

EXHIBIT 8-13 POST-DESIGNATION IMPACTS OF LYNX CONSERVATION ON TRANSPORTATION PROJECTS (7 PERCENT DISCOUNT RATE)

SUBUNIT	PRESENT VALUE BASELINE IMPACTS		ANNUALIZED BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS		ANNUALIZED INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
UNIT 1: MAINE								
Private Timber Land	$499,000	$909,000	$47,100	$85,800	$7,950	$7,950	$750	$750
Subtotal Unit 1	*$499,000*	*$909,000*	*$47,100*	*$85,800*	*$7,950*	*$7,950*	*$750*	*$750*
UNIT 2: MINNESOTA								
Superior National Forest	$807,000	$1,470,000	$76,200	$139,000	$38,500	$38,500	$3,640	$3,640
MN DNRC	$669,000	$1,220,000	$63,200	$115,000	$31,900	$31,900	$3,020	$3,020
Other Private Landowners	$740,000	$1,350,000	$69,800	$127,000	$35,300	$35,300	$3,330	$3,330
Subtotal Unit 2	*$2,220,000*	*$4,030,000*	*$209,000*	*$381,000*	*$106,000*	*$106,000*	*$9,980*	*$9,980*
UNIT 4: NORTH CASCADES								
BLM	$18,900	$18,900	$1,780	$1,780	$6,290	$6,290	$594	$594
USFS	$75,500	$75,500	$7,120	$7,120	$25,200	$25,200	$2,380	$2,380
Subtotal Unit 4	*$94,300*	*$94,300*	*$8,910*	*$8,910*	*$31,500*	*$31,500*	*$2,970*	*$2,970*
UNIT 5: GREATER YELLOWSTONE AREA								
BLM	$29,300	$29,300	$2,770	$2,770	$9,770	$9,770	$922	$922
NPS	$77,500	$77,500	$7,310	$7,310	$25,800	$25,800	$2,440	$2,440
USFS	$29,300	$29,300	$2,770	$2,770	$9,770	$9,770	$922	$922
Subtotal Unit 5	*$136,000*	*$136,000*	*$12,800*	*$12,800*	*$45,400*	*$45,400*	*$4,280*	*$4,280*
TOTAL	**$2,950,000**	**$5,170,000**	**$278,000**	**$488,000**	**$191,000**	**$191,000**	**$18,000**	**$18,000**

Note: Entries may not sum to totals reported due to rounding.

350. The Northeast Minnesota Long Range Plan outlines Minnesota Department of Transportation (MN DOT) transportation projects from 2008 to 2030.[347] Assuming full funding to meet MN DOT performance based measures by 2030, 15 separate projects are planned to increase safety along the Trunk Highway 61 corridor from Two Harbors to Grand Marais.[348] This analysis assumes each of these 15 projects will be formal and will be subject to the range of lynx conservation efforts in Exhibit 8-11.

351. In Units 4 and 5, forecast projects based on frequency and location of past consultations. As a result, this analysis anticipates 25 informal consultations in Unit 4, and 15 informal and 10 formal consultations in Unit 5, over the next 20 years. None of these consultations is expected to result in project modification for the lynx.

8.5 SPECIES RESEARCH AND ACTIVE MANAGEMENT

352. Species management activities, often in the form of surveys conducted to evaluate presence of lynx populations, coordination with landowners in known lynx habitat areas, and staff time at agencies reviewing lynx-related management, has been conducted on lands throughout the study area. Research to better understand lynx and snowshoe hare ecology has also been undertaken in each of the five proposed units by a variety of entities.

353. Species management and research activities are primarily designed to benefit the lynx and its habitat, and to develop the scientific basis for managing the species. When conducted by a Federal agency, or on Federal lands, there is a Federal nexus for these activities and therefore there may be additional costs of lynx conservation associated with the section 7 consultation requirements.

8.5.1 EXTENT AND MANAGEMENT OF ACTIVITY

354. This section describes the extent of species research and active management activities across the study area for this analysis.

Unit 1 – Northern Maine

355. The Maine Department of Inland Fisheries and Wildlife (IF&W) conducts extensive lynx management. In the past, IF&W has conducted radio-tagging lynx research throughout northern Maine. The following lynx research and management activities are forecast to continue following the designation of critical habitat.

- Maintaining liaisons with other State landowners (primarily the BLM), and the Maine Forest Products Council (MFPC); reviewing permits with the Land Use

[347] Published by the Minnesota Department of Transportation (District 1), Northeast Minnesota Area Transportation Partnership, and the Arrowhead Regional Development Commission, August, 2005.

[348] Northeast Minnesota Long Range Transportation Plan (2008-2030), Minnesota Department of Transportation (District 1), Northeast Minnesota Area Transportation Partnership, and the Arrowhead Regional Development Commission, August, 2005.

Regulation Commission (LURC); and coordinating with the timber industry on forest inventory planning for lynx conservation.

- Conducting lynx management activities exclusive of research.
- Acquiring land and conservation easements for lynx conservation.
- Rehabilitating injured lynx.[349]

In addition to these ongoing efforts in Maine, the Passamaquoddy Tribe has worked with the Service to conduct a population assessment and forest management planning for the lynx.

Unit 2 –Minnesota

356. In Minnesota, both the Department of Natural Resources (MN DNR), Voyageurs National Park, and Superior National Forest conduct ongoing species management. At MN DNR, staff respond to questions about policies and provide technical guidance regarding lynx, coordinate research efforts, and collaborate with the Service for sightings solicitation, compiling data, fundraising, and providing information to the public related to lynx.[350]

357. While Voyageurs National Park does not have current plans for any changes in lynx management or major research projects, the Park has conducted snow-tracking surveys for lynx in the past, and expects to spend time on lynx-related issues, and research coordination each year in the future.[351] Superior National Forest conducted lynx research in 2006, employing one full-time and two part-time biological science technicians.[352]

Unit 3 – Northern Rockies

358. Montana Department of Natural Resources and Conservation (MT DNRC) evaluated the 2006 critical habitat proposal and designation in meetings with Service personnel to discuss the potential impact of the 2006 proposed rule on State Trust Lands. Attendance at this meeting and close review of the 2006 proposed rule required staff time. MT DNRC provided an estimate of the costs of this effort in their public comment on the 2008 proposed rule.[353] In addition, as described in Chapter 3 of this report, MT DNRC has developed a draft habitat conservation plan that includes consideration of lynx.

Unit 5 – Greater Yellowstone Area

359. The Wyoming Game and Fish Department (Wyoming GFD) has conducted surveys using DNA sampling, telemetry and trapping for lynx on State lands. The Department

[349] Personal communication with Ken Elowe, Director, Maine Department of Inland Fisheries & Wildlife, May 30, 2008.

[350] Personal communication with Rich Baker, Minnesota Department of Natural Resources, February 8, 2006.

[351] Written communication from Steve Windels, Biologist, Voyageurs National Park, May 30, 2008.

[352] Written communication from Mary Shedd, Biologist, Superior National Forest, June 11, 2008.

[353] Public comment: Comments from the Montana Department of Natural Resources and Conservation (DNRC) on the proposed rule for revising the designation of critical habitat for the Canada lynx published in the Federal Register (Vol. 73, No. 40, February 28, 2008). Submitted by David Groeshl, Chief, Forest Management Bureau, DNRC, on April 25, 2008.

conducted extensive surveys in the 1990s, but found that around 2000, it became more difficult to locate lynx. In 2005 and 2006, additional reports of lynx spurred Wyoming GFD to do more survey work.[354]

360. Yellowstone National Park has been operating under the LCAS since 2003. Biologists at the Park have found that the LCAS adds little in the way of additional time or effort to address lynx conservation issues, and expect lynx management at the Park to continue in the same manner regardless of critical habitat designation. Yellowstone National Park surveyed for evidence of lynx reproduction over four winters, completing the effort in 2004.[355]

8.5.2 PRE-DESIGNATION IMPACTS

361. The species management and research impacts outlined above are baseline impacts of lynx conservation. The pre-designation administrative costs of section 7 consultation for these activities are also baseline. Exhibit 8-10 lists the research and management efforts and summarizes past section 7 consultation and associated economic impacts by subunit.

EXHIBIT 8-10 PRE-DESIGNATION IMPACTS OF TO SPECIES RESEARCH AND MANAGEMENT ACTIVITIES BY SUBUNIT (7 PERCENT DISCOUNT RATE)

UNIT	SUBUNIT	DESCRIPTION OF LYNX RESEARCH EFFORT	IMPACTS
AREAS PROPOSED FOR DESIGNATION			
Unit 1: Maine	Maine Department of Inland Fisheries and Wildlife	Radio-tagging studies, snow-tracking, and associated administrative support and partnerships with landowners. (1)	$2.30 million
		Ongoing lynx management including coordination with landowners, rehabilitation of injured lynx, and acquisition of conservation easements. (1)	$442,000
	University of Maine	Snowshoe hare and lynx research.(2)	$1.03 million
	Baxter State Park	Lynx presence surveys in the 29,584 acre Scientific Forest Management Area (SFMA) portion of the Park. (3)	$5,360
Unit 2: Minnesota	MNDNR	Staff time spent managing lynx issues.(4)	$32,900
	Superior National Forest Superior National Forest	Research such as lynx radio collaring and tracking has been conducted by the Natural Resources Research Institute on Superior NF and State lands. An estimated 10-15 percent of research activities occurred within the study area. These costs are borne by a variety of funding entities, including: U.S. Forest Service, U.S. Geological Survey, MN DNR, University of Minnesota, and the National Council for Air and Stream Improvement. (5)	$104,000 - $207,000
		Lynx research employing one full-time biological science technician and two temporary technicians.(6)	$84,700
		Lynx habitat inventory and monitoring.(6)	$48,200
	Voyageurs National Park	Snow-tracking research to monitor lynx 2000 – 2005. (7)	$156,000
		Lynx monitoring in 2006. (8)	$1,000

[354] Personal communication with Bob Oakleaf, Non-game Coordinator, Wyoming Game and Fish Department, May 22, 2008.

[355] Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.

UNIT	SUBUNIT	DESCRIPTION OF LYNX RESEARCH EFFORT	IMPACTS
	Administrative costs of section 7 consultation	One programmatic, eight formal and 13 informal section 7 consultations for projects by Superior National Forest, Voyageurs National Park and MNDNR.	$325,000
Unit 3: Northern Rockies	MTDNRC	Review and evaluation of the 2005 proposed critical habitat designation with the Service. (9)	$6,790
		Study of snowshoe hares on its lands to understand where lynx populations might occur. (10)	$21,300
	Glacier National Park	DNA Research project (2000-2001); Tracking surveys pilot project; Lynx telemetry study; Snowshoe Hare Study.(11)	$2.07 million
	Administrative costs of section 7 consultation	Three programmatic, 14 formal, 20 informal, and two technical assistance section 7 consultations for projects on National Forests, Glacier National Park, and Bureau of Land Management lands.	$626,000
Unit 4: North Cascades	WADNR	Lynx habitat research on the Loomis State Forest. Funded by the following entities: Seattle City Light; USFS Pacific Northwest Research Station; Washington Department of Fish and Wildlife; and, US Fish and Wildlife Service. (12)	$110,000
	Okanogan National Forest, Ross Lake National Recreation Area	Lynx presence research funded by the Washington Department of Transportation along Highway 20 using DNA hair-snag pads on Okanogan National Forest, and Ross Lake National Recreation Area. (12)	$143,000
	North Cascades National Park	Conducted inventory to document the presence and distribution of lynx, wolverine, fisher, and martin, and develop habitat models.(13)	$192,000
	Administrative costs of section 7 consultation	Six formal, 27 informal, and two technical assistance section 7 consultations on Forest Service, Bureau of Land Management, and WA DNR lands, and Service funding to other entities.	$437,000
Unit 5: Greater Yellowstone Area	Wyoming Game and Fish Department	Lynx telemetry surveys, DNA samples, and trapping.(14)	$71,100
	Yellowstone National Park	Snow-tracking surveys for lynx presence. (15)	$226,000
	Bureau of Land Management	Habitat and LAU mapping and field surveys for Lynx on BLM-administered lands.(16)	$69,700
	Administrative costs of section 7 consultation	Three formal and two informal section 7 consultations for projects on Forest Service and Bureau of Land Management lands in Unit 4.	$77,800
SUBTOTAL AREAS PROPOSED FOR DESIGNATION			$8.57 - $8.67 million
AREAS CONSIDERED FOR EXCLUSION			
Unit 1: Maine	Passamaquoddy Tribe	Lynx surveys under a Tribal Landowner Grant from the Service, requiring biologist and technician time, and preparation of survey plan. (17)	$254,000
Unit 2: Minnesota	Grand Portage Reservation Tribal Council	In 2007, the Band hosted a conference on lynx research. (18)	Cost information not available.
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION			$254,000

Note: Entries may not sum to totals reported due to rounding.
Sources:
(1) Personal Communication with Ken Elowe, Ph.D., Maine Department of Inland Fisheries and Wildlife, February 24, 2006.
(2) Personal Communication, Professor Daniel J. Harrison, University of Maine, July 18, 2006. Absent more specific information,

UNIT	SUBUNIT	DESCRIPTION OF LYNX RESEARCH EFFORT	IMPACTS

costs are presented for the private landowner type. Assumes that lynx research has occurred since 2000 and will continue through 2028.
(3) Email communication from Jensen Bissel, Director, Baxter State Park, May 30, 2008.
(4) Personal communication with Rich Baker, Minnesota Department of Natural Resources, on February 8, 2006.
(5) Personal Communication, Ron Moen, Ph.D., Natural Resources Research Institute. February 23, 2006, and April 7, 2006. Absent more specific information, costs are presented as split evenly between Superior NF and MN DNR lands where research occurs. Acreage in these areas in the study area is similar.
(6) Written communication from Mary Shedd, Biologist, Superior National Forest, on June 11, 2008.
(7) Personal Communication, Steve Windels, February 15, and 21, and March 3, 2006
(8) Written communication from Steve Windels, Biologist, Voyageurs National Park, on May 30, 2008.
(9) Public comment: Comments from the Montana Department of Natural Resources and Conservation (DNRC) on the proposed rule for revising the designation of critical habitat for the Canada lynx published in the Federal Register (Vol. 73, No. 40, February 28, 2008). Submitted by David Groeshl, Chief, Forest Management Bureau, DNRC, on April 25, 2008.
(10) Email communication from Mike O'Herron, February 13, 2006.
(11) Personal communication from Steve Gniadek, January 11. 2006. Preliminary estimates.
(12) Email communication from Keith Aubry, Ph.D. Research Wildlife Biologist. United States Forest Service - Pacific Northwest Research Station, May 29, 2008.
(13) Personal Communication, Roger Christophersen and Robert Kuntz, North Cascades National Park. March 2, 2006.
(14) Personal communication with Bob Oakleaf, Non-game Coordinator, Wyoming Game and Fish Department on May 22, 2008.
(15) Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.
(16) Email communication from Dr. Gary P. Beauvais, Director, Wyoming Natural Diversity Database University of Wyoming. June 4, 2008.
(17) Personal communication with John Sewell, February 27, 2006.
(18) Public comment submitted by the Grand Portage Reservation Tribal Council on the February 2008 Proposed Rule.

8.5.3 POST-DESIGNATION IMPACTS

362. Post-designation impacts are expected to result from continuation of the species management efforts outlined above, and from section 7 consultations for projects on Federal lands related to species management and research. Exhibit 8-11 presents the baseline and incremental future economic impacts of these efforts. This analysis applies the rate of consultation from the past to predict future consultations for these activities. The only incremental impacts stem from additional administrative costs of consultation. Specifically, the efforts quantified are as follows:

- **Unit 1 (Maine) -** The majority of forecast impacts result from ongoing efforts by the IF&W to conserve land for lynx, conduct research and surveys and coordinate development of lynx management strategies for corporate timberlands in the State. No species management or research-related consultations have occurred in the past in Maine. As such, there are no forecast baseline or incremental administrative impacts of section 7 consultation quantified for this Unit.
- **Unit 2 (Minnesota) –** Costs include lynx surveying and monitoring in Superior National Forest and staff time for general lynx management in Voyageurs National Park and MN DNR lands. In addition to these species management and research efforts, these agencies in Unit 2 are expected to conduct approximately two consultations per year with the Service for projects related to these activities, generating baseline and incremental administrative impacts.
- **Unit 3 (Northern Rocky Mountains) -** Post-designation economic impacts to species management and research in Unit 3 are expected to result entirely from continued administrative costs of section 7 consultation, at a similar rate as in the

past. Based on the past level of consultation, BLM, USFS, and Glacier National Park are expected to conduct approximately three consultations per year.

- **Unit 4 (North Cascades) -** Post-designation economic impacts to species management and research in Unit 4 are expected to result entirely from continued administrative costs of section 7 consultation, at a similar rate as in the past. BLM, USFS, and WA DNR are expected together, to conduct approximately four consultations per year.
- **Unit 5 (Greater Yellowstone Area) –** Impacts in Unit 5 include helicopter surveys for lynx every five years in Yellowstone National Park. No project modifications have been requested in the past that indicate there would be any modifications to Yellowstone's survey project. The Park also expects that future consultations will continue at a similar rate to the present. Specifically, five informal consultations per year are expected for projects that will consider impacts to lynx.

EXHIBIT 8-12 POST-DESIGNATION BASELINE IMPACTS TO RESEARCH AND ACTIVE SPECIES MANAGEMENT ACTIVITIES BY SUBUNIT (7 PERCENT DISCOUNT RATE)

UNIT	SUBUNIT	DESCRIPTION OF ACTIVITY	BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS
AREAS PROPOSED FOR DESIGNATION						
Unit 1: Maine	Maine IFW	Radio-tagging studies, snow-tracking, and associated administrative support and partnerships with landowners. (1)	$271,000	$25,600	$0	$0
		Ongoing lynx management including coordination with landowners, rehabilitation of injured lynx, and acquisition of conservation easements. (1)	$4.69 million	$442,000	$0	$0
	University of Maine	Snowshoe hare and lynx research. (2)	$910,000	$85,900	$0	$0
Unit 2: Minnesota	Superior National Forest	Ongoing lynx research. (3)	$31,800	$3,000	$0	$0
		Lynx habitat inventory and monitoring. (3)	$159,000	$15,000	$0	$0
	Voyageurs National Park	Staff time spent on lynx management issues. (4)	$10,600	$1,000	$0	$0
	MN DNR	Staff time spent on lynx management issues. (5)	$55,100	$5,210	$0	$0
	USFS, NPS, MNDNR	Administrative impacts of section 7 consultation. (6)	$264,000	$24,900	$88,100	$8,320
Unit 3: Northern Rockies	BLM, USFS, NPS	Administrative impacts of section 7 consultation. (6)	$468,000	$44,200	$156,000	$14,700
Unit 4: North Cascades	BLM, USFS, NPS, WA DNR	Administrative impacts of section 7 consultation. (6)	$267,000	$25,200	$89,100	$8,410
Unit 5: Greater Yellowstone Area	Yellowstone National Park	Helicopter surveys for lynx and lynx den sites at five-year intervals. (7)	$55,500	$5,240	$0	$0
		Section 7 consultations for helicopter surveys, and an estimated 5 informal consultations per year for Park projects. (7)	$17,200	$1,630	$5,750	$542
	BLM, USFS, Yellowstone NP	Administrative impacts of section 7 consultation. (6)	$447,000	$42,200	$149,000	$14,100
SUBTOTAL AREAS PROPOSED FOR DESIGNATION			**$7.64 million**	**$722,000**	**$488,000**	**$46,100**

UNIT	SUBUNIT	DESCRIPTION OF ACTIVITY	BASELINE IMPACTS	ANNUALIZED BASELINE IMPACTS	INCREMENTAL IMPACTS	ANNUALIZED INCREMENTAL IMPACTS

Note: Entries may not sum to totals reported due to rounding.

Sources:

(1) Personal Communication with Ken Elowe, Ph.D., Maine Department of Inland Fisheries and Wildlife, May 30, 2008.

(2) Personal Communication, Professor Daniel J. Harrison, University of Maine, July 18, 2006. Absent more specific information, costs are presented for the private landowner type. Assumes that lynx research has occurred since 2000 and will continue through 2028.

(3) Written communication from Mary Shedd, Biologist, Superior National Forest, on June 11, 2008.

(4) Written Communication from Steve Windels, Biologist, Voyageurs National Park, May 30, 2008.

(5) Personal communication with Rich Baker, Minnesota Department of Natural Resources, on February 8, 2006.

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(7) Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.

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PERSONAL AND WRITTEN COMMUNICATION

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Baxter State Park

Bureau of Land Management

Cook County, Planning and Zoning Department

ExxonMobil Corporation

Flathead County, Planning and Zoning Office

Forest Society of Maine

Glacier National Park

Huber Resources

Jackson Hole Mountain Resort

Katahdin Forest Management, LLC.

Koochiching County, Environmental Services Department

Lake County, Planning Department

Lincoln County, Planning Department

Maine Bureau of Parks and Lands

Maine Department of Environmental Protection

Maine Department of Inland Fisheries and Wildlife

Maine Forest Products Council

Maine Land Use Regulatory Commission

Maine Revenue Service

Maine Snowmobile Association

Minnesota Department of Natural Resources

Minnesota United Snowmobile Association

Missoula County, Office of Planning and Grants

Montana Bureau of Mines and Geology

Montana Department of Environmental Quality

Montana Department of Fish Wildlife and Parks

Montana Department of Natural Resources and Conservation

Natural Resources Conservation Service

Natural Resources Research Institute

North Cascades National Park

Northshore Mining Company

Okanogan-Wenatchee National Forest

Penobscot Nation

Plum Creek Timber Company

PolyMet Mining Corporation

St. Louis County, Planning and Development

Stillwater Mining Company

Stoel Rives, LLP

Superior National Forest

TetraTech EC, Inc.

The Nature Conservancy

TRC Engineering

University of Maine

UPM Blandin

U.S. Army Corps of Engineers

U.S. Fish and Wildlife Service

U.S. Forest Service

Voyageurs National Park

Washington Cattlemen's Association

Washington Department of Natural Resources

Washington State Snowmobile Association

Wyoming Game and Fish Department

Yellowstone National Park

APPENDIX A | FINAL REGULATORY FLEXIBILITY ANALYSIS AND ENERGY IMPACT ANALYSIS

1. This appendix considers the extent to which incremental impacts from critical habitat designation may be borne by small entities and the energy industry. The analysis presented in Section A.1 is conducted pursuant to the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996. Information for this analysis was gathered from the Small Business Administration (SBA), the Service, and from interviews with stakeholders contacted during the development of the economic analysis. The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.

2. The analyses of impacts to small entities and the energy industry rely on the estimated *incremental* impacts resulting from the proposed critical habitat designation. The incremental impacts of the rulemaking are most relevant for the small business and energy impacts analyses because they reflect costs that may be avoided or reduced based on decisions regarding the composition of the final rule. The post-designation baseline impacts associated with the listing of the lynx and other State and local regulations and policies, as quantified in Chapters 3 through 8 of this report, are expected to occur regardless of the outcome of this rulemaking.

A.1 IMPACTS TO SMALL ENTITIES

3. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an Initial Regulatory Flexibility Analysis (IRFA) that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions).[1]

4. If a proposed rule is not expected to have a significant impact on a substantial number of small entities, the RFA allows an agency to so certify the rule, in lieu of preparing an IRFA.[2] In the case of the proposed critical habitat for the lynx, uncertainty exists regarding both the numbers of entities that will be subject to the proposed rule and the degree of impact on individual entities. In particular, uncertainty surrounds the nature and cost of project modifications that may be requested by the Service, and the distribution of these costs across the affected industries. The problem is complicated by

[1] 5 U.S.C. 601 et seq.

[2] Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" and a threshold for a "substantial number of small entities." 5 U.S.C. 605(b).

differences among entities—even within the same sector—as to the nature and size of their operations. Therefore, to ensure a broad consideration of impacts on small entities, the Service prepared an IRFA without first making the threshold determination of whether the proposed critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities. The IRFA was made available to the public on October 21, 2008. This appendix meets the requirements for completing a Final Regulatory Flexibility Analysis (FRFA) according to RFA/SBREFA.

A.1.1 SUMMARY OF IMPACTS ON SMALL ENTITIES

5. This analysis concludes that, of the activities considered to be affected by this rulemaking in Sections 3 through 8 of this report, incremental impacts associated with four activities, forest management, recreation, mining, and wind energy development, may be experienced by small entities. Exhibit A-1 summarizes the number of small firms that may be affected, the forecast incremental impacts that may be borne by small businesses, and a range of impacts per small entity.

6. Approximately 60 percent of the land within the study area is managed according to one of several existing lynx management plans (as described in Chapter 3). Continued compliance with these existing lynx management plans is baseline protection for the species that is not expected to be affected by the designation of critical habitat. Because of the broad scope and scale of baseline conservation afforded the lynx through the existing lynx management plans, the forecast incremental impacts are relatively minor and administrative. That is, the proposed critical habitat rule is expected only to affect small entities by increasing their administrative costs associated with participating in section 7 consultation considering the effects of their activities on the critical habitat for the lynx. All lynx conservation efforts and project modifications associated with these consultations are expected to occur because of the listing of the species, regardless of the critical habitat designation as described in Chapters 3 through 8.

7. The number of potentially affected small businesses is presented according to two scenarios to account for the uncertainty regarding the number of small entities that may undertake section 7 consultation. Under Scenario A, a single business is associated with all of the forecast consultations for each activity. This assumption generates the greatest possible per business impact. Under Scenario B, each individual consultation is undertaken by a distinct small business. This assumption results in the greatest total number of small businesses affected, but the lowest impact per business. Importantly, the high end number of businesses would therefore not bear the high end per business cost estimate. Impact estimates are total present values forecast over 20 years.

8. As data were not available regarding the average per business revenues for these small businesses, information is provided in Exhibit A-1 regarding the threshold for small businesses by NAICS code. For timber tract operations, ski facilities, and grazing lessors, the threshold is expressed in terms of annual revenues. While this threshold marks the high end revenue estimate for the potentially affected small businesses, impacts

per entity as described in the exhibit, are significantly less than the threshold estimates. The greatest impact per entity is associated with Scenario A for grazing small businesses. Even the present value, 20-year impact of $19,000 to a single small business is less than 0.3 percent of the small business revenue threshold in this case.

EXHIBIT A-1 SUMMARY OF POTENTIAL IMPACTS ON INDIVIDUAL SMALL BUSINESSES

ACTIVITY	INDUSTRY AND NAICS CODE	SMALL BUSINESS SIZE STANDARD	SUBUNIT(S)	NUMBER OF SMALL FIRMS	POTENTIAL INCREMENTAL ECONOMIC IMPACTS TO SMALL BUSINESSES (PV, 7%)*	POTENTIAL IMPACTS PER SMALL BUSINESS (PV, 7%)*
Forest Management	Timber Tract Operations (NAICS Code 113110)	$6.5 million	Unit 1: Private Timberlands	Scenario A: 1 Scenario B: 17	$3,650	Scenario A: $3,650 Scenario B: $215
Recreation	Ski Facilities (NAICS Code 713920)	$6.5 million	Unit 3: USFS Unit 5: USFS	Scenario A: 1 Scenario B: 6	$2,320	Scenario A: $2,320 Scenario B: $387
Mining	Iron Ore Mining (NAICS Code 212210) Copper Ore and Nickel Ore Mining (NAICS Code 212234)	500 employees	Unit 2: Private Mining Companies	Scenario A: 1 Scenario B: 26	$8,770	Scenario A: $8,770 Scenario B: $337
Wind Energy	Other Electric Power Generation (NAICS Code 221119)	4 million megawatts	Unit 1: Private Timberlands	Scenario A: 1 Scenario B: 3	$2,450	Scenario A: $2,450 Scenario B: $817
Livestock Grazing	Lessors of Other Real Estate Property (NAICS Code 531190)	$6.5 million	Unit 3: USFS Unit 4: USFS, BLM Unit 5: USFS, BLM	Scenario A: 1 Scenario B: 60	$19,000	Scenario A: $19,000 Scenario B: $317

Note:

* Impacts are present value estimates forecast over 20 years and discounted at seven percent.

A.1.2 FRFA

9. This FRFA is intended to improve the Service's understanding of the effects of the proposed rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. Exhibit A-2 describes the components of an FRFA. The remainder of this section addresses each of these FRFA requirements.

EXHIBIT A-2 ELEMENTS OF A FRFA

ELEMENTS OF A FINAL REGULATORY FLEXIBILITY ANALYSIS
1. A succinct statement of the need for, and objectives of, the rule.
2. A summary of the significant issues raised by the public comments in response to the IRFA, a summary of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments.
3. A description and an estimate of the number of small entities to which the rule will apply.
4. A description of the projected reporting, recordkeeping, and other compliance requirements of the rule, including an estimate of the classes of small entities that will be subject to the requirement and the types of professional skills necessary for the preparation of the report or record.
5. A description of steps the agency has taken to minimize the significant adverse economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each of the other significant alternatives to the rule considered by the agency was rejected.
Source: Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 49.

Objectives and Need for the Rule

10. Section 4(a)(3) of the Endangered Species Act (Act) requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.[3] Given that the Canada lynx is Federally-listed as threatened under the Act, the Service finds that the designation of critical habitat is required. Critical habitat was originally designated for the species on November 9, 2006.[4] On July 20, 2007, the Service announced it would review the 2006 critical habitat rule, and subsequently determined that it was necessary to reconsider the critical habitat designation.[5] On February 28, 2008, the Service published a revised proposal for critical habitat designation for the lynx.[6]

[3] 16 U.S.C. Sections 1531-1544.

[4] 71 FR 66007.

[5] For a description of the species, its risk factors, habitat description, and regulatory history, see 73 FR 10860.

[6] 73 FR 10860 – 10896.

11. The benefits of critical habitat designation derive from section 7 of the Act, which requires that Federal agencies, in consultation with the Service, ensure that actions they carry out, permit or fund are not likely to destroy or adversely modify critical habitat. As noted above, the Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable.

12. The purpose of the proposed rule is to designate critical habitat for the Canada lynx pursuant to the Endangered Species Act (Act). Section 4(b)(2) of the Act requires that the Service designate critical habitat "on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts, of specifying any particular area as critical habitat." This section grants the Secretary [of Interior] discretion to exclude any area from critical habitat if (s)he determines "the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat". The Secretary's discretion is limited, as (s)he may not exclude areas if it "will result in the extinction of the species."

Summary of the Significant Issues Raised by the Public Comments in Response to the IRFA, a Summary of the Assessment of the Agency of such issues, and a Statement of any Changes Made in the Proposed Rule as a Result of Such Comments

13. The only public comment provided on the IRFA was from the Small Business Administration, Office of Advocacy (SBA). The SBA commented that the IRFA was inadequate to provide a factual basis for certifying that the proposed critical habitat designation will not have a significant impact on a substantial number of small entities for the following reasons. First, the IRFA does not provide sufficient information to adequately forecast costs associated with section 7 consultations involving small entities. The SBA stated that, in the case that critical habitat is designated, past section 7 consultations initiated by small entities to avoid jeopardy must then be re-opened to account for newly designated critical habitat. Second, the IRFA only considers the administrative costs of re-opening past consultations and fails to consider costs small entities could face if required to modify projects to avoid adverse modification of critical habitat. In addition, the IRFA incorrectly assumes that no new section 7 consultations will occur as a result of the proposed critical habitat because the critical habitat designation only covers areas currently occupied by the species. Finally, the SBA stated that the IRFA does not provide any estimates of costs of consultations with private landowners under section 10 of the ESA to obtain an incidental take permit that may result from critical habitat designation.

14. Sections 3 through 8 of the draft economic analysis do consider and quantify costs of various project modifications associated with forecast section 7 consultations. These project modifications are all expected to be recommended regardless of the critical habitat and are therefore assigned to the baseline impacts quantified in the analysis. The IRFA and this FRFA do include information on the baseline impacts quantified in the economic analysis for context. However, the incremental impacts associated specifically with the

critical habitat rulemaking are considered the suite of impacts that are relevant to the small business analysis. The baseline impacts are not affected by this rulemaking.

15. The economic analysis also does forecast new consultations and not just re-openings, as stated by the SBA, following the designation of critical habitat; however, these new consultations are expected to occur regardless of whether critical habitat is designated. As a result, the baseline impacts of forecast section 7 project modifications are not relevant to the IRFA as they are not engendered by the critical habitat rulemaking. In addition, critical habitat does not necessarily increase the need for section 10 incidental take permits. In surveying landowners and land managers, the economic analysis did not identify any basis for assuming critical habitat designation would result in landowners developing Habitat Conservation Plans (HCPs), which are typically associated with the issuance of section 10 incidental take permits.

16. A complete summary of public comments and Service responses are included in the Final Rule. The Final Rule also describes any changes to the Proposed Rule made by the Service. The remainder of this FRFA describes impacts to small entities as a result of the Proposed Rule and does not reflect changes made to the designation in the Final Rule.

Description and Types and Number of Small Entities to which the Rule will Apply

17. Three types of small entities are defined in the RFA:

- **Small Business -** Section 601(3) of the RFA defines a small business as having the same meaning as small business concern under section 3 of the Small Business Act. This includes any firm that is independently owned and operated and is not dominant in its field of operation. The U.S. Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act, and those size standards can be found in 13 CFR 121.201. The size standards are matched to North American Industry Classification System (NAICS) industries. The SBA definition of a small business applies to a firm's parent company and all affiliates as a single entity.
- **Small Governmental Jurisdiction -** Section 601(5) defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. Special districts may include those servicing irrigation, ports, parks and recreation, sanitation, drainage, soil and water conservation, road assessment, etc. When counties have populations greater than 50,000, those municipalities of fewer than 50,000 can be identified using population reports. Other types of small government entities are not as easily identified under this standard, as they are not typically classified by population.
- **Small Organization -** Section 601(4) defines a small organization as any not-for-profit enterprise that is independently owned and operated and not dominant in its field. Small organizations may include private hospitals, educational institutions, irrigation districts, public utilities, agricultural co-ops, etc.

Description of Small Entities to which the Proposed Rule will Apply

18. The courts have held that the RFA/SBREFA requires Federal agencies to perform a regulatory flexibility analysis of forecast impacts to small entities that are directly regulated. In the case of *Mid-Tex Electric Cooperative, Inc., v. Federal Energy Regulatory Commission (FERC)*, FERC proposed regulations affecting the manner in which generating utilities incorporated construction work in progress in their rates. The generating utilities that expected to be regulated were large businesses; however, their customers -- transmitting utilities such as electric cooperatives -- included numerous small entities. In this case, the court agreed that FERC simply authorized large electric generators to pass these costs through to their transmitting and retail utility customers, and FERC could therefore certify that small entities were not directly impacted within the definition of the RFA.[7]

19. Similarly, *American Trucking Associations, Inc. v. Environmental Protection Agency* (EPA) addressed a rulemaking in which EPA established a primary national ambient air quality standard for ozone and particulate matter.[8] The basis of EPA's RFA/SBREFA certification was that this standard did not directly regulate small entities; instead, small entities were indirectly regulated through the implementation of state plans that incorporated the standards. The court found that, while EPA imposed regulation on states, it did not have authority under this rule to impose regulations directly on small entities and therefore small entities were not directly impacted within the definition of the RFA.

20. The Small Business Administration (SBA) in its guidance on how to comply with the RFA recognizes that consideration of indirectly affected small entities is not required by the RFA, but encourages agencies to perform a regulatory flexibility analysis even when the impacts of its regulation are indirect.[9] "If an agency can accomplish its statutory mission in a more cost-effective manner, the Office of Advocacy [of the SBA] believes that it is good public policy to do so. The only way an agency can determine this is if it does not certify regulations that it knows will have a significant impact on small entities even if the small entities are regulated by a delegation of authority from the federal agency to some other governing body."[10]

21. The regulatory mechanism through which critical habitat protections are enforced is section 7 of the Act, which directly regulates only those activities carried out, funded, or permitted by a Federal agency. By definition, Federal agencies are not considered small entities, although the activities they may fund or permit, may be proposed or carried out by small entities. Given the SBA guidance described above, this analysis considers the

[7] 773 F. 2d 327 (D.C. Cir. 1985).

[8] 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

[9] Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 20.

[10] *Ibid.*, pg. 21.

extent to which this designation could potentially affect small entities, regardless of whether these entities would be directly regulated by the Service through the proposed rule or by a delegation of impact from the directly regulated entity.

22. This FRFA focuses on small entities that may bear the regulatory costs quantified in Chapters 3 through 8 of this economic analysis. Although downstream businesses are considered, this analysis considers only those entities whose impact would not be measurably diluted. Specifically, this economic analysis quantifies incremental economic impacts of lynx conservation associated with development of species management plans, forest management, development, recreation, mining, fire management activities, wind energy development, livestock grazing, transportation, and species and habitat research.[11] However, as described below, only incremental changes in forest management, recreation, mining, wind energy development, and livestock grazing activities are expected to affect small entities.

23. Impacts are not expected to small entities in other economic sectors potentially affected by this rule for the following reasons:

- **Development of Lynx Management Plans (Chapter 3) -** This analysis presents the potential impacts associated with the development of lynx management plans, which are undertaken by State and Federal agencies. As such, these impacts are not anticipated to affect small entities.
- **Development Activities (Chapter 5) -** Economic impacts to development activities are forecast in only one subunit – private timberlands in Maine (Unit 1) – and are anticipated to be borne by Plum Creek, which is not a small business.[12]
- **Fire Management Activities (Section 8.1) -** All incremental impacts related to fire management activities are administrative costs of section 7 consultations in Units 4 and 5, and are anticipated to be undertaken by State and Federal agencies. As such, these impacts are not anticipated to affect small entities.
- **Transportation, Utility, and Municipal Activities (Section 8.4) -** Impacts to these projects are expected to be borne by the Federal and State agencies undertaking lynx-related modifications to these types of projects, including The Federal Highways Administration (FHWA), Federal Emergency Management Agency (FEMA), United States Army Corps of Engineers (USACE) and State transportation departments. These impacts are therefore not expected to affect small entities.

[11] The analysis also quantifies impacts to Tribal activities. Tribal lands are being considered for exclusion from critical habitat. Tribes are not considered small entities in this analysis (the U.S. EPA has noted that, "for the purposes of the RFA, States and Tribal governments are not considered small governments but rather as independent sovereigns." EPA. "Regulatory Flexibility Act/Small Business Regulatory Enforcement Fairness Act. What is a "small government?" Accessed at http://www.epa.gov/sbrefa/government.htm.")

[12] According to its website, Plum Creek employs had roughly $1.68 billion in total revenues (http://finance.google.com/finance?client=ig&q=PCL), which exceeds the small business revenue threshold for a timber tract operation (NAICS code 113110) of $6.5 million.

- **Species Research and Management Activities (Section 8.5) -** All incremental impacts related to species research and management activities are administrative costs of section 7 consultations, and are anticipated to be borne by State and Federal agencies. Thus, these impacts are not anticipated to affect small entities.

24. Incremental impacts may, however, be borne by the following types of small entities:

- **Timber tract operations (NAICS code 113110)**. For timber activities, total impacts include the cost of implementing lynx management plans, including associated species surveying and monitoring costs, increased up-front effort for harvest planning, and establishing set-asides in the critical habitat area, as discussed in Chapter 4. Baseline impacts associated with timber management activities in areas proposed for designation are forecast to be $13.5 million (discounted at seven percent). The incremental impacts relevant to this FRFA, however, are forecast to be $226,000, only $3,650 of which is borne by timber tract businesses in Maine (both discounted at seven percent). These incremental impacts are entirely related to the administrative costs of section 7 consultations. No other units have forecast incremental impacts associated with forest management activities that may be borne by small businesses.
- **Ski Facilities (NAICS code 713920)**. The economic analysis evaluates impacts to recreators and associated businesses. Total baseline impacts associated with lynx conservation efforts on recreation activities are forecast to be $5.47 million to $5.58 million (discounted at seven percent). The majority of the baseline impacts to recreation activity forecast in Chapter 6 of this report include welfare impacts to individual snowmobilers. Incremental impacts relevant to this FRFA, $282,000 (discounted at seven percent), are administrative impacts of section 7 consultation, of which $2,320 may be borne by small skiing facilities.
- **Mining operations (NAICS codes 212234 and 212210)**. Chapter 7 considers potential impacts to mining activities. Forecast baseline impacts are $1.43 million. Incremental impacts of $115,000 stem from administrative costs of consultation, $8,770 of which may be borne by small businesses as opposed to Federal agencies or the Service. Small businesses that conduct copper and nickel ore mining (NAICS code 212234) and iron ore mining (NAICS code 212210) may bear these impacts.
- **Wind Energy Interests (NAICS code 221119)**. As discussed in Section 8.2, this analysis quantifies costs of section 7 consultations related to three wind projects. Forecast baseline impacts associated with these three consultations are roughly $51,100, of which $14,000 are incremental. Small businesses may bear approximately $2,450 of these incremental costs. No information is available regarding the companies who may propose these projects; thus, whether the businesses are small is uncertain. As a substitute, the analysis gathers information about the status of the “other electric power generation” industry in the study area (Exhibit A-6).

- **Livestock Grazing (NAICS code 531190).** Section 8.3 evaluates potential impacts to livestock grazing activities. Total baseline impacts are forecast to be $273,000. The incremental administrative impacts of section 7 consultation relative to this FRFA, however, are $91,100, $19,000 of which may be borne by small businesses that own livestock (some of which may be small).

Estimates of the Number of Small Entities to which the Proposed Rule will Apply

25. The Service has determined that the most practical unit of analysis for designating critical habitat for the Canada lynx is four "units" as described in Chapter 1 of this economic analysis. This economic analysis further divides the units as described into subunits according to landowner type. It is not possible, however, to directly determine the number of firms in each industry sector in each of the subunits because of the geo-political coverage of the business activity data sets, which are available at the county level in each State containing proposed critical habitat. The numbers of potential entities to which the rule may apply are estimated for each activity for which incremental impacts may be borne by small entities as follows.

- **Timber tract operations (NAICS code 113110).** The analysis forecasts 17 section 7 consultations involving third parties related to forest management activities over the next 20 years. As such, the analysis assumes that between one (Scenario A) and 17 (Scenario B) businesses will be affected. Dun and Bradstreet data indicate that nine businesses conduct timber tract operations in the Private Timberlands subunit of Unit 1 (Maine), each of which earns less than $6.5 million in revenues and is therefore small (Exhibit A-4). Because 100 percent of the registered timber tract operations is small, this analysis assumes each of the potentially affected businesses is small. Information on the number of landowners that manage lands for timber suggests that the Dun and Bradstreet estimate of the number of timber tract operations in Unit 1 may be an underestimate. This may be the result of businesses that are registered under other NAICS codes, such as logging (NAICS code 113310) or Support Activities for Forestry (NAICS code 115310), or businesses that manage timber in Unit 1 but are based in other nearby counties.
- **Ski Facilities (NAICS code 713920)**. The analysis forecasts that between one (Scenario A) and six (Scenario B) businesses in the skiing industry will be affected by section 7 consultations in Unit 3 (Montana and Idaho) and Unit 5 (Wyoming and Montana). Dun and Bradstreet data indicate that a total of 10 ski facilities exist in the subject subunits, eight of which earn less than $6.5 million in revenues and are therefore small (see Exhibit A-5). Because 80 percent of ski resorts in the region are small, this analysis therefore conservatively assumes that impacts to each of the ski resort projects will be borne small businesses.
- **Mining operations (NAICS codes 212234 and 212210)**. The analysis forecasts 26 section 7 consultations in Unit 2 (Minnesota) that relate to mining activities and involve a third party. As such, one (Scenario A) to 26 (Scenario B) businesses are assumed to be affected in future years. Dun and Bradstreet data indicate that ten

mining businesses exist within the Private Mining Companies subunit of Unit 2 (Minnesota), of which five have fewer than 500 employees and are therefore small (see Exhibit A-6). All of these businesses mine iron ore (NAICS code 212210) as opposed to copper or nickel ore (NAICS code 212234). The analysis conservatively assumes that the one to 26 businesses that are affected are small. Note that these Dun and Bradstreet estimates may underestimate the number of total and small businesses related to mining activities, as there may be businesses that are registered under other NAICS codes or that are based in other counties.

- **Wind Energy Interests (NAICS code 221119)**. As discussed above, three wind energy projects are assumed to be developed in the Private Timberlands subunit of Unit 1 (Maine), all of which incur incremental costs associated with section 7 consultations. Accordingly, between one (Scenario A) and three (Scenario B) businesses are assumed to be affected in future years. Dun and Bradstreet data indicate that 32 businesses exist in the "other electric power generation" industry in counties that contain this subunit, all of which produce less than four million megawatts of electricity annually and are therefore small (see Exhibit A-7).[13] Note that these businesses may be unrelated to the wind industry; however, the Dun and Bradstreet data not separately identify wind energy businesses. Also, of note, businesses outside of the subunit or even out of the State of Maine, may seek to develop wind energy projects in Maine. Data are not available, however, to determine the specific businesses that may develop these projects.
- **Livestock Grazing (NAICS Code 531190).** The analysis forecasts that 60 section 7 consultations involving third parties and related to livestock grazing will occur within proposed critical habitat. As such, between one (Scenario A) and 60 (Scenario B) businesses are assumed to be affected. Dun and Bradstreet data indicate that 266 businesses under the NAICS category "Lessors of Other Real Estate Property" exist within Units 3, 4 and 5 (Montana, Idaho, Washington, and Wyoming), all of which earn less than $6.5 million in revenues and is therefore small (see Exhibit A-8). Absent additional information, the analysis assumes that all of these lessors are small livestock grazing operations. Although this NAICS category is broader than potentially affected grazing lessors, these entities are included in the category and the available data suggests they are likely to be small.

[13] All entities in the Electric Services Sectors are assumed to be small entities. Consequently, the number for small entities in these sectors represent an upper bound estimate. For this sector, the SBA defines a firm as "small" if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale, and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

EXHIBIT A-3 SMALL TIMBER TRACT OPERATIONS THAT MAY BE AFFECTED BY LYNX CRITICAL HABITAT DESIGNATION IN MAINE

INDUSTRY AND NAICS CODE	SMALL BUSINESS SIZE STANDARD		COUNTY						
			AROOSTOOK	FRANKLIN	PENOBSCOT	PISCATAQUIS	SOMERSET	TOTAL	% SMALL
Timber Tract Operations (NAICS Code 113110)	$6.5 million	Total	3	0	4	2	0	9	
		Small	3	0	4	2	0	9	100%
Note: Size standards are based on SBA's Table of Small Business Size Standards based on NAICS 2007 (http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf). Dun and Bradstreet information downloaded in July 2008.									

EXHIBIT A-4 SMALL SKIING FACILITIES THAT MAY BE AFFECTED BY LYNX CRITICAL HABITAT DESIGNATION IN MONTANA AND WYOMING

INDUSTRY AND NAICS CODE	SMALL BUSINESS SIZE STANDARD		COUNTY							
			GLACIER	GRANITE	LINCOLN	MISSOULA	TETON	TETON (WY)	TOTAL	% SMALL
Skiing Facilities (NAICS Code 713920)	$6.5 million	Total	1	1	1	3	1	3	10	
		Small	0	0	1	3	1	3	8	80%
Note: Size standards are based on SBA's Table of Small Business Size Standards based on NAICS 2007 (http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf). Dun and Bradstreet information downloaded in July 2008.										

EXHIBIT A-5 SMALL MINING BUSINESSES THAT MAY BE AFFECTED BY LYNX CRITICAL HABITAT DESIGNATION IN MINNESOTA

INDUSTRY AND NAICS CODE	SMALL BUSINESS SIZE STANDARD		COUNTY			
			LAKE	ST. LOUIS	TOTAL	% SMALL
Iron Ore Mining (NAICS Code 212210)	500 employees	Total	1	9	10	
		Small	0	5	5	50%
Copper Ore and Nickel Ore Mining (NAICS Code 212234)	500 employees	Total	0	0	0	
		Small	0	0	0	Not applicable
Note: Size standards are based on SBA's Table of Small Business Size Standards based on NAICS 2007 (http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf). Dun and Bradstreet information downloaded in July 2008.						

EXHIBIT A-6 SMALL POTENTIAL WIND ENERGY BUSINESSES THAT MAY BE AFFECTED BY LYNX CRITICAL HABITAT DESIGNATION IN MAINE

INDUSTRY AND NAICS CODE	SMALL BUSINESS SIZE STANDARD		COUNTY						
			AROOSTOOK	FRANKLIN	PENOBSCOT	PISCATAQUIS	SOMERSET	TOTAL	% SMALL
Other Electric Power Generation (NAICS Code 221119)	$6.5 million	Total	8	3	14	1	6	32	
		Small	8	3	14	1	6	32	100%

Note: Size standards are based on SBA's Table of Small Business Size Standards based on NAICS 2007 (http://www.sba.gov/idc/groups/public/documents/sba_homepage/serv_sstd_tablepdf.pdf). Dun and Bradstreet information downloaded in July 2008.

EXHIBIT A-7 SMALL POTENTIAL LIVESTOCK GRAZING BUSINESSES THAT MAY BE AFFECTED BY LYNX CRITICAL HABITAT DESIGNATION IN MONTANA, WASHINGTON, AND WYOMING

INDUSTRY AND NAICS CODE	SMALL BUSINESS SIZE STANDARD		MONTANA COUNTIES						
			CARBON	FLATHEAD	GALLATIN	GLACIER	GRANITE	LAKE	LINCOLN
Lessors of Other Real Estate Property (NAICS Code 531190)	$6.5 million	Total	5	27	24	2	1	9	11
		Small	5	27	24	2	1	9	11
			MONTANA COUNTIES (CONTINUED)						
			MISSOULA	PARK	PONDERA	POWELL	STILLWATER	TETON	
		Total	30	4	8	1	2	10	
		Small	30	4	8	1	2	10	
			WASHINGTON COUNTIES						
			CHELAN	OKANOGAN	SKAGIT	WHATCOM			
		Total	17	9	27	41			
		Small	17	9	27	41			
			WYOMING COUNTIES					TOTAL	% SMALL
			FREMONT	LINCOLN	PARK	SUBLETTE	TETON		
		Total	12	11	4	3	8	236	
		Small	12	11	4	3	8	236	100%

Description of the projected reporting, recordkeeping, and other compliance requirements of the rule

26. Given the rural nature of the proposed designation and the nature of the affected activities, between 50 and 100 percent of the potentially affected entities in these regions are small (as displayed above in Exhibits A-3 to A-7). Potential impacts to individual small businesses are provided in Exhibit A-1 and summarized in the discussion that follows.

- **Timber tract operations (NAICS code 113110).** Incremental costs that may affect small timber tract operations are roughly $3,650 (discounted at seven percent). This translates to roughly $3,650 (Scenario A) or $215 (Scenario B) per small business. Forestry and Logging earnings in Franklin, Penobscot, and Piscataquis Counties for 2006 were roughly $60.0 million (information was unavailable for Aroostook and Somerset Counties).[14] Data are not available to determine what percentage of this is related to small business earnings. As such, Exhibit A-1 describes the small business threshold for timber tract operations in terms of annual revenue of $6.5 million. Importantly, this represents the high end of earnings for a small business in this category. In the case that the average small business earns half of the revenue threshold, Scenario A impacts of $3,650 (a present value over 20 years) to a single business represents 0.1 percent of the annual revenue of the small business.
- **Ski Facilities (NAICS code 713920)**. Total incremental impacts to skiing facilities, assumed in this analysis to be small, are roughly $2,320 over 20 years (discounted at seven percent). This translates to approximately $2,320 (Scenario A) or $387 (Scenario B) in incremental costs of section 7 consultation per small business. Data are not available to determine average revenues per small business. As such, Exhibit A-1 describes the small business threshold for ski facilities in terms of annual revenue of $6.5 million. Again, this represents the high end of earnings for a small business in this category. In the case that the average small business earns half of the revenue threshold, Scenario A impacts of $2,320 (a present value over 20 years) to a single business represents less than 0.1 percent of the annual revenue of the small business.
- **Mining operations (NAICS codes 212234 and 212210)**. Total incremental impacts to mining businesses, some of which may be small, are forecast to be $8,770 (discounted at seven percent), translating to between $8,770 (Scenario A) or $337 (Scenario B) in potential impacts per business. Total mining related earnings in St. Louis County were roughly $354 million in 2006 (note that earnings for Lake County were not available). The percentage of this related to small business earnings is unknown.

[14] BEA. 2006. Personal income by major source and earnings by NAICS industry. Accessed on July 8, 2008 from http://www.bea.gov/bea/regional/reis.

- **Wind Energy Interests (NAICS code 221119)**. This analysis estimates incremental impacts to wind energy businesses at roughly $2,450 over 20 years (discounted at seven percent). This translates to approximately $2,450 (Scenario A) or $817 (Scenario B) per small business. Average annual revenues per small business in this category are unknown.
- **Livestock Grazing (NAICS Code 531190).** Incremental impacts to livestock grazing activities that may affect small businesses are estimated at roughly $19,000 (discounted at seven percent), which translates to approximately $19,000 (Scenario A) or $317 (Scenario B) per small business. Data are not available to determine average revenues per small business. As such, Exhibit A-1 describes the small business threshold for grazing lessors in terms of annual revenue of $6.5 million. This represents the high end of earnings for a small business in this category. In the case that the average small business earns half of the revenue threshold, Scenario A impacts of $19,000 (a present value over 20 years) to a single business represents less than 0.3 percent of the annual revenue of the small business.

A description of steps the agency has taken to minimize the signi ficant adverse economic impact on small entities

27. The Service identified five units as potential critical habitat for the lynx. This analysis describes subunits by landowner type to provide economic impact information at a more refined geographic scale. Specifically, 50 subunits were proposed for designation of critical habitat and three subunits were considered for exclusion from critical habitat by the Service. An alternative to the Proposed Rule (designating the land area of the 50 proposed subunits for critical habitat) was the designation of all 53 subunits. In addition, section 4(b)(2) of the Act allows the Service to exclude additional areas proposed for designation based on economic impact and other relevant impacts. As a result, the designation of multiple combinations of subunits are also available to the Service as alternatives.

28. A reduction in the size of critical habitat reduces the number of small businesses potentially affected. The extent to which the economic impact to small entities is reduced depends on how many, and which, subunits or portions of subunits of critical habitat are excluded. A description of the final critical habitat, including which areas of proposed critical habitat were excluded and for what reason, is included in the Final Rule.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

29. Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on

the supply, distribution, and use of energy."[15] The OMB's guidance for implementing this Executive Order outlines nine outcomes that may constitute "a significant adverse effect" as compared to a scenario without the regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million Mcf per year;
- Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.[16]

30. Although the analysis forecasts potential impacts to both wind energy development activities and oil and gas activities, no impacts to energy production are anticipated. Impacts of critical habitat designation to both activities relate only to administrative costs of section 7 consultations. Incremental administrative costs to mining operators of $8,770 per year (the fraction of total administrative costs which may be borne by mining operators as opposed to administrative effort of Federal agencies or the Service) is not expected to affect any of the abovementioned thresholds given the size of the energy industry across the broad scope of the proposed critical habitat area. As such, none of the criteria listed above is relevant to this analysis, and energy-related impacts associated with lynx conservation within the study area are not expected.

[15] Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

[16] *Ibid.*

APPENDIX B | DETAILED IMPACTS TO ACTIVITIES BY UNIT

1. This analysis employs standard discounting techniques to calculate the present value of economic impacts that are expected to occur at different points in time. The present value estimates provided in the main body of the report are calculated using a real discount rate of seven percent. To test the sensitivity of the report's findings to the discount rate assumption, this appendix provides detailed estimates of the present value baseline and incremental economic impacts applying an alternate discount rate of three percent (Exhibits B-3 through B-16).
2. As the detailed exhibits in this appendix indicate, the present value of estimated impacts is higher when a three percent rate is employed. This is to be expected; all else equal, the use of a lower discount rate will assign a higher present value to future costs. For example, employing a three percent discount rate to baseline impacts associated with development of lynx management plans (Exhibit B-5), the present value of quantified impacts at a three percent discount rate is estimated at $1.16 million. In contrast, assuming a seven percent discount rate, the present value of quantified impacts is estimated to be $990,000.
3. The following textbox explains how present value and annualized impacts are calculated given a specific discount rate.

Calculating Present Value and Annualized Impacts

For each land use activity, this analysis presents economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of the economic impacts of past or future impacts to present value terms requires the following: a) past or projected future impacts of species conservation efforts; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PV_c) of lynx conservation efforts from year t to T is measured in 2008 dollars according to the following standard formula:[a]

$$PV_c = \sum_{t=t_0}^{t=T} \frac{C_t}{(1+r)^{t-2008}}$$

C_t = cost of species conservation efforts in year t

r = discount rate[b]

Impacts of conservation efforts for each land use activity in each unit are also expressed as annualized values (i.e., the series of equal annual costs over some defined time period that have the same present value as estimated total impacts). Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). This analysis employs a forecast period of 20 years, 2009 through 2028. Annualized impacts of future lynx conservation efforts (APV_c) are calculated using the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1-(1+r)^{-(N)}} \right]$$

N = number of years in the forecast period

[a] To derive the present value of pre-designation conservation efforts for this analysis, t is 2000 and T is 2008; to derive the present value of post-designation conservation efforts, t is 2009 and T is 2028. In the case of pre-commercial thinning impacts in Chapter 4, present value impacts are calculated in perpetuity to reflect a change in the long term sustainable yield of the forests. The formula applied to do this is to divide the annual impact estimate by the discount rate.

[b] To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

4. Exhibits B-1 and B-2 provide rankings of subunits from highest to lowest, based on the present value of estimated baseline and incremental impacts employing three and seven percent discount rates. As the exhibits indicate, the use of different discount rates produces some variation in the rankings. The maximum difference in the rankings, however, is only two places (for example, in terms of baseline impacts, Unit 3: Montana Department of Natural Resources subunit ranks 14th assuming a seven percent discount rate and 12th assuming a three percent discount rate), and the overall rankings appear reasonably well correlated. Thus, the ranking of subunits by estimated impact is relatively insensitive to the use of a three or seven percent discount rate.

EXHIBIT B-1 RANKING OF SUBUNITS BY PRESENT VALUE OF POST-DESIGNATION BASELINE IMPACTS ASSUMING ALTERNATE DISCOUNT RATES

SUBUNIT	RANKING AT 3 PERCENT	RANKING AT 7 PERCENT
PROPOSED CRITICAL HABITAT		
Unit 1: Private Timber Lands	1	1
Unit 4: WA Dept. of Natural Resources	2	2
Unit 2: Minnesota Dept. of Natural Resources	3	3
Unit 2: Superior National Forest	4	4
Unit 2: Other Private Landowners	5	6
Unit 3: U.S. Forest Service	6	5
Unit 2: Private Mining Lands	7	7
Unit 4: U.S. Forest Service	8	8
Unit 5: National Park Service	9	9
Unit 5: U.S. Forest Service	10	10
Unit 5: U.S. Bureau of Land Management	11	11
Unit 3: Montana Dept. of Natural Resources	12	14
Unit 3: U.S. Bureau of Land Management	13	12
Unit 5: Private Mining Lands	14	13
Unit 4: U.S. Bureau of Land Management	15	15
Unit 1: Maine Dept of Conservation	16	16
Unit 3: Private Timber Lands	17	17
Unit 2: Voyageurs National Park	18	18
Unit 3: Glacier National Park	19	20
Unit 4: WA Dept. of Fish and Wildlife	20	19
Unit 1: National Park Service	21	21
Unit 3: Montana Fish, Wildlife, and Parks	22	22
Unit 1: Other Private Landowners	23	23
Unit 1: U.S. Fish and Wildlife Service	24	24
Unit 1: Baxter State Park Authority	24	24
Unit 1: Conservation NGO	24	24

SUBUNIT	RANKING AT 3 PERCENT	RANKING AT 7 PERCENT
Unit 2: U.S. Bureau of Land Management	24	24
Unit 2: University of Minnesota	24	24
Unit 2: Local Public Ownership	24	24
Unit 2: Private Timber Lands	24	24
Unit 3: U.S. Fish and Wildlife Service	24	24
Unit 3: U.S. Bureau of Reclamation	24	24
Unit 3: U.S. Department of Defense	24	24
Unit 3: Montana Dept. of Transportation	24	24
Unit 3: Montana University System	24	24
Unit 3: Local Public Landowners	24	24
Unit 3: Conservation NGO	24	24
Unit 3: Other Private Landowners	24	24
Unit 4: National Park Service	24	24
Unit 4: U.S. Fish and Wildlife Service	24	24
Unit 4: Private Landowners	24	24
Unit 5: U.S. Bureau of Reclamation	24	24
Unit 5: Federal Highway Administration	24	24
Unit 5: U.S. Fish and Wildlife Service	24	24
Unit 5: Montana State Highway Commission	24	24
Unit 5: Montana Fish, Wildlife, and Parks	24	24
Unit 5: Wyoming Fish and Game Commission	24	24
Unit 5: Wyoming Dept. of Transportation	24	24
Unit 5: Local Public Landowners	24	24
Unit 5: Other Private Landowners	24	24
AREAS CONSIDERED FOR EXCLUSION		
Unit 1: Tribal lands	1	1
Unit 3: Tribal Lands	2	2
Unit 2: Tribal Lands	3	3

EXHIBIT B-2 RANKING OF SUBUNITS BY PRESENT VALUE OF POST-DESIGNATION INCREMENTAL IMPACTS ASSUMING ALTERNATE DISCOUNT RATES

SUBUNIT	RANKING AT 3 PERCENT	RANKING AT 7 PERCENT
PROPOSED CRITICAL HABITAT		
Unit 3: U.S. Forest Service	1	1
Unit 4: U.S. Forest Service	2	2
Unit 5: National Park Service	3	3
Unit 2: Superior National Forest	4	4
Unit 5: U.S. Forest Service	5	6
Unit 2: Private Mining Lands	6	5
Unit 5: U.S. Bureau of Land Management	7	7
Unit 2: Minnesota Dept. of Natural Resources	8	8
Unit 3: U.S. Bureau of Land Management	9	9
Unit 2: Other Private Landowners	10	10
Unit 1: Private Timber Lands	11	11
Unit 4: U.S. Bureau of Land Management	12	12
Unit 5: Private Mining Lands	13	13
Unit 3: Private Timber Lands	14	14
Unit 3: Glacier National Park	15	15
Unit 1: Maine Dept of Conservation	16	16
Unit 4: WA Dept. of Natural Resources	17	17
Unit 2: Voyageurs National Park	18	18
Unit 1: National Park Service	19	19
Unit 1: Other Private Landowners	20	20
Unit 1: U.S. Fish and Wildlife Service	21	21
Unit 1: Baxter State Park Authority	21	21
Unit 1: Conservation NGO	21	21
Unit 2: U.S. Bureau of Land Management	21	21
Unit 2: University of Minnesota	21	21
Unit 2: Local Public Ownership	21	21
Unit 2: Private Timber Lands	21	21
Unit 3: U.S. Fish and Wildlife Service	21	21
Unit 3: U.S. Bureau of Reclamation	21	21
Unit 3: U.S. Department of Defense	21	21
Unit 3: Montana Dept. of Natural Resources	21	21
Unit 3: Montana Dept. of Transportation	21	21
Unit 3: Montana Fish, Wildlife, and Parks	21	21
Unit 3: Montana University System	21	21
Unit 3: Local Public Landowners	21	21

SUBUNIT	RANKING AT 3 PERCENT	RANKING AT 7 PERCENT
Unit 3: Conservation NGO	21	21
Unit 3: Other Private Landowners	21	21
Unit 4: National Park Service	21	21
Unit 4: U.S. Fish and Wildlife Service	21	21
Unit 4: WA Dept. of Fish and Wildlife	21	21
Unit 4: Private Landowners	21	21
Unit 5: U.S. Bureau of Reclamation	21	21
Unit 5: Federal Highway Administration	21	21
Unit 5: U.S. Fish and Wildlife Service	21	21
Unit 5: Montana State Highway Commission	21	21
Unit 5: Montana Fish, Wildlife, and Parks	21	21
Unit 5: Wyoming Fish and Game Commission	21	21
Unit 5: Wyoming Dept. of Transportation	21	21
Unit 5: Local Public Landowners	21	21
Unit 5: Other Private Landowners	21	21
AREAS CONSIDERED FOR EXCLUSION		
Unit 1: Tribal lands	1	1
Unit 3: Tribal Lands	2	2
Unit 2: Tribal Lands	3	3

EXHIBIT B-3 POST-DESIGNATION BASELINE IMPACTS TO ALL ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$18,400	$18,400	$13,100	$13,100	$1,240	$1,240	$1,240	$1,240
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$57,400	$57,400	$44,500	$44,500	$3,860	$3,860	$4,200	$4,200
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$107,000,000	$118,000,000	$1,050,000	$110,000,000	$7,180,000	$7,900,000	$9,430,000	$10,400,000
Other Private Landowners	$1,860	$1,860	$1,320	$1,320	$125	$125	$125	$125
Subtotal Unit 1	*$107,000,000*	*$118,000,000*	*$100,000,000*	*$110,000,000*	*$7,190,000*	*$7,910,000*	*$9,430,000*	*$10,400,000*
UNIT 2: MINNESOTA								
Superior National Forest	$3,400,000	$4,420,000	$2,350,000	$3,010,000	$229,000	$297,000	$221,000	$284,000
Voyageurs National Park	$38,500	$38,500	$27,400	$27,400	$2,580	$2,580	$2,580	$2,580
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$4,350,000	$5,180,000	$3,040,000	$3,590,000	$292,000	$348,000	$287,000	$339,000
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$1,790,000	$1,790,000	$1,290,000	$1,290,000	$121,000	$121,000	$122,000	$122,000
Other Private Landowners	$1,170,000	$2,080,000	$773,000	$1,380,000	$78,300	$140,000	$73,000	$130,000
Subtotal Unit 2	*$10,700,000*	*$13,500,000*	*$7,480,000*	*$9,300,000*	*$722,000*	*$908,000*	*$706,000*	*$878,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$2,000,000	$2,000,000	$1,510,000	$1,510,000	$134,000	$134,000	$133,000	$133,000
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$209,000	$209,000	$149,000	$149,000	$14,000	$14,000	$14,000	$14,000

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$36,600	$36,600	$26,000	$26,000	$2,460	$2,460	$2,460	$2,460
Montana Dept. of Natural Resources	$240,000	$240,000	$116,000	$116,000	$16,100	$16,100	$10,900	$10,900
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$5,950	$5,950	$4,240	$4,240	$400	$400	$400	$400
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$43,100	$43,100	$30,700	$30,700	$2,900	$2,900	$2,900	$2,900
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$2,530,000*	*$2,530,000*	*$1,840,000*	*$1,840,000*	*$170,000*	*$170,000*	*$164,000*	*$164,000*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$106,000	$106,000	$75,300	$75,300	$7,110	$7,110	$7,110	$7,110
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$1,220,000	$1,360,000	$866,000	$959,000	$81,700	$91,100	$81,700	$90,600
WA Dept. of Natural Resources	$15,800,000	$15,800,000	$11,300,000	$11,300,000	$1,060,000	$1,060,000	$1,060,000	$1,060,000
WA Dept. of Fish and Wildlife	$28,300	$28,300	$26,200	$26,200	$1,900	$1,900	$2,480	$2,480
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$17,100,000*	*$17,300,000*	*$12,200,000*	*$12,300,000*	*$1,150,000*	*$1,160,000*	*$1,150,000*	*$1,160,000*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$343,000	$343,000	$251,000	$251,000	$23,100	$23,100	$23,700	$23,700
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$867,000	$867,000	$622,000	$622,000	$58,200	$58,200	$58,700	$58,700
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$784,000	$784,000	$604,000	$604,000	$52,700	$52,700	$57,000	$57,000
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$163,000	$163,000	$135,000	$135,000	$10,900	$10,900	$12,700	$12,700
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$2,160,000*	*$2,160,000*	*$1,610,000*	*$1,610,000*	*$145,000*	*$145,000*	*$152,000*	*$152,000*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$139,000,000**	**$153,000,000**	**$123,000,000**	**$135,000,000**	**$9,380,000**	**$10,300,000**	**$11,600,000**	**$12,800,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$143,000	$143,000	$133,000	$133,000	$9,610	$9,610	$12,500	$12,500
Subtotal Unit 1	*$143,000*	*$143,000*	*$133,000*	*$133,000*	*$9,610*	*$9,610*	*$12,500*	*$12,500*
UNIT 2: MINNESOTA								
Tribal Lands	$6,630	$6,630	$4,720	$4,720	$446	$446	$446	$446
Subtotal Unit 2	*$6,630*	*$6,630*	*$4,720*	*$4,720*	*$446*	*$446*	*$446*	*$446*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$11,800	$11,800	$8,390	$8,390	$792	$792	$792	$792
Subtotal Unit 3	*$11,800*	*$11,800*	*$8,390*	*$8,390*	*$792*	*$792*	*$792*	*$792*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$161,000**	**$161,000**	**$146,000**	**$146,000**	**$10,900**	**$10,900**	**$13,700**	**$13,700**
OVERALL TOTAL	**$140,000,000**	**$153,000,000**	**$123,000,000**	**$135,000,000**	**$9,390,000**	**$10,300,000**	**$11,600,000**	**$12,800,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-4 POST-DESIGNATION INCREMENTAL IMPACTS TO ALL ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$6,150	$6,150	$4,380	$4,380	$413	$413	$413	$413
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$10,400	$10,400	$8,650	$8,650	$701	$701	$816	$816
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$49,000	$49,000	$40,700	$40,700	$3,300	$3,300	$3,840	$3,840
Other Private Landowners	$620	$620	$441	$441	$42	$42	$42	$42
Subtotal Unit 1	*$66,200*	*$66,200*	*$54,200*	*$54,200*	*$4,450*	*$4,450*	*$5,110*	*$5,110*
UNIT 2: MINNESOTA								
Superior National Forest	$215,000	$215,000	$149,000	$149,000	$14,400	$14,400	$14,100	$14,100
Voyageurs National Park	$7,870	$7,870	$5,600	$5,600	$529	$529	$529	$529
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$98,600	$98,600	$68,800	$68,800	$6,630	$6,630	$6,500	$6,500
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$131,000	$131,000	$94,600	$94,600	$8,810	$8,810	$8,930	$8,930
Other Private Landowners	$69,100	$69,100	$46,500	$46,500	$4,640	$4,640	$4,390	$4,390
Subtotal Unit 2	*$521,000*	*$521,000*	*$364,000*	*$364,000*	*$35,000*	*$35,000*	*$34,400*	*$34,400*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$423,000	$423,000	$301,000	$301,000	$28,400	$28,400	$28,400	$28,400
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$69,700	$69,700	$49,600	$49,600	$4,680	$4,680	$4,680	$4,680

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$12,200	$12,200	$8,690	$8,690	$820	$820	$820	$820
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$14,400	$14,400	$10,200	$10,200	$967	$967	$967	$967
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$519,000*	*$519,000*	*$370,000*	*$370,000*	*$34,900*	*$34,900*	*$34,900*	*$34,900*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$35,300	$35,300	$25,100	$25,100	$2,370	$2,370	$2,370	$2,370
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$406,000	$406,000	$289,000	$289,000	$27,300	$27,300	$27,300	$27,300
WA Dept. of Natural Resources	$8,490	$8,490	$6,040	$6,040	$571	$571	$571	$571
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$449,000*	*$449,000*	*$320,000*	*$320,000*	*$30,200*	*$30,200*	*$30,200*	*$30,200*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$114,000	$114,000	$82,400	$82,400	$7,690	$7,690	$7,780	$7,780
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$265,000	$265,000	$183,000	$183,000	$17,800	$17,800	$17,200	$17,200
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$131,000	$131,000	$91,100	$91,100	$8,830	$8,830	$8,600	$8,600
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$25,700	$25,700	$18,500	$18,500	$1,730	$1,730	$1,750	$1,750
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$536,000*	*$536,000*	*$375,000*	*$375,000*	*$36,100*	*$36,100*	*$35,400*	*$35,400*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$2,090,000**	**$2,090,000**	**$1,480,000**	**$1,480,000**	**$141,000**	**$141,000**	**$140,000**	**$140,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$6,820	$6,820	$4,860	$4,860	$458	$458	$458	$458
Subtotal Unit 1	*$6,820*	*$6,820*	*$4,860*	*$4,860*	*$458*	*$458*	*$458*	*$458*
UNIT 2: MINNESOTA								
Tribal Lands	$2,210	$2,210	$1,570	$1,570	$149	$149	$149	$149
Subtotal Unit 2	*$2,210*	*$2,210*	*$1,570*	*$1,570*	*$149*	*$149*	*$149*	*$149*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$3,930	$3,930	$2,800	$2,800	$264	$264	$264	$264
Subtotal Unit 3	*$3,930*	*$3,930*	*$2,800*	*$2,800*	*$264*	*$264*	*$264*	*$264*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$13,000**	**$13,000**	**$9,230**	**$9,230**	**$871**	**$871**	**$871**	**$871**
OVERALL TOTAL	**$2,110,000**	**$2,110,000**	**$1,490,000**	**$1,490,000**	**$142,000**	**$142,000**	**$141,000**	**$141,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-5 POST-DESIGNATION BASELINE IMPACTS OF LYNX MANAGEMENT PLAN DEVELOPMENT (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Superior National Forest	$18,900	$18,900	$12,400	$12,400	$1,270	$1,270	$1,170	$1,170
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$18,900*	*$18,900*	*$12,400*	*$12,400*	*$1,270*	*$1,270*	*$1,170*	*$1,170*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$599,000	$599,000	$514,000	$514,000	$40,300	$40,300	$48,600	$48,600
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$123,000	$123,000	$116,000	$116,000	$8,260	$8,260	$10,900	$10,900
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$722,000*	*$722,000*	*$630,000*	*$630,000*	*$48,500*	*$48,500*	*$59,500*	*$59,500*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$25,300	$25,300	$24,400	$24,400	$1,700	$1,700	$2,300	$2,300
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$390,000	$390,000	$323,000	$323,000	$26,200	$26,200	$30,500	$30,500

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$415,000*	*$415,000*	*$347,000*	*$347,000*	*$27,900*	*$27,900*	*$32,800*	*$32,800*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$1,160,000**	**$1,160,000**	**$990,000**	**$990,000**	**$77,700**	**$77,700**	**$93,400**	**$93,400**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$1,160,000**	**$1,160,000**	**$990,000**	**$990,000**	**$77,700**	**$77,700**	**$93,400**	**$93,400**

Entries may not sum to totals reported due to rounding.

EXHIBIT B-6 POST-DESIGNATION INCREMENTAL IMPACTS OF LYNX MANAGEMENT PLAN DEVELOPMENT (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Superior National Forest	$6,290	$6,290	$4,130	$4,130	$422	$422	$390	$390
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$6,290*	*$6,290*	*$4,130*	*$4,130*	*$422*	*$422*	*$390*	*$390*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$8,450	$8,450	$8,130	$8,130	$568	$568	$767	$767
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$8,450*	*$8,450*	*$8,130*	*$8,130*	*$568*	*$568*	*$767*	*$767*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$14,700**	**$14,700**	**$12,300**	**$12,300**	**$990**	**$990**	**$1,160**	**$1,160**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$14,700**	**$14,700**	**$12,300**	**$12,300**	**$990**	**$990**	**$1,160**	**$1,160**

Entries may not sum to totals reported due to rounding.

EXHIBIT B-7 POST-DESIGNATION BASELINE IMPACTS TO FOREST MANAGEMENT ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$6,630	$6,630	$4,720	$4,720	$446	$446	$446	$446
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$5,580	$5,580	$3,970	$3,970	$375	$375	$375	$375
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$543,000	$543,000	$512,000	$512,000	$36,500	$36,500	$48,300	$48,300
Other Private Landowners	$1,860	$1,860	$1,320	$1,320	$125	$125	$125	$125
Subtotal Unit 1	*$557,000*	*$557,000*	*$522,000*	*$522,000*	*$37,500*	*$37,500*	*$49,300*	*$49,300*
UNIT 2: MINNESOTA								
Superior National Forest	$1,470,000	$1,470,000	$1,050,000	$1,050,000	$99,000	$99,000	$99,000	$99,000
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$1,470,000*	*$1,470,000*	*$1,050,000*	*$1,050,000*	*$99,000*	*$99,000*	*$99,000*	*$99,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$396,000	$396,000	$282,000	$282,000	$26,600	$26,600	$26,600	$26,600
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$27,300	$27,300	$19,500	$19,500	$1,840	$1,840	$1,840	$1,840

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$117,000	$117,000	$0	$0	$7,890	$7,890	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$43,100	$43,100	$30,700	$30,700	$2,900	$2,900	$2,900	$2,900
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$584,000*	*$584,000*	*$332,000*	*$332,000*	*$39,200*	*$39,200*	*$31,300*	*$31,300*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$6,630	$6,630	$4,720	$4,720	$446	$446	$446	$446
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$140,000	$140,000	$99,800	$99,800	$9,420	$9,420	$9,420	$9,420
WA Dept. of Natural Resources	$15,800,000	$15,800,000	$11,200,000	$11,200,000	$1,060,000	$1,060,000	$1,060,000	$1,060,000
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$15,900,000*	*$15,900,000*	*$11,300,000*	*$11,300,000*	*$1,070,000*	*$1,070,000*	*$1,070,000*	*$1,070,000*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$27,300	$27,300	$19,500	$19,500	$1,840	$1,840	$1,840	$1,840
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$205,000	$205,000	$146,000	$146,000	$13,800	$13,800	$13,800	$13,800
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$232,000*	*$232,000*	*$166,000*	*$166,000*	*$15,600*	*$15,600*	*$15,600*	*$15,600*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$18,800,000**	**$18,800,000**	**$13,400,000**	**$13,400,000**	**$1,260,000**	**$1,260,000**	**$1,270,000**	**$1,270,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$143,000	$143,000	$133,000	$133,000	$9,610	$9,610	$12,500	$12,500
Subtotal Unit 1	*$143,000*	*$143,000*	*$133,000*	*$133,000*	*$9,610*	*$9,610*	*$12,500*	*$12,500*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$11,800	$11,800	$8,390	$8,390	$792	$792	$792	$792
Subtotal Unit 3	*$11,800*	*$11,800*	*$8,390*	*$8,390*	*$792*	*$792*	*$792*	*$792*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$155,000**	**$155,000**	**$141,000**	**$141,000**	**$10,400**	**$10,400**	**$13,300**	**$13,300**
OVERALL TOTAL	**$18,900,000**	**$18,900,000**	**$13,500,000**	**$13,500,000**	**$1,270,000**	**$1,270,000**	**$1,280,000**	**$1,280,000**

Entries may not sum to totals reported due to rounding.

EXHIBIT B-8 POST-DESIGNATION INCREMENTAL IMPACTS TO FOREST MANAGEMENT ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$2,210	$2,210	$1,570	$1,570	$149	$149	$149	$149
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$1,860	$1,860	$1,320	$1,320	$125	$125	$125	$125
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$14,900	$14,900	$10,600	$10,600	$1,000	$1,000	$1,000	$1,000
Other Private Landowners	$620	$620	$441	$441	$42	$42	$42	$42
Subtotal Unit 1	*$19,600*	*$19,600*	*$13,900*	*$13,900*	*$1,320*	*$1,320*	*$1,320*	*$1,320*
UNIT 2: MINNESOTA								
Superior National Forest	$14,900	$14,900	$10,600	$10,600	$1,000	$1,000	$1,000	$1,000
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$14,900*	*$14,900*	*$10,600*	*$10,600*	*$1,000*	*$1,000*	*$1,000*	*$1,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$132,000	$132,000	$93,900	$93,900	$8,870	$8,870	$8,870	$8,870
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$9,110	$9,110	$6,490	$6,490	$613	$613	$613	$613

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$14,400	$14,400	$10,200	$10,200	$967	$967	$967	$967
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$155,000*	*$155,000*	*$111,000*	*$111,000*	*$10,400*	*$10,400*	*$10,400*	*$10,400*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$2,210	$2,210	$1,570	$1,570	$149	$149	$149	$149
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$46,700	$46,700	$33,300	$33,300	$3,140	$3,140	$3,140	$3,140
WA Dept. of Natural Resources	$620	$620	$441	$441	$42	$42	$42	$42
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$49,500*	*$49,500*	*$35,300*	*$35,300*	*$3,330*	*$3,330*	*$3,330*	*$3,330*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$9,110	$9,110	$6,490	$6,490	$613	$613	$613	$613
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$68,400	$68,400	$48,700	$48,700	$4,600	$4,600	$4,600	$4,600
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$77,500*	*$77,500*	*$55,200*	*$55,200*	*$5,210*	*$5,210*	*$5,210*	*$5,210*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$317,000**	**$317,000**	**$226,000**	**$226,000**	**$21,300**	**$21,300**	**$21,300**	**$21,300**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$6,820	$6,820	$4,860	$4,860	$458	$458	$458	$458
Subtotal Unit 1	*$6,820*	*$6,820*	*$4,860*	*$4,860*	*$458*	*$458*	*$458*	*$458*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$3,930	$3,930	$2,800	$2,800	$264	$264	$264	$264
Subtotal Unit 3	*$3,930*	*$3,930*	*$2,800*	*$2,800*	*$264*	*$264*	*$264*	*$264*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$10,700**	**$10,700**	**$7,650**	**$7,650**	**$722**	**$722**	**$722**	**$722**
OVERALL TOTAL	**$328,000**	**$328,000**	**$233,000**	**$233,000**	**$22,000**	**$22,000**	**$22,000**	**$22,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-9 POST-DESIGNATION BASELINE IMPACTS TO DEVELOPMENT ACTIVITIES (2009 – 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$94,200,000	$104,000,000	$90,700,000	$101,000,000	$6,330,000	$7,020,000	$8,560,000	$9,490,000
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$94,200,000*	*$104,000,000*	*$90,700,000*	*$101,000,000*	*$6,330,000*	*$7,020,000*	*$8,560,000*	*$9,490,000*
UNIT 2: MINNESOTA								
Superior National Forest	$0	$0	$0	$0	$0	$0	$0	$0
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$94,200,000**	**$104,000,000**	**$90,700,000**	**$101,000,000**	**$6,330,000**	**$7,020,000**	**$8,560,000**	**$9,490,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$94,200,000**	**$104,000,000**	**$90,700,000**	**$101,000,000**	**$6,330,000**	**$7,020,000**	**$8,560,000**	**$9,490,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-10 POST-DESIGNATION INCREMENTAL IMPACTS TO DEVELOPMENT ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$8,450	$8,450	$8,130	$8,130	$568	$568	$767	$767
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$8,450*	*$8,450*	*$8,130*	*$8,130*	*$568*	*$568*	*$767*	*$767*
UNIT 2: MINNESOTA								
Superior National Forest	$0	$0	$0	$0	$0	$0	$0	$0
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$8,450**	**$8,450**	**$8,130**	**$8,130**	**$568**	**$568**	**$767**	**$767**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$8,450**	**$8,450**	**$8,130**	**$8,130**	**$568**	**$568**	**$767**	**$767**

Entries may not sum to totals reported due to rounding.

EXHIBIT B-11 POST-DESIGNATION BASELINE IMPACTS TO RECREATION ACTIVITIES (2009 – 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$11,800	$11,800	$8,390	$8,390	$792	$792	$792	$792
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$51,800	$51,800	$40,600	$40,600	$3,480	$3,480	$3,830	$3,830
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$3,140,000	$3,140,000	$2,240,000	$2,240,000	$211,000	$211,000	$211,000	$211,000
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$3,200,000*	*$3,200,000*	*$2,290,000*	*$2,290,000*	*$215,000*	*$215,000*	*$216,000*	*$216,000*
UNIT 2: MINNESOTA								
Superior National Forest	$179,000	$179,000	$128,000	$128,000	$12,000	$12,000	$12,000	$12,000
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$3,130,000	$3,130,000	$2,230,000	$2,230,000	$210,000	$210,000	$211,000	$211,000
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$47,100	$47,100	$33,600	$33,600	$3,170	$3,170	$3,170	$3,170
Subtotal Unit 2	*$3,350,000*	*$3,350,000*	*$2,390,000*	*$2,390,000*	*$225,000*	*$225,000*	*$226,000*	*$226,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$503,000	$503,000	$358,000	$358,000	$33,800	$33,800	$24,600	$24,600
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$24,200	$24,200	$17,200	$17,200	$1,630	$1,630	$1,630	$1,630

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$5,950	$5,950	$4,240	$4,240	$400	$400	$400	$400
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$533,000*	*$533,000*	*$380,000*	*$380,000*	*$35,800*	*$35,800*	*$26,600*	*$26,600*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$448,000	$588,000	$319,000	$413,000	$30,100	$39,500	$30,100	$38,900
WA Dept. of Natural Resources	$0	$23,300	$0	$15,600	$0	$1,570	$0	$1,470
WA Dept. of Fish and Wildlife	$28,300	$28,300	$26,200	$26,200	$1,900	$1,900	$2,480	$2,480
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$476,000*	*$639,000*	*$345,000*	*$454,000*	*$32,000*	*$43,000*	*$32,600*	*$42,900*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$11,800	$11,800	$8,390	$8,390	$792	$792	$792	$792
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$61,400	$61,400	$43,700	$43,700	$4,130	$4,130	$4,130	$4,130
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$23,600	$23,600	$16,800	$16,800	$1,580	$1,580	$1,580	$1,580
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$96,700*	*$96,700*	*$68,900*	*$68,900*	*$6,500*	*$6,500*	*$6,500*	*$6,500*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$7,670,000**	**$7,830,000**	**$5,470,000**	**$5,580,000**	**$515,000**	**$526,000**	**$507,000**	**$518,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$7,670,000**	**$7,830,000**	**$5,470,000**	**$5,580,000**	**$515,000**	**$526,000**	**$507,000**	**$518,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-12 POST-DESIGNATION INCREMENTAL IMPACTS TO RECREATION ACTIVITIES (2009 – 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$3,930	$3,930	$2,800	$2,800	$264	$264	$264	$264
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$8,570	$8,570	$7,320	$7,320	$576	$576	$691	$691
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$12,500*	*$12,500*	*$10,100*	*$10,100*	*$841*	*$841*	*$956*	*$956*
UNIT 2: MINNESOTA								
Superior National Forest	$59,800	$59,800	$42,600	$42,600	$4,020	$4,020	$4,020	$4,020
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$8,790	$8,790	$7,470	$7,470	$591	$591	$706	$706
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$15,700	$15,700	$11,200	$11,200	$1,060	$1,060	$1,060	$1,060
Subtotal Unit 2	*$84,300*	*$84,300*	*$61,300*	*$61,300*	*$5,670*	*$5,670*	*$5,780*	*$5,780*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$124,000	$124,000	$88,500	$88,500	$8,350	$8,350	$8,350	$8,350
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$8,070	$8,070	$5,740	$5,740	$542	$542	$542	$542

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$132,000*	*$132,000*	*$94,200*	*$94,200*	*$8,890*	*$8,890*	*$8,890*	*$8,890*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$150,000	$150,000	$106,000	$106,000	$10,000	$10,000	$10,000	$10,000
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$150,000*	*$150,000*	*$106,000*	*$106,000*	*$10,000*	*$10,000*	*$10,000*	*$10,000*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$3,930	$3,930	$1,580	$1,580	$264	$264	$149	$149
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$20,500	$20,500	$8,210	$8,210	$1,380	$1,380	$775	$775
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$7,870	$7,870	$3,160	$3,160	$529	$529	$298	$298
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$32,300*	*$32,300*	*$13,000*	*$13,000*	*$2,170*	*$2,170*	*$1,220*	*$1,220*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$411,000**	**$411,000**	**$285,000**	**$285,000**	**$27,600**	**$27,600**	**$26,900**	**$26,900**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$411,000**	**$411,000**	**$285,000**	**$285,000**	**$27,600**	**$27,600**	**$26,900**	**$26,900**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-13 POST-DESIGNATION BASELINE IMPACTS TO MINING ACTIVITIES (2009 – 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Superior National Forest	$0	$0	$0	$0	$0	$0	$0	$0
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$1,790,000	$1,790,000	$1,290,000	$1,290,000	$121,000	$121,000	$122,000	$122,000
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$1,790,000*	*$1,790,000*	*$1,290,000*	*$1,290,000*	*$121,000*	*$121,000*	*$122,000*	*$122,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$9,310	$9,310	$6,630	$6,630	$626	$626	$626	$626
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$9,310*	*$9,310*	*$6,630*	*$6,630*	*$626*	*$626*	*$626*	*$626*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$163,000	$163,000	$135,000	$135,000	$10,900	$10,900	$12,700	$12,700
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$163,000*	*$163,000*	*$135,000*	*$135,000*	*$10,900*	*$10,900*	*$12,700*	*$12,700*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$1,970,000**	**$1,970,000**	**$1,430,000**	**$1,430,000**	**$132,000**	**$132,000**	**$135,000**	**$135,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$1,970,000**	**$1,970,000**	**$1,430,000**	**$1,430,000**	**$132,000**	**$132,000**	**$135,000**	**$135,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-14 POST-DESIGNATION INCREMENTAL IMPACTS TO MINING ACTIVITIES (2009 – 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Superior National Forest	$0	$0	$0	$0	$0	$0	$0	$0
Voyageurs National Park	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$131,000	$131,000	$94,600	$94,600	$8,810	$8,810	$8,930	$8,930
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$131,000*	*$131,000*	*$94,600*	*$94,600*	*$8,810*	*$8,810*	*$8,930*	*$8,930*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$3,110	$3,110	$2,210	$2,210	$209	$209	$209	$209
WA Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$3,110*	*$3,110*	*$2,210*	*$2,210*	*$209*	*$209*	*$209*	*$209*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$0	$0	$0	$0	$0	$0	$0	$0
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$25,700	$25,700	$18,500	$18,500	$1,730	$1,730	$1,750	$1,750
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$25,700*	*$25,700*	*$18,500*	*$18,500*	*$1,730*	*$1,730*	*$1,750*	*$1,750*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$160,000**	**$160,000**	**$115,000**	**$115,000**	**$10,700**	**$10,700**	**$10,900**	**$10,900**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 2	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
OVERALL TOTAL	**$160,000**	**$160,000**	**$115,000**	**$115,000**	**$10,700**	**$10,700**	**$10,900**	**$10,900**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-15 POST-DESIGNATION BASELINE IMPACTS TO OTHER ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$8,900,000	$9,480,000	$6,420,000	$6,830,000	$598,000	$637,000	$606,000	$645,000
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$8,900,000*	*$9,480,000*	*$6,420,000*	*$6,830,000*	*$598,000*	*$637,000*	*$606,000*	*$645,000*
UNIT 2: MINNESOTA								
Superior National Forest	$1,730,000	$2,750,000	$1,160,000	$1,820,000	$116,000	$185,000	$109,000	$172,000
Voyageurs National Park	$38,500	$38,500	$27,400	$27,400	$2,580	$2,580	$2,580	$2,580
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$1,220,000	$2,050,000	$813,000	$1,360,000	$81,800	$138,000	$76,700	$129,000
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$1,120,000	$2,030,000	$740,000	$1,350,000	$75,100	$137,000	$69,800	$127,000
Subtotal Unit 2	*$4,100,000*	*$6,870,000*	*$2,740,000*	*$4,550,000*	*$276,000*	*$462,000*	*$258,000*	*$430,000*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$500,000	$500,000	$356,000	$356,000	$33,600	$33,600	$33,600	$33,600
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Bureau of Land Management	$157,000	$157,000	$112,000	$112,000	$10,600	$10,600	$10,600	$10,600
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$36,600	$36,600	$26,000	$26,000	$2,460	$2,460	$2,460	$2,460
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$694,000*	*$694,000*	*$494,000*	*$494,000*	*$46,600*	*$46,600*	*$46,600*	*$46,600*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$99,100	$99,100	$70,600	$70,600	$6,660	$6,660	$6,660	$6,660
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$619,000	$619,000	$441,000	$441,000	$41,600	$41,600	$41,600	$41,600
WA Dept. of Natural Resources	$23,600	$23,600	$16,800	$16,800	$1,580	$1,580	$1,580	$1,580
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$741,000*	*$741,000*	*$528,000*	*$528,000*	*$49,800*	*$49,800*	*$49,800*	*$49,800*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$279,000	$279,000	$198,000	$198,000	$18,700	$18,700	$18,700	$18,700
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$805,000	$805,000	$578,000	$578,000	$54,100	$54,100	$54,600	$54,600
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Forest Service	$165,000	$165,000	$118,000	$118,000	$11,100	$11,100	$11,100	$11,100
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$1,250,000*	*$1,250,000*	*$895,000*	*$895,000*	*$84,000*	*$84,000*	*$84,400*	*$84,400*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$15,700,000**	**$19,000,000**	**$11,100,000**	**$13,300,000**	**$1,050,000**	**$1,280,000**	**$1,050,000**	**$1,260,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$6,630	$6,630	$4,720	$4,720	$446	$446	$446	$446
Subtotal Unit 2	*$6,630*	*$6,630*	*$4,720*	*$4,720*	*$446*	*$446*	*$446*	*$446*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$6,630**	**$6,630**	**$4,720**	**$4,720**	**$446**	**$446**	**$446**	**$446**
OVERALL TOTAL	**$15,700,000**	**$19,000,000**	**$11,100,000**	**$13,300,000**	**$1,060,000**	**$1,280,000**	**$1,050,000**	**$1,260,000**
Entries may not sum to totals reported due to rounding.								

EXHIBIT B-16 POST-DESIGNATION INCREMENTAL IMPACTS TO OTHER ACTIVITIES (2009 - 2028, $2008)

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PROPOSED CRITICAL HABITAT								
UNIT 1: MAINE								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
Maine Dept of Conservation	$0	$0	$0	$0	$0	$0	$0	$0
Baxter State Park Authority	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$25,700	$25,700	$22,000	$22,000	$1,730	$1,730	$2,070	$2,070
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$25,700*	*$25,700*	*$22,000*	*$22,000*	*$1,730*	*$1,730*	*$2,070*	*$2,070*
UNIT 2: MINNESOTA								
Superior National Forest	$134,000	$134,000	$91,600	$91,600	$8,990	$8,990	$8,650	$8,650
Voyageurs National Park	$7,870	$7,870	$5,600	$5,600	$529	$529	$529	$529
U.S. Bureau of Land Management	$0	$0	$0	$0	$0	$0	$0	$0
Minnesota Dept. of Natural Resources	$89,800	$89,800	$61,400	$61,400	$6,030	$6,030	$5,790	$5,790
University of Minnesota	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Ownership	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$53,400	$53,400	$35,300	$35,300	$3,590	$3,590	$3,330	$3,330
Subtotal Unit 2	*$285,000*	*$285,000*	*$194,000*	*$194,000*	*$19,100*	*$19,100*	*$18,300*	*$18,300*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
U.S. Forest Service	$167,000	$167,000	$119,000	$119,000	$11,200	$11,200	$11,200	$11,200
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Bureau of Land Management	$52,500	$52,500	$37,400	$37,400	$3,530	$3,530	$3,530	$3,530
U.S. Department of Defense	$0	$0	$0	$0	$0	$0	$0	$0
Glacier National Park	$12,200	$12,200	$8,690	$8,690	$820	$820	$820	$820
Montana Dept. of Natural Resources	$0	$0	$0	$0	$0	$0	$0	$0
Montana Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Montana University System	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Conservation NGO	$0	$0	$0	$0	$0	$0	$0	$0
Private Timber Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$231,000*	*$231,000*	*$165,000*	*$165,000*	*$15,500*	*$15,500*	*$15,500*	*$15,500*
UNIT 4: NORTH CASCADES								
National Park Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Bureau of Land Management	$33,100	$33,100	$23,500	$23,500	$2,220	$2,220	$2,220	$2,220
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0
U.S. Forest Service	$206,000	$206,000	$147,000	$147,000	$13,900	$13,900	$13,900	$13,900
WA Dept. of Natural Resources	$7,870	$7,870	$5,600	$5,600	$529	$529	$529	$529
WA Dept. of Fish and Wildlife	$0	$0	$0	$0	$0	$0	$0	$0
Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 4	*$247,000*	*$247,000*	*$176,000*	*$176,000*	*$16,600*	*$16,600*	*$16,600*	*$16,600*
UNIT 5: GREATER YELLOWSTONE AREA								
U.S. Bureau of Land Management	$93,000	$93,000	$66,200	$66,200	$6,250	$6,250	$6,250	$6,250
U.S. Bureau of Reclamation	$0	$0	$0	$0	$0	$0	$0	$0
Federal Highway Administration	$0	$0	$0	$0	$0	$0	$0	$0
National Park Service	$244,000	$244,000	$174,000	$174,000	$16,400	$16,400	$16,500	$16,500
U.S. Fish and Wildlife Service	$0	$0	$0	$0	$0	$0	$0	$0

SUBUNIT	TOTAL PRESENT VALUE (3%)		TOTAL PRESENT VALUE (7%)		ANNUALIZED (3%)		ANNUALIZED (7%)	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
U.S. Forest Service	$55,100	$55,100	$39,200	$39,200	$3,700	$3,700	$3,700	$3,700
Montana State Highway Commission	$0	$0	$0	$0	$0	$0	$0	$0
Montana Fish, Wildlife, and Parks	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Fish and Game Commission	$0	$0	$0	$0	$0	$0	$0	$0
Wyoming Dept. of Transportation	$0	$0	$0	$0	$0	$0	$0	$0
Local Public Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Private Mining Lands	$0	$0	$0	$0	$0	$0	$0	$0
Other Private Landowners	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 5	*$393,000*	*$393,000*	*$280,000*	*$280,000*	*$26,400*	*$26,400*	*$26,400*	*$26,400*
SUBTOTAL AREAS PROPOSED FOR DESIGNATION	**$1,180,000**	**$1,180,000**	**$837,000**	**$837,000**	**$79,400**	**$79,400**	**$79,000**	**$79,000**
AREAS CONSIDERED FOR EXCLUSION								
UNIT 1: MAINE								
Tribal lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 1	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
UNIT 2: MINNESOTA								
Tribal Lands	$2,210	$2,210	$1,570	$1,570	$149	$149	$149	$149
Subtotal Unit 2	*$2,210*	*$2,210*	*$1,570*	*$1,570*	*$149*	*$149*	*$149*	*$149*
UNIT 3: NORTHERN ROCKY MOUNTAINS								
Tribal Lands	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Unit 3	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*
SUBTOTAL AREAS CONSIDERED FOR EXCLUSION	**$2,210**	**$2,210**	**$1,570**	**$1,570**	**$149**	**$149**	**$149**	**$149**
OVERALL TOTAL	**$1,180,000**	**$1,180,000**	**$838,000**	**$838,000**	**$79,600**	**$79,600**	**$79,100**	**$79,100**
Entries may not sum to totals reported due to rounding.								

APPENDIX C | UNDISCOUNTED IMPACTS TO ACTIVITIES BY UNIT

This appendix provides details of the forecast undiscounted baseline and incremental impacts by year and subunit for each land use activity.

EXHIBIT C-1 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS OF LYNX MANAGEMENT PLAN DEVELOPMENT

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 2: MINNESOTA				
Superior National Forest	$26,100	2019	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$300,000	2009	Develop and implement management plan	Personal communication with Tim Bertram, U.S. Forest Service, April 22, 2008 and with George Herschenberger, Bureau of Land Management, Missoula Field Office, April 5, 2006.
	$150,000	2010		
	$12,000	2009-2028		
Montana Dept. of Natural Resources	$54,000	2009	Develop and implement management plan	Public Comment submitted by David A. Groeschl, Chief, Forest Management Bureau, Montana DNRC, dated April 25, 2008. Dates of plan development based on email communication with Mike O'Herron, Montana Department of Natural Resources and Conservation, February 14, 2006.
	$74,600	2010		
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$26,100	2009	Administrative cost of section 7 consultation	Personal communication with Jeff Carroll, Threatened and Endangered Species Coordinator, BLM - Wyoming State Office, May 16, 2008 (consultation numbers) and administrative cost model (costs of consultation)..
U.S. Forest Service	$75,000	2009, 2011	Develop and implement management plan	Personal communication with Tim Bertram, U.S. Forest Service, April 22, 2008 and with George Herschenberger, Bureau of Land Management, Missoula Field Office, April 5, 2006.
	$150,000	2013		
	$8,000	2009-2028		

EXHIBIT C-2 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS OF LYNX MANAGEMENT PLAN DEVELOPMENT

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 2: MINNESOTA				
Superior National Forest	$8,700	2019	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$8,700	2009	Administrative cost of section 7 consultation	Personal communication with Jeff Carroll, Threatened and Endangered Species Coordinator, BLM - Wyoming State Office, May 16, 2008 (consultation numbers) and administrative cost model (costs of consultation).

EXHIBIT C-3 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO FOREST MANAGEMENT ACTIVITIES

`	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
National Park Service	$446	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
Maine Dept of Conservation	$375	2009-2028	Administrative cost of section 7 consultation	
	$3,000	2009-2028	Administrative cost of section 7 consultation	
Private Timber Lands	$514,000	2009	Habitat Restoration Plan development	Personal communication with Bill Yamartino, Natural Resources Conservation Service, May 20, 2008.
Other Private Landowners	$125	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 2: MINNESOTA				
	$59,000	2009-2028	Administrative cost of section 7 consultation	Personal communication with Mary Shedd, Superior National Forest, June 11, 2008 (consultation numbers and modification costs) and administrative cost model (costs of consultation).
Superior National Forest	$40,000	2009-2028	Modification to forest management projects	
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$26,600	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
	$1,840	2009-2028	Administrative cost of section 7 consultation	
U.S. Bureau of Land Management	$428,000	2009-2028	Preclusion of pre-commercial thinning	Personal communication with Jeff Carroll, Threatened and Endangered Species Coordinator, BLM - Wyoming State Office, May 16, 2008.
Montana Dept. of Natural Resources	$187,000	2009-2028	Preclusion of pre-commercial thinning	Personal communication with Timothy Spoelma, Montana Department of Natural Resources, June 18, 2008.
Private Timber Lands	$2,900	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 4: NORTH CASCADES				
U.S. Bureau of Land Management	$446	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
	$9,420	2009-2028	Administrative cost of section 7 consultation	
U.S. Forest Service	$1,340,000	2009-2028	Preclusion of pre-commercial thinning	Personal communication with Mallory Lenz, Okanogan-Wenatchee National Forest, July 3, 2008.

`	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
	$125	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
WA Dept. of Natural Resources	$1,060,000	2009-2028	WA DNR habitat management plan	Personal communication with Scott Fisher, Washington Department of Natural Resources, March 17, 2006.
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$1,840	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
	$13,800	2009-2028	Administrative cost of section 7 consultation	
U.S. Forest Service	$610,000	2009-2028	Preclusion of pre-commercial thinning	Personal communication with Gary Dickerson, Assistant Director, Michael Niccolucci, Acting Budget Coordinator, Timothy Bertram, Wildlife Biologist, and Barry Bollenbacher, Regional Silviculturalist, U.S. Forest Service, Northern Region, Forest and Rangeland Staff, September 4, 2008.
Wyoming Fish and Game Commission	$4,300	2009-2028	Preclusion of pre-commercial thinning	Wyoming Game and Fish Commission. 2005. A comprehensive wildlife conservation strategy for Wyoming. WYGFC. Cheyenne, Wyoming.
AREAS CONSIDERED FOR EXCLUSION				
UNIT 1: MAINE				
	$1,380	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
Tribal lands	$126,000	2009	Habitat Restoration Plan development	Personal communication with Bill Yamartino, Natural Resources Conservation Service, May 20, 2008.
UNIT 3: NORTHERN ROCKY MOUNTAINS				
Tribal lands	$792	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).

EXHIBIT C-4 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO FOREST MANAGEMENT ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
National Park Service	$149	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
Maine Dept of Conservation	$125	2009-2028	Administrative cost of section 7 consultation	
Private Timber Lands	$1,000	2009-2028	Administrative cost of section 7 consultation	
Other Private Landowners	$42	2009-2028	Administrative cost of section 7 consultation	
UNIT 2: MINNESOTA				
Superior National Forest	$1,000	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$8,870	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
U.S. Bureau of Land Management	$613	2009-2028	Administrative cost of section 7 consultation	
Private Timber Lands	$967	2009-2028	Administrative cost of section 7 consultation	
UNIT 4: NORTH CASCADES				
U.S. Bureau of Land Management	$149	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
U.S. Forest Service	$3,140	2009-2028	Administrative cost of section 7 consultation	
WA Dept. of Natural Resources	$42	2009-2028	Administrative cost of section 7 consultation	
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$613	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
U.S. Forest Service	$4,600	2009-2028	Administrative cost of section 7 consultation	
AREAS CONSIDERED FOR EXCLUSION				
UNIT 1: MAINE				
Tribal lands	$458	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 3: NORTHERN ROCKY MOUNTAINS				
Tribal lands	$264	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).

EXHIBIT C-5 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO DEVELOPMENT ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
	$26,100	2009	Administrative cost of section 7 consultation	Based on forecasts for known development project at Moosewood Lake and administrative cost model (costs of consultation).
Private Timber Lands	$97,000,000 to $108,000,000	2009	Project modifications to development activities	Based on (1) LURC. 2008. Amendments to Core Elements of Plum Creek's Concept Plan Proposal Generated by the Land use Regulation Commission at its May 27-28 Deliberative Sessions. (2) Written communication from Lori Nordstrom, Field Supervisor of the Maine Field Office, to Agnieszka Pnette of the Land Use Regulation Commission on September 13, 2007. (3) MRS appraisal data with ID numbers matching those on LURC parcel polygons, received on January 16, 2008 from Ellen Jackson, LURC GIS Coordinator. (4) Personal communication with Bob Doirion, Supervisor of Unorganized Territories at MRS, April 26, 2006. (5) Open Space Institute and Industrial Economics, Inc. November 20, 2007. Analysis of Conservation Commitments in Plum Creek's Moosehead Lake Concept Plan. Discussion Paper No. 3.

EXHIBIT C-6 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO DEVELOPMENT ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
Private Timber Lands	$8,700	2009	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).

EXHIBIT C-7 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO RECREATION ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
National Park Service	$792	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
Maine Dept of Conservation	$15,000	2009	Administrative cost of section 7 consultation	
	$2,510	2009-2028		
Private Timber Lands	$211,000	2009-2028	Trapping programs	Personal communication with Ken Elowe, Director, Maine Department of Inland Fisheries and Wildlife, May 30, 2008.
UNIT 2: MINNESOTA				
Superior National Forest	$12,000	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
Minnesota Dept. of Natural Resources	$15,000	2009	Administrative cost of section 7 consultation	
	$792	2009-2008		
	$209,000	2009-2028	Trapping programs	Personal communication with Conrad Christianson, Minnesota Department of Natural Resources, March 13 and 15, 2006.
Other Private Landowners	$3,170	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$33,800	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
U.S. Bureau of Land Management	$1,630	2009-2028	Administrative cost of section 7 consultation	
Montana Fish, Wildlife, and Parks	$400	2009-2028	Trapping programs	Montana Department of Fish, Wildlife, and Parks. 2003. How to Avoid Incidental Take of Lynx While Trapping or Hunting Bobcats and Other Furbearers. Produced by the U.S. Fish and Wildlife Service and the International Association of Fish and Wildlife Agencies.

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
UNIT 4: NORTH CASCADES				
	$30,100	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
U.S. Forest Service	$5,860 (increases by 5.2% annually)	2009-2028	Restrictions on snowmobile trail expansions	Moore, D.L. 2000. 2000 Survey of Registered Snowmobile Owners in Washington State. Technical Report. December 2000 (Rev. 1_23_01:DLM). Survey conducted by Social and Economic Sciences Research Center, Washington State University. Prepared by Danna I. Moore, Principal Investigator, for Washington State Parks, Snowmobile Program, Washington State Snowmobile Association, State of Washington. Technical Report #00-18 of the Social and Economic Sciences Research Center; and written communication from Wayne Mohler, Past President/Legislative Committee, Washington State Snowmobile Association, May 14, 2008.
WA Dept. of Natural Resources	$976 (increases by 5.2% annually)	2009-2028	Restrictions on snowmobile trail expansions	
WA Dept. of Fish and Wildlife	$10,000	2009-2011	Trapping programs	Personal communication with Donny Martorello, Carnivore, furbearer, and special species section manager, Washington Department of Fish and Wildlife, March 8, 2006; CERTIFICATION OF ENROLLMENT ENGROSSED SUBSTITUTE HOUSE BILL 2438 Chapter 8, Laws of 2008 60th Legislature 2008 Regular Session HOUND HUNTING--COUGARS EFFECTIVE DATE: 06/12/08. Accessed at: http://www.leg.wa.gov/pub/billinfo/2007-08/Pdf/Bills/Session%20Law%202008/2438-S.SL.pdf on June 24, 2008.
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$792	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
National Park Service	$4,130	2009-2028	Administrative cost of section 7 consultation	
U.S. Forest Service	$1,580	2009-2028	Administrative cost of section 7 consultation	

EXHIBIT C-8 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO RECREATION ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 1: MAINE				
National Park Service	$264	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
	$5,000	2009		
Maine Dept of Conservation	$250	2009-2028	Administrative cost of section 7 consultation	
UNIT 2: MINNESOTA				
Superior National Forest	$4,020	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
Minnesota Dept. of Natural Resources	$5,000	2009		
	$264	2009-2028	Administrative cost of section 7 consultation	
Other Private Landowners	$1,060	2009-2028	Administrative cost of section 7 consultation	
UNIT 3: NORTHERN ROCKY MOUNTAINS				
U.S. Forest Service	$8,350	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
U.S. Bureau of Land Management	$542	2009-2028	Administrative cost of section 7 consultation	
UNIT 4: NORTH CASCADES				
U.S. Forest Service	$10,000	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 5: GREATER YELLOWSTONE AREA				
U.S. Bureau of Land Management	$264	2009-2028	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
National Park Service	$1,380	2009-2028	Administrative cost of section 7 consultation	
U.S. Forest Service	$529	2009-2028	Administrative cost of section 7 consultation	

EXHIBIT C-9 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO MINING ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 2: MINNESOTA				
Private Mining Lands	$2,000	2009	Research, reporting, and monitoring	Written communication from Dave Skolasinski, Dave Skolasinski, District Manager on Environmental Affairs at Northshore Mining Company, on June 13, 2008. Personal communication with Jim Scott, Assistant Project Manager, PolyMet Mining Corp. between March 7 and March 16, 2006.
	$4,000 (increases by $1,000 annually)	2010-2024		
	$20,000 (increases by $1,000 annually)	2025-2028		
	$73,100	2011 to 2024, 2026 to 2028		
	$146,000	2009, 2010, 2025		
	$21,500	2011 to 2024, 2026 to 2028	Administrative costs of section 7 consultations	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
	$32,900	2009, 2010, 2025		
UNIT 4: NORTH CASCADES				
U.S. Forest Service	$626	2009 to 2028	Administrative costs of section 7 consultations	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 5: GREATER YELLOWSTONE AREA				
Private Mining Lands	$11,400	2009, 2011, 2014, 2016, 2018, 2021, 2023, 2025, 2027	Administrative costs of section 7 consultations	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
	$73,100	2009	Research, reporting, and monitoring	Written communication from Dave Skolasinski, Dave Skolasinski, District Manager on Environmental Affairs at Northshore Mining Company, on June 13, 2008. Personal communication with Jim Scott, Assistant Project Manager, PolyMet Mining Corp. between March 7 and March 16, 2006.
	$1,000	2009 to 2028		

EXHIBIT C-10 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO MINING ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT				
UNIT 2: MINNESOTA				
Private Mining Lands	$8,160 $12,000	2011 to 2024, 2026 to 2028 2009, 2010, 2025	Administrative costs of section 7 consultations	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 4: NORTH CASCADES				
U.S. Forest Service	$209	2009 to 2028	Administrative costs of section 7 consultations	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).
UNIT 5: GREATER YELLOWSTONE AREA				
Private Mining Lands	$3,800	2009, 2011, 2014, 2016, 2018, 2021, 2023, 2025, 2027	Administrative costs of section 7 consultations	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (consultation numbers) and administrative cost model (costs of consultation).

EXHIBIT C-11 UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO OTHER ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT					
UNIT 1: MAINE					
	$45,000	2009	Wind energy development	Administrative cost of section 7 consultation	Review of consultation history and known forecast projects (number of consultations); administrative cost model (cost of consultations).
	$47,100 to $85,800	2009 to 2028	Transportation	Administrative cost of section 7 consultation and project modifications	Review of consultation history and known forecast projects (number of consultations); administrative cost model (cost of consultations); and personal communication with the MT DOT on March 13, and 15 and June 15,2006 and the MN DOT on March 9, 2006 (costs of project modifications).
	$150,000	2009 and 2010			Personal communication with Ken Elowe, Director, Maine Department of Inland Fisheries and Wildlife, May 30, 2008.
	$85,900	2009 to 2028		Research	Email from Professor Dan Harrison, University of Maine, received August 28, 2008.
Private Timber Lands	$442,000	2009 to 2028	Species Management	Species management	Personal communication with Ken Elowe, Director, Maine Department of Inland Fisheries and Wildlife, May 30, 2008.
UNIT 2: MINNESOTA					
Superior National Forest	$173,000 to $314,000	2015 to 2023			Northeast Minnesota Long Range Transportation Plan (2008-2030), Minnesota Department of Transportation (District 1), Northeast Minnesota Area Transportation Partnership, and the Arrowhead Regional Development Commission, August, 2005(number of consultations); administrative cost model (cost of consultations); and personal communication with the MT DOT on March 13, and 15 and June 15,2006 and the MN DOT on March 9, 2006 (costs of project modifications).
	$39,000 to $70,900	2024 to 2028	Transportation	Administrative cost of section 7 consultation and project modifications	

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
	$3,000	2009 to 2028		Research	Personal communication from Mary Shedd, Biologist, Superior National Forests, June 11, 2008.
	$15,000	2009 to 2028		Species Management	
	$15,000	2009 to 2028	Species Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008.
	$1,000	2009 to 2028		Species Management	Personal communication with Steve Windels, Voyageurs National Park, May 30, 2008.
Voyageurs National Park	$1,580	2009 to 2028	Species Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008.
	$149,000 to $272,000	2015 to 2023			Northeast Minnesota Long Range Transportation Plan (2008-2030), Minnesota Department of Transportation (District 1), Northeast Minnesota Area Transportation Partnership, and the Arrowhead Regional Development Commission, August, 2005(number of consultations); administrative cost model (cost of consultations); and personal communication with the MT DOT on March 13, and 15 and June 15,2006 and the MN DOT on March 9, 2006 (costs of project modifications).
	$14,500 to $26,300	2024 to 2028	Transportation	Administrative cost of section 7 consultation and project modifications	
	$5,200	2009 to 2028		Species management	Personal communication with Rich Baker, Minnesota Dept. of Natural Resources, February 8, 2006
Minnesota Dept. of Natural Resources	$8,333	2009 to 2028	Species Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008.
	$167,000 to $304,000	2015 to 2023			Northeast Minnesota Long Range Transportation Plan (2008-2030), Minnesota Department of Transportation (District 1), Northeast Minnesota Area Transportation Partnership, and the Arrowhead Regional Development Commission, August, 2005(number of consultations); administrative cost model (cost of consultations); and personal communication with the MT DOT on March 13, and 15 and June 15, 2006 and the MN DOT on March 9,
Other Private Landowners	$9,430 to $17,200	2024 to 2028	Transportation	Administrative cost of section 7 consultation and project modifications	

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
					2006 (costs of project modifications).
UNIT 3: NORTHERN ROCKY MOUNTAINS					
U.S. Forest Service	$31,100	2009 to 2028	Species Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$2,460	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
U.S. Bureau of Land Management	$10,600	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
Glacier National Park	$2,460	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
UNIT 4: NORTH CASCADES					
U.S. Bureau of Land Management	$1,780	2009 to 2028	Transportation	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$4,090	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$10,500	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
U.S. Forest Service	$7,130	2009 to 2028	Transportation	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$19,600	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$792	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
	$4,450	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	
WA Dept. of Fish and Wildlife	$1,580	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
UNIT 5: GREATER YELLOWSTONE AREA					
U.S. Bureau of Land Management	$2,770	2009 to 2028	Transportation	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$3,330	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$10,400	2009 to 2028	Grazing	Administrative cost of section 7 consultation	

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
	$2,260	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	
National Park Service	$7,310	2009 to 2028	Transportation	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$23,000	2009, 2014, 2019, 2024	Species management	Research	Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.
	$7,130	2009, 2014, 2019, 2024			Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.
	$35,700	2009 to 2028		Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008.
	$4,770	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
U.S. Forest Service	$2,770	2009 to 2028	Transportation	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$3,250	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$1,670	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
	$3,430	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	
AREAS CONSIDERED FOR EXCLUSION					
UNIT 2: MINNESOTA					
Tribal lands	$446	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).

EXHIBIT C-12 UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO OTHER ACTIVITIES

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
PROPOSED CRITICAL HABITAT					
UNIT 1: MAINE					
	$15,000	2009	Wind energy development	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations). Surveying and monitoring estimates based on written communication from Jensen Bissel, Director, Baxter State Park, May 30, 2008. and written communication from Mary Shedd, Biologist, Superior National Forest, June 11, 2008.
Private Timber Lands	$750	2009 to 2028	Transportation	Administrative cost of section 7 consultation	
UNIT 2: MINNESOTA					
	$8,230	2015 to 2023		Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$1,860	2024 to 2028	Transportation		
Superior National Forest	$5,010	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
Voyageurs National Park	$529	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$7,120	2015 to 2023		Administrative cost of section 7 consultation	
	$690	2024 to 2028	Transportation		
Minnesota Dept. of Natural Resources	$2,780	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
Other Private Landowners	$7,980	2015 to 2023		Administrative cost of section 7 consultation	
	$450	2024 to 2028	Transportation		
UNIT 3: NORTHERN ROCKY MOUNTAINS					
	$10,400	2009 to 2028	Species Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
U.S. Forest Service	$820	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
U.S. Bureau of Land Management	$3,530	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
Glacier National Park	$820	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
UNIT 4: NORTH CASCADES					

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
	$2,380	2009 to 2028	Transportation	Administrative cost of section 7 consultation	
	$1,360	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
U.S. Bureau of Land Management	$264	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
	$594	2009 to 2028	Transportation	Administrative cost of section 7 consultation	
	$6,520	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$3,490	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
U.S. Forest Service	$1,480	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
WA Dept. of Natural Resources	$529	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
UNIT 5: GREATER YELLOWSTONE AREA					
	$922	2009 to 2028	Transportation	Administrative cost of section 7 consultation	
	$1,110	2009 to 2028	Species Management	Administrative cost of section 7 consultation	
	$3,460	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
U.S. Bureau of Land Management	$752	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$2,440	2009 to 2028	Transportation	Administrative cost of section 7 consultation	
	$2,380	2009, 2014, 2019, 2024			Personal communication with Kerry Murphy, Yellowstone National Park, April 25, 2008.
	$11,900	2009 to 2028	Species Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
National Park Service	$1,590	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	
U.S. Forest Service	$922	2009 to 2028	Transportation	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).
	$1,080	2009 to 2028	Species Management	Administrative cost of section 7 consultation	

SUBUNIT	IMPACT	FREQUENCY	ACTIVITY	DESCRIPTION	SOURCE
	$556	2009 to 2028	Grazing	Administrative cost of section 7 consultation	
	$1,140	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	
AREAS CONSIDERED FOR EXCLUSION					
UNIT 2: MINNESOTA					
Tribal lands	$149	2009 to 2028	Fire Management	Administrative cost of section 7 consultation	Based on a review of the consultation history in the areas proposed for critical habitat from 2000-2008 (number of consultations) and administrative cost model (costs of consultations).