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ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE SOUTHWEST ALASKA DISTINCT POPULATION SEGMENT OF THE NORTHERN SEA OTTER

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TABLE OF CONTENTS

EXECUTIVE SUMMARY *ES-1*

CHAPTER 1 INTRODUCTION AND BACKGROUND *1-1*

1.1 Introduction *1-1*
1.2 Overview of Proposed Critical Habitat Area *1-2*
1.3 Economic Activities Considered in this Analysis *1-2*
1.4 Organization of the Report *1-4*

CHAPTER 2 FRAMEWORK FOR THE ANALYSIS *2-1*

2.1 Background *2-2*
2.2 Categories of Potential Economic Effects of Species Conservation *2-4*
2.2.1 Efficiency Effects *2-4*
2.2.2 Distributional and Regional Economic Effects *2-5*
2.3 Analytic Framework and Scope of the Analysis *2-6*
2.3.1 Identifying Baseline Impacts *2-6*
2.3.2 Identifying Incremental Impacts *2-8*
2.3.3 Benefits *2-13*
2.3.4 Geographic Scope of the Analysis *2-14*
2.3.5 Analytic Time Frame *2-14*
2.4 Information Sources *2-15*

CHAPTER 3 OIL SPILLS: PLANNING AND RESPONSE *3-1*

3.1 Existing Management of Oil Spills *3-3*
3.1.1 Characteristics of Oil Spills that Affect Otters *3-3*
3.1.2 Oil Spill Response Planning *3-4*
3.1.3 Oil Spill Response Actions in Otter Areas *3-5*
3.2 Pre-Designation Impacts on Oil Spill Planning and Response Activities *3-9*
3.2.1 Past Oil Spills in Critical Habitat Areas *3-9*
3.2.2 Past Economic Impacts of Otter Conservation on Oil Spill Planning and Response *3-12*
3.3 Potential Post-Designation Impacts on Oil Spill Planning and Response Activities *3-12*
3.3.1 Future Number of Oil Spills Near Proposed Critical Habitat Areas *3-13*
3.3.2 Potential Baseline Economic Impacts to Oil Spill Planning and Response *3-16*
3.3.3 Potential Incremental Economic Impacts to Oil Spill Planning and Response *3-18*
3.4 Sources of Uncertainty *3-19*

CHAPTER 4 OIL AND GAS EXPLORATION AND DEVELOPMENT *4-1*

4.1 Existing Management of Oil and Gas Exploration and Development *4-2*

4.2 Scope and Scale of Oil and Gas Development Activities *4-7*

4.2.1 Bristol Bay/Aleutian Basin Area (Units 1 through 4) *4-8*

4.2.2 Cook Inlet Area (Northern Portion of Unit 5) *4-9*

4.3 Pre-Designation Impacts on Oil and Gas Development *4-10*

4.4 Post-Designation Impacts on Oil and Gas Development *4-12*

4.4.1 Future Oil and Gas Development Activities in Proposed Critical Habitat Areas *4-12*

4.4.2 Potential Economic Impacts to Future Oil and Gas Development Activities *4-15*

CHAPTER 5 MARINE AND COASTAL CONSTRUCTION *5-1*

5.1 Extent of Known Future Construction Projects *5-3*

5.1.1 Airports *5-3*

5.1.2 Harbors *5-5*

5.1.3 Mariculture *5-7*

5.1.4 Tidal Energy Projects *5-7*

5.2 Existing Management of Marine and Coastal Construction Activities *5-10*

5.2.1 Clean Water Act *5-10*

5.2.2 Coastal Zone Management Act and Alaska Coastal Management Program *5-11*

5.2.3 Rivers and Harbors Appropriations Act *5-12*

5.3 Analytic Methods *5-12*

5.4 Estimated Pre-Designation Impacts of Otter Conservation on Construction Activities *5-16*

5.5 Estimated Post-Designation Baseline Impacts of Otter Conservation on Construction Activities *5-17*

5.6 Estimated Post-Designation Incremental Impacts of Otter Conservation on Construction Activities *5-19*

5.7 Sources of Uncertainty *5-19*

CHAPTER 6 OTHER WATER QUALITY MANAGEMENT ISSUES *6-1*

6.1 Extent of Economic Activities Affecting Water Quality in Proposed Critical Habitat *6-1*

6.1.1 Seafood Processing Facilities *6-3*

6.1.2 Log and Log Transfer Facilities *6-4*

6.2 Existing Management of Water Quality 6-5
6.2.1 NPDES Permitting 6-6
6.2.2 State Water Quality Standards 6-7
6.3 Analytic Methodology 6-10
6.3.1 Seafood Processing Facilities 6-10
6.3.2 Log Transfer Facilities 6-11
6.4 Estimated Pre-Designation Impacts of Otter Conservation on Water Quality Management Activities 6-12
6.5 Estimated Post-Designation Baseline Impacts of Otter Conservation on Water Quality Management Activities 6-12
6.6 Estimated Post-Designation Incremental Impacts of Otter Conservation on Water Quality Management Activities 6-13
6.7 Sources of Uncertainty 6-14

CHAPTER 7 ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATION 7-1
7.1 Background 7-2
7.1.1 The Consultation Process 7-2
7.1.2 Administrative Section 7 Consultation Costs 7-3
7.2 Oil Spill Planning and Response Administrative Costs 7-6
7.3 Marine and Coastal Construction Administrative Costs 7-8
7.4 Water Quality Management Administrative Costs 7-9
7.5 Other Activities Administrative Costs 7-11
7.6 Caveats 7-12

CHAPTER 8 ECONOMIC BENEFITS 8-1
8.1 Categories of Benefit Relating to Species and Habitat Conservation 8-1
8.2 Available Literature Valuing Sea Otter Populations 8-2
8.3 Potential Benefits of Northern Sea Otter Conservation Efforts Quantified in this Analysis 8-6

REFERENCES R-1

APPENDIX A SMALL BUSINESS ANALYSIS AND ENERGY IMPACT ANALYSIS A-1

APPENDIX B SENSITIVITY OF RESULTS TO DISCOUNT RATE B-1

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 Southwest Alaska Distinct Population Segment of the northern sea otter (*Enhydra lutris kenyoni*). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

2. The Southwest Alaska DPS of the northern sea otter (hereafter, "otter"), a small marine mammal generally occupying nearshore marine waters, was listed as a threatened species on August 9, 2005.[1] On December 16, 2008, the Service proposed critical habitat for the otter, identifying 5,879 square miles organized in five "units" as proposed for critical habitat designation.[2] The five units are further broken down into seven subunits (Units 1, 2, 3, 4a, 4b, 4c, and 5), and include waters adjacent to the Aleutian Islands, the Alaska Peninsula, the Kodiak archipelago, and the Barren Islands. The proposed critical habitat area comprises nearshore marine waters ranging from mean high tide to 20 meters in water depth, as well as those waters that occur within 100 meters of the mean high tide line. Exhibit ES-1 maps the areas proposed as critical habitat, highlighting landownership of the adjacent lands.

3. This analysis considers the economic impacts of otter conservation efforts associated with the following categories of economic activity: 1) oil spill planning and response, 2) oil and gas exploration and development, 3) marine and coastal construction activities (including airport construction, harbor developments, and tidal energy projects), and 4) water quality management (e.g., National Pollutant Discharge Elimination System (NPDES) permitted activities).

4. This analysis does not consider subsistence hunting and arts and crafts uses of the otter by Alaskan natives. These activities are allowed under Section 101(b) of the Marine Mammal Protection Act, Section 10(e) of the Endangered Species Act, and the Special Rule published for the otter on August 15, 2006.[3] Commercial shipping and fishing are also prevalent within the proposed critical habitat. This analysis considers the potential for oil spills from commercial shipping and fishing vessels, as well as construction of associated ports and harbors. No impacts to the fishing and shipping activities themselves, however, are forecast. As the Service states in the Proposed Rule, "With the

[1] 70 FR 46366.

[2] 73 FR 76454.

[3] 71 FR 46864.

exception of oil spills from shipwrecks, we do not believe that existing commercial fishing activities in southwest Alaska have the potential to harm the identified physical and biological features for the southwest Alaska DPS of the northern sea otter."[4]

5. To provide an understanding of the potential economic impacts that could be associated with otter conservation, this analysis: 1) characterizes existing or potential threats to the otter and its habitat within the proposed critical habitat; 2) links these threats with particular economic activities; 3) identifies modifications to these activities that would avoid or minimize these threats ("otter conservation efforts"); and (4) to the extent feasible, quantifies and monetizes the economic costs of these modifications. Where data are not available to quantify or monetize potential impacts, this analysis qualitatively describes the potential for impacts to occur and highlights specific geographic areas within the proposed designation where economic activities may occur that may be a conservation threat to the otter or its habitat. For example, Chapter 4 addresses the potential for future oil and gas exploration and development activities to be affected although data limitations on the scope and scale of this activity and potential otter conservation efforts that may be recommended prevents the quantification of impacts.

6. 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 otter, for example, under the Federal listing and other Federal, State, and local regulations. The "with critical habitat" scenario describes the incremental cost impacts potentially 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 otter.

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

   - **Relatively low level of incremental impacts:** Total forecast baseline impacts of otter conservation are $37.7 million over the next 20 years (assuming a seven percent discount rate). In comparison, incremental impacts of critical habitat designation are forecast to be $660,000 (discounted at seven percent) over the same time period. While the baseline impacts include both administrative costs of consultation and impacts of implementing otter conservation efforts, forecast incremental impacts in this analysis stem only from additional administrative effort in section 7 consultation. That is, economic activities are not forecast to change specifically because of critical habitat designation. The Service does not anticipate the designation of critical habitat to result in any additional project modification recommendations above and beyond those that would be requested because of the listing of the species as threatened.[5] Further, State and local management agencies interviewed in the development of this report did not

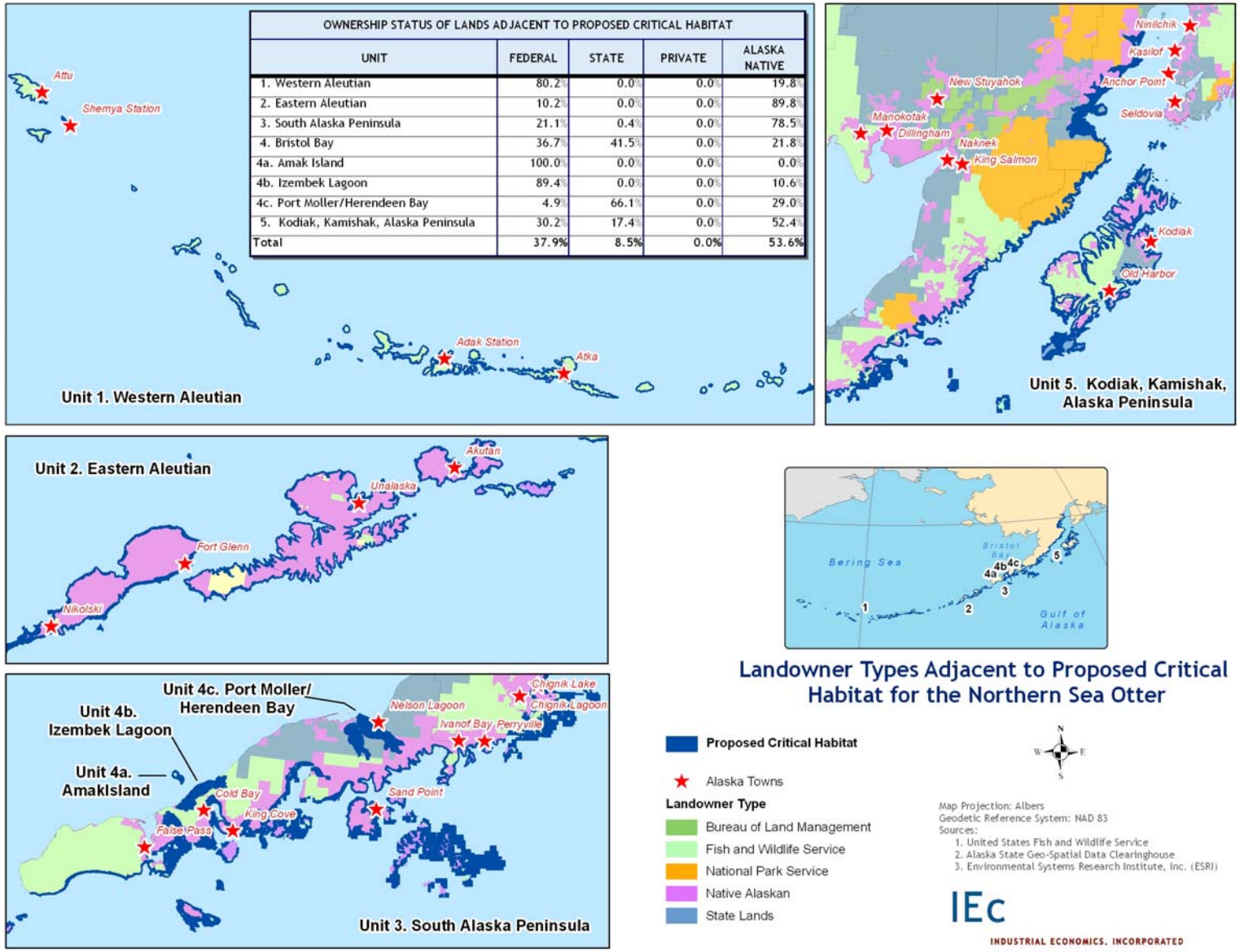
[4] 73 FR 76454, pg. 76459.

[5] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

indicate that they would change their own otter conservation behavior following critical habitat designation.

- **Limited economic impact of otter conservation on oil spill planning and response.** The Proposed Rule and existing otter management documents describe oil spills as primary threats to the otter and its habitat. The majority of spills, however, are small, and otter conservation is not expected to increase the cost of oil spill response. For mid-sized spills, otter conservation efforts are, in general, only expected to add administrative costs to oil spill planning and response efforts, as quantified in Chapter 7. While otter conservation efforts are likely for large spills in habitat areas, it is not possible to reliably forecast large spill events. Estimated economic impacts of otter conservation on oil spill planning and response are therefore limited to administrative costs of section 7 consultation, which are expected to be incurred for approximately eight spills per year based on historic consultation rates on this activity.
- **Uncertain future of oil and gas exploration and development activities within the proposed critical habitat area.** The potential for oil and gas development in the proposed critical habitat is an area of considerable uncertainty in this analysis. Oil and gas development has not occurred within the proposed critical habitat area to date, and no past consultations on otter have addressed oil and gas development activities. The uncertainty is therefore twofold: first, the scope and scale of potential future development in this area are unknown; and, second, how these activities may be modified for the purposes of otter conservation is uncertain. Absent a reliable forecast of these factors, Chapter 4 of this analysis discusses the relative potential for the activity to occur across the proposed critical habitat units but does not quantify economic impacts of otter conservation.
- **Construction and water quality management are the only activities forecast to be subject to project modification impacts.** Chapter 7 of this analysis forecasts administrative costs associated with oil spill planning and response and other activities (e.g., conservation projects such as weed eradication and invasive species management). Chapter 4 qualitatively describes the potential for the proposed critical habitat units to be affected by oil and gas development activities. The only sea otter conservation efforts (i.e., above and beyond administrative effort for consultations) forecast to result from otter conservation are quantified in Chapters 5 and 6, which address marine and coastal construction activities and water quality management, respectively. These activities may bear additional costs associated with otter conservation (e.g., time delays for construction, environmental research and reporting, and barging seafood processing waste out to sea). It is important to note that all of these forecast conservation efforts are expected to occur regardless of critical habitat designation and are therefore quantified as part of the baseline.

EXHIBIT ES-1. MAP OF PROPOSED CRITICAL HABITAT FOR THE SEA OTTER



OWNERSHIP STATUS OF LANDS ADJACENT TO PROPOSED CRITICAL HABITAT				
UNIT	FEDERAL	STATE	PRIVATE	ALASKA NATIVE
1. Western Aleutian	80.2%	0.0%	0.0%	19.8%
2. Eastern Aleutian	10.2%	0.0%	0.0%	89.8%
3. South Alaska Peninsula	21.1%	0.4%	0.0%	78.5%
4. Bristol Bay	36.7%	41.5%	0.0%	21.8%
4a. Amak Island	100.0%	0.0%	0.0%	0.0%
4b. Izembek Lagoon	89.4%	0.0%	0.0%	10.6%
4c. Port Moller/Herendeen Bay	4.9%	66.1%	0.0%	29.0%
5. Kodiak, Kamishak, Alaska Peninsula	30.2%	17.4%	0.0%	52.4%
Total	37.9%	8.5%	0.0%	53.6%

QUANTIFIED IMPACTS OF SEA OTTER CONSERVATION

8. Exhibits ES-2, ES-3 and ES-4 summarize the pre-designation, post-designation baseline, and incremental cost impacts of otter conservation by critical habitat unit, respectively. To calculate present value and annualized impacts, guidance provided by OMB specifies the use of a real annual discount rate of seven percent.[6] In addition, OMB recommends conducting a sensitivity analysis using other discount rates, such as three percent.[7] Accordingly, all cost figures presented in Chapters 3 through 6 of this analysis describe present value cost impacts assuming a seven percent discount rate. Appendix B reports forecast cost impacts assuming a discount rate of three percent to highlight the sensitivity of the results to the discount rate assumption.

9. Activities in subunits 4a, 4b, and 4c are forecast to bear less of a cost impact in the future, both baseline or incremental, than the other proposed critical habitat units. The primary reason for this is the low level of economic activity occurring within these regions. Relatively few spill have occurred in these subunits, and no forecast marine or coastal construction projects or seafood processing facilities occur in these units. Unit 4c, however, holds the potential for future oil and gas development activities, including possible pipeline construction. Unit 4a includes the marine area surrounding a remote island and borders the Alaska Maritime Wildlife Refuge. The remote location and refuge status of the region result in this area being less susceptible to economic activities, such as those considered in this analysis.

10. Approximately 84 percent of forecast baseline cost impacts are associated with otter conservation efforts expected to occur in Units 2 and 5. These two units contain the majority of the NPDES permitted facilities within the proposed critical habitat designation. Both Units are also expected to support airport and ferry terminal construction projects that will be subject to otter conservation efforts in the future.

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[6] "A real discount rate that has been adjusted to eliminate the effect of expected inflation should be used to discount constant-dollar or real benefits and costs. A real discount rate can be approximated by subtracting expected inflation from a nominal interest rate… Constant-dollar benefit-cost analyses of proposed investments and regulations should report net present value and other outcomes determined using a real discount rate of 7 percent. This rate approximates the marginal pretax rate of return on an average investment in the private sector in recent years." U.S. Office of Management and Budget, Circular A-94 Revised, October 29, 1992.

[7] 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.

EXHIBIT ES-2. SUMMARY OF PRE-DESIGNATION IMPACTS (2005-PRESENT)

PROPOSED SUBUNIT	PRESENT VALUE IMPACTS	
	3 PERCENT	7 PERCENT
1. Western Aleutian	$1,150,000	$1,260,000
2. Eastern Aleutian	$23,200,000	$25,200,000
3. South Alaska Peninsula	$2,200,000	$2,400,000
4a. Amak Island	$50,600	$52,600
4b. Izembek Lagoon	$50,800	$53,000
4c. Port Moller/Herendeen Bay	$74,400	$77,700
5. Kodiak, Kamishak, Alaska Peninsula	$12,300,000	$13,500,000
Total Impacts	**$39,000,000**	**$42,500,000**

1. Estimates are rounded to three significant digits and may not sum to totals reported due to rounding.

EXHIBIT ES-3. SUMMARY OF ESTIMATED 20-YEAR POST-DESIGNATION BASELINE IMPACTS (2009-2028)

PROPOSED SUBUNIT	3% DISCOUNT RATE		7% DISCOUNT RATE	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1. Western Aleutian	$3,920,000	$256,000	$2,890,000	$255,000
2. Eastern Aleutian	$13,700,000	$892,000	$10,600,000	$939,000
3. South Alaska Peninsula	$3,900,000	$254,000	$2,880,000	$254,000
4a. Amak Island	$63,300	$4,130	$46,700	$4,120
4b. Izembek Lagoon	$63,300	$4,130	$46,700	$4,120
4c. Port Moller/Herendeen Bay	$133,000	$8,670	$98,100	$8,660
5. Kodiak, Kamishak, Alaska Peninsula	$28,100,000	$1,830,000	$21,100,000	$1,860,000
Total Impacts	**$49,800,000**	**$3,250,000**	**$37,700,000**	**$3,330,000**

1. Impact estimates reflect a 20-year time horizon.
2. Estimates are rounded to three significant digits and may not sum to totals reported due to rounding.

EXHIBIT ES-4. SUMMARY OF ESTIMATED 20-YEAR POST-DESIGNATION INCREMENTAL IMPACTS (2009-2028)

PROPOSED SUBUNIT	3% DISCOUNT RATE		7% DISCOUNT RATE	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1. Western Aleutian	$91,500	$5,970	$66,800	$5,890
2. Eastern Aleutian	$268,000	$17,500	$202,000	$17,800
3. South Alaska Peninsula	$84,800	$5,540	$62,300	$5,490
4a. Amak Island	$20,000	$1,300	$14,800	$1,300
4b. Izembek Lagoon	$20,000	$1,300	$14,800	$1,300
4c. Port Moller/Herendeen Bay	$42,000	$2,740	$31,000	$2,740
5. Kodiak, Kamishak, Alaska Peninsula	$358,000	$23,400	$268,000	$23,700
Total Impacts	**$885,000**	**$57,700**	**$660,000**	**$58,200**

1. Impact estimates reflect a 20-year time horizon.
2. Estimates are rounded to three significant digits and may not sum to totals reported due to rounding.

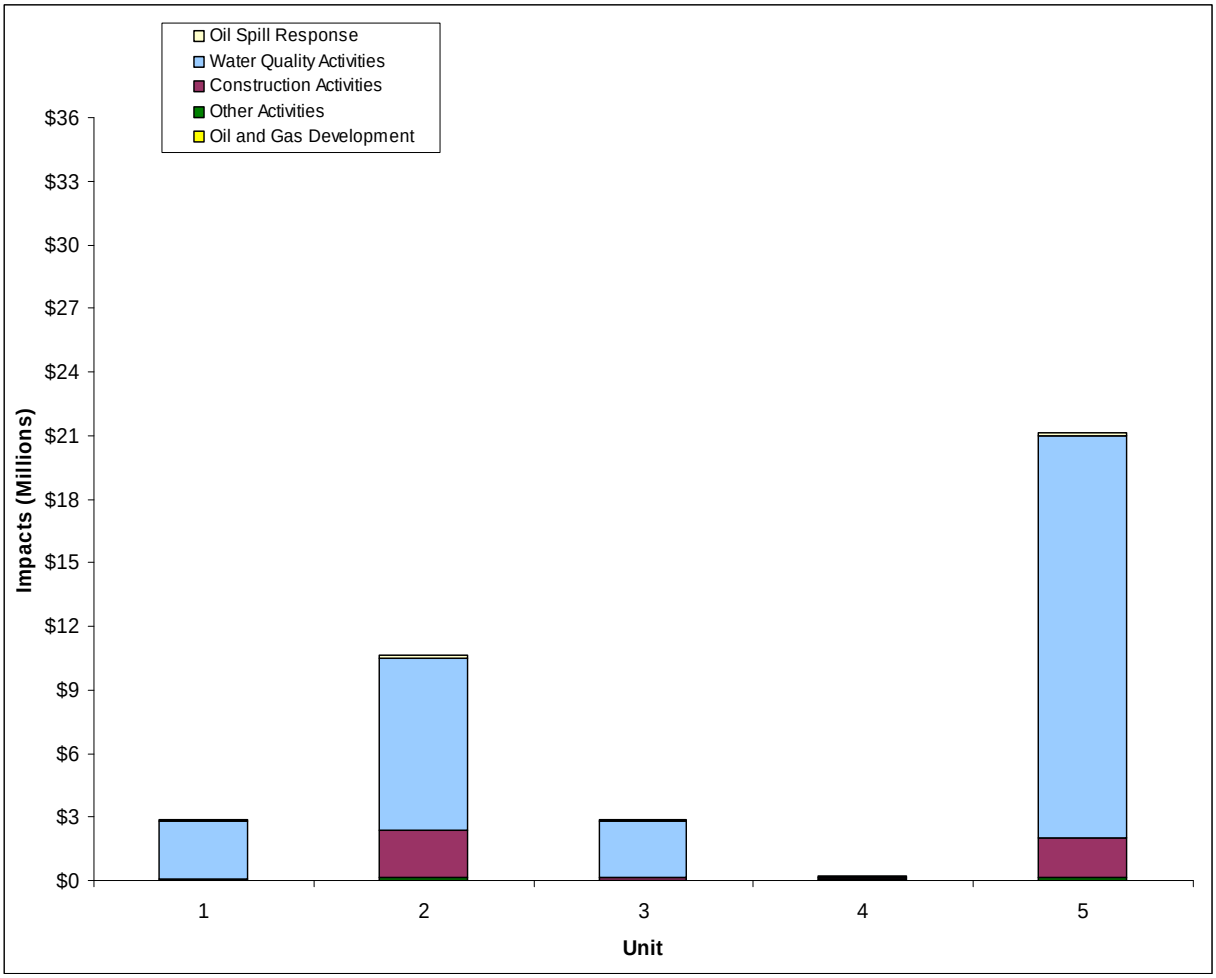
11. Exhibits ES-5 and ES-6 describe post-designation baseline and incremental cost impacts by activity in the five units proposed for critical habitat designation. As highlighted, water quality management activities, and to a lesser extent construction activities, are expected to bear the majority of forecast baseline impacts in each unit, while incremental impacts are distributed more evenly across the economic activities. These incremental cost impacts, comprised solely of forecast administrative costs of consultation, are driven by the forecast number of section 7 consultations for each activity. In contrast, the baseline impacts are driven by the project modification costs of otter conservation efforts. Because no baseline project modifications are forecast for oil spill planning and response activities and other activities, their baseline impact are relatively low.

12. Exhibit ES-5 highlights forecast baseline impacts by activity. Specifically, water quality management activities account for 86 percent of total present value ($32.6 million). Of these baseline impacts, 99 percent are associated with the barging of seafood processing waste out to see for the purposes of sea otter conservation. The remaining one percent represents the administrative costs of section 7 consultation for NPDES permit review.

13. Another 11 percent of forecast baseline impacts stem costs to from marine and coastal construction activities ($4.24 million). Of these, approximately 79 percent are associated with environmental research and reporting and project delays related to airport and harbor construction projects. The remaining 21 percent are administrative costs of section 7 consultation for marine and coastal construction projects.

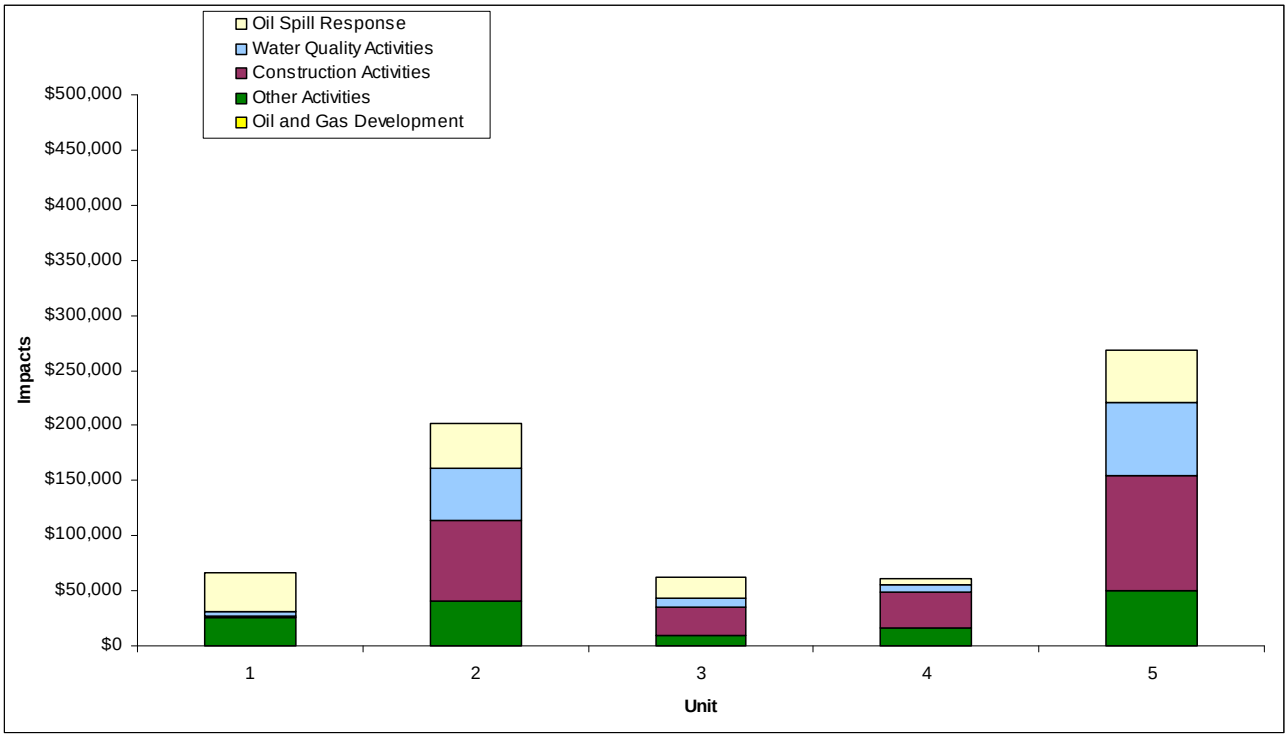
14. Oil spill planning and response and other activities are expected to account for the remaining three percent of forecast baseline impacts. Because of their relatively low level of impact, these activities barely register on the bar charts in Exhibit ES-5.

EXHIBIT ES-5. DISTRIBUTION OF POTENTIAL POST-DESIGNATION BASELINE IMPACTS BY ACTIVITY TYPE (DISCOUNTED AT 7 PERCENT)



15. Exhibit ES-6 highlights the distribution of forecast incremental impacts by activity. The incremental costs of this designation are entirely comprised of administrative costs of section 7 consultation, which are estimated to be $660,000 over the next 20 years assuming a seven percent discount rate. These costs are anticipated to arise from consultations on a variety of activities, including oil spill planning and response activities (22 percent), marine and coastal construction activities (36 percent), water quality management (20 percent), and other consultations (22 percent).

EXHIBIT ES-6. DISTRIBUTION OF ESTIMATED INCREMENTAL IMPACTS BY ACTIVITY TYPE (DISCOUNTED AT 7 PERCENT)



POTENTIAL ADDITIONAL IMPACTS OF SEA OTTER CONSERVATION NOT QUANTIFIED

16. As described in the activity-specific chapters of this analysis, data limitations prevent the forecast of activity level and associated economic impact analysis for particular economic activities that may affect the otter and its habitat. While this analysis concludes that it is reasonable to assume such activities as oil and gas development and tidal energy projects may occur within the proposed critical habitat area in the future, a lack of information on their frequency and distribution within the region is highly uncertain. Further, the potential effects of these activities on the otter and its habitat are not well studied. Because these activities have not to date occurred within the proposed critical habitat area, section 7 consultations have not taken place. It is therefore difficult for the Service to discern what types of sea otter conservation efforts they may recommend.

17. Absent information to forecast specific economic impacts, this analysis provides information on where these activities are most likely to occur across the proposed critical habitat area given available information. This information is provided so that the Service may consider the potential existence of additional, unquantified economic impact of otter conservation.

- **Oil and gas exploration and development.** Chapter 4 of this report provides detailed information on the potential for this activity and how it may affect the sea otter and its habitat. This chapter highlights the particular potential for oil and gas development and exploration activities in Units 2 and 4c.
- **Tidal energy developments.** Chapter 5 of this report provides information on the potential for tidal energy developments. This chapter highlights the particular potential for this activity within Cook Inlet overlapping Unit 5.
- **Pebble Mine**. As described in Chapter 5, the Pebble Mine project area is inland of Unit 5 near Lake Iliamna and Lake Clark. According to the current timeline, construction would not begin until following permit approvals (assumed to occur in 2012) and production would not occur until 2016. While costs associated with the associated port construction and continued monitoring and reporting on the otter are quantified in this analysis, potential additional project modification requests are unknown. In the case that the mine project affects the water quality within the proposed critical habitat area, additional sea otter conservation impacts may be incurred that are not quantified in this report.

CHAPTER 1 | INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

1. Under the provisions of the Endangered Species Act (the Act), the U.S. Fish and Wildlife Service (Service) proposes to designate critical habitat for the southwest Alaska Distinct Population Segment of the northern sea otter (*Enhydra lutris kenyoni*). The northern sea otter (hereafter, "otter"), a small marine mammal generally occupying nearshore, marine areas, was listed as a threatened species on August 9, 2005.[1] At that time, critical habitat was considered to be prudent, but not determinable, and therefore was not designated at the time of listing.

2. On December 16, 2008, the Service proposed critical habitat for the otter, identifying approximately 5,879 square miles (approximately 15,226 square kilometers) organized in five "units" proposed for critical habitat designation.[2] The five units are further broken down into seven subunits (Units 1, 2, 3, 4a, 4b, 4c, and 5), and include waters adjacent to the Aleutian Islands, the Alaska Peninsula, the Kodiak archipelago, and the Barren Islands. The areas proposed as critical habitat encompass nearshore, marine waters ranging from mean high tide to 20 meters in water depth or that occur within 100 meters of the mean high tide line. Exhibit 1-1 maps the areas proposed as critical habitat, highlighting landownership of the adjacent lands.

3. Section 4(b)(2) of the ESA requires the Service to consider the economic, national security, and other impacts of designating a particular area as critical habitat. The Service may exclude an area from critical habitat if it determines that the benefits of exclusion outweigh the benefits of specifying the area as part of the critical habitat, unless it also determines that the failure to designate the area as critical habitat will result in the extinction of the species concerned.

4. As described more fully in Chapter 2, this analysis relies on the best available data to estimate the baseline (without critical habitat) and incremental (engendered by critical habitat) economic impacts of designating particular areas as critical habitat for the otter. This chapter begins with an overview of the proposed designation. It then describes the economic activities that may be conservation threats to the otter and its habitat. The chapter concludes with an overview of the remainder of this report.

[1] 70 FR 46366.

[2] 73 FR 76454.

1.2 OVERVIEW OF PROPOSED CRITICAL HABITAT AREA

5. Because the otter is a marine species, the proposed critical habitat itself falls primarily within State of Alaska waters. Exhibit 1-1 describes ownership of the lands adjacent to the proposed critical habitat to provide context regarding the types of entities that may be affected by a critical habitat designation. The area adjacent to the proposed critical habitat is approximately 40 percent Federal lands, 52 percent native lands, and eight percent State lands.[3]

6. The proposed critical habitat area is remote and the adjacent land contains limited infrastructure. The Proposed Rule explicitly excludes developed areas that lack the biological features of critical habitat from the proposed critical habitat boundaries. The remote nature of the islands within the areas proposed for critical habitat limit the amount of economic activity taking place. These areas are sparsely populated by humans; the Service estimates only 31 populated communities (a total of 17,000 individuals) occur within the area that contains the approximately 18,000 km (11,184 mi) of coastline adjacent to the proposed critical habitat.

7. The five boroughs that abut critical habitat are Aleutians East, Aleutians West, Kodiak Peninsula, Kodiak Island, and Lake and Peninsula. These boroughs are all occupied by less than three people per square mile. As shown in Exhibit 1-2, the total population of these boroughs in 2000 was approximately 73,000, which comprised approximately 12 percent of the Alaska statewide population (626,900). Racial demographics in affected boroughs vary, but generally include relatively large Alaska Native populations (varying from eight percent in Kenai Peninsula to 74 percent in Lake and Peninsula).

1.3 ECONOMIC ACTIVITIES CONSIDERED IN THIS ANALYSIS

8. Review of this Proposed Rule, the rule listing the species as threatened, existing management documents, and the available portion of the consultation history identified the following economic activities as being potentially affected by conservation efforts for the otter and its habitat. The predominant risk factors associated with these activities are oil spills and other water quality issues. Each of the following economic activities are addressed in Chapters 3 through 7 of the economic analysis. For each of these activities, the Service has not been able to identify a case in which the consideration of adverse modification would change otter conservation efforts requested for these economic activities.[4] That is, the Service does not expect to recommend any additional sea otter conservation following the critical habitat designation above and beyond what it may already recommend because of the status of the otter as a threatened species under the Endangered Species Act.

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[3] To develop estimates of adjacent land ownership in Exhibit 1-1, this analysis used GIS to create a 500 meter buffer around the proposed designation. This layer then was overlaid with land ownership data provided by the Service. To estimate the percentage of area owned, the analysis assumed that the length of shoreline was proportional to the area created by the intersection of the two layers.

[4] U.S. Fish and Wildlife Service Memo to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

- **Oil spill planning and response efforts.** The Proposed Rule states that "pollution from various potential sources, including oil spills from vessels…could render areas containing the identified physical and biological features unsuitable for use by sea otters."[5] Further, it states that "special management considerations and protections may be needed to minimize the risk of oil and other hazardous-material spills" from commercial shipping and from oil and gas development and production. Chapter 3 contemplates the potential impacts of otter conservation on oil spill planning and response efforts.
- **Oil and gas exploration, development, and transportation.** As above, "…discharges from oil and gas drilling and production, could render areas containing the identified physical and biological features unsuitable for use by sea otters." Chapter 4 examines potential impacts of otter conservation on oil and gas exploration, development, and transportation.
- **Marine and coastal construction activities (including airport development, port and harbor construction, mariculture, and tidal energy projects).** Chapter 5 quantifies the impacts of otter conservation efforts on future marine and coastal construction activities forecast to occur within the proposed critical habitat.
- **Other water quality management (discharge from seafood processing and log transfer facilities).** Issuance of Clean Water Act permits associated with industry discharge may result in section 7 consultation considering the otter. Chapter 6 includes a discussion of the consideration of the otter in the context of issuance and renewal of water quality permits and review and revision of State water quality standards.

This analysis does not consider subsistence hunting and arts and crafts uses of the otter by Alaskan natives. Subsistence hunting is allowed under Section 101(b) of the Marine Mammal Protection Act, Section 10(e) of the Endangered Species Act, as well as the Special Rule published for the species on August 15, 2006.[6] In addition, the Service does not list this activity as a threat to the species in the proposed critical habitat rule.

9. This analysis does consider the potential for oil spills from commercial shipping and fishing vessels, as well as construction of associated ports and harbors. No impacts to the fishing and shipping activities themselves, however, are forecast. No past consultations have occurred regarding the effect of these activities on the sea otter beyond the potential harm from oil spills. As the Service stated in the proposed rule, "With the exception of oil spills from shipwrecks, we do not believe that existing commercial fishing activities in southwest Alaska have the potential to harm the identified physical and biological

[5] U.S. Fish and Wildlife Service. Threatened and Endangered Wildlife and Plants; Designation of Critical Habitat for the Southwest Alaska Distinct Population Segment of the Northern Sea Otter (*Enhydra lutris kenyoni*): Proposed Rule. 73 Federal Register 76454, December 16, 2008

[6] 71 FR 46864.

features for the southwest Alaska DPS of the northern sea otter."[7] Further, in a public comment submitted on the proposed critical habitat rule, the North Pacific Fisheries Management Council stated that they did not anticipate the critical habitat would affect the fisheries they manage.[8]

10. Significant uncertainty exists regarding the future economic uses of the proposed critical habitat area. As of the writing of this report, uncertainty surrounds the scale and scope of future oil and gas development and associated infrastructure development, potential extent of tidal energy development activities, and the specific otter conservation efforts that may be requested of these types of projects. This analysis, however, applies the best available information on these issues as of the writing of this report to quantify impacts, where possible, and highlight the associated areas of uncertainty.

1.4 ORGANIZATION OF THE REPORT

11. The remainder of this report proceeds through six additional chapters. Chapter 2 discusses the framework employed in the analysis. Chapters 3 through 6 then cover the assessment of potential economic impacts, organized by economic activity:

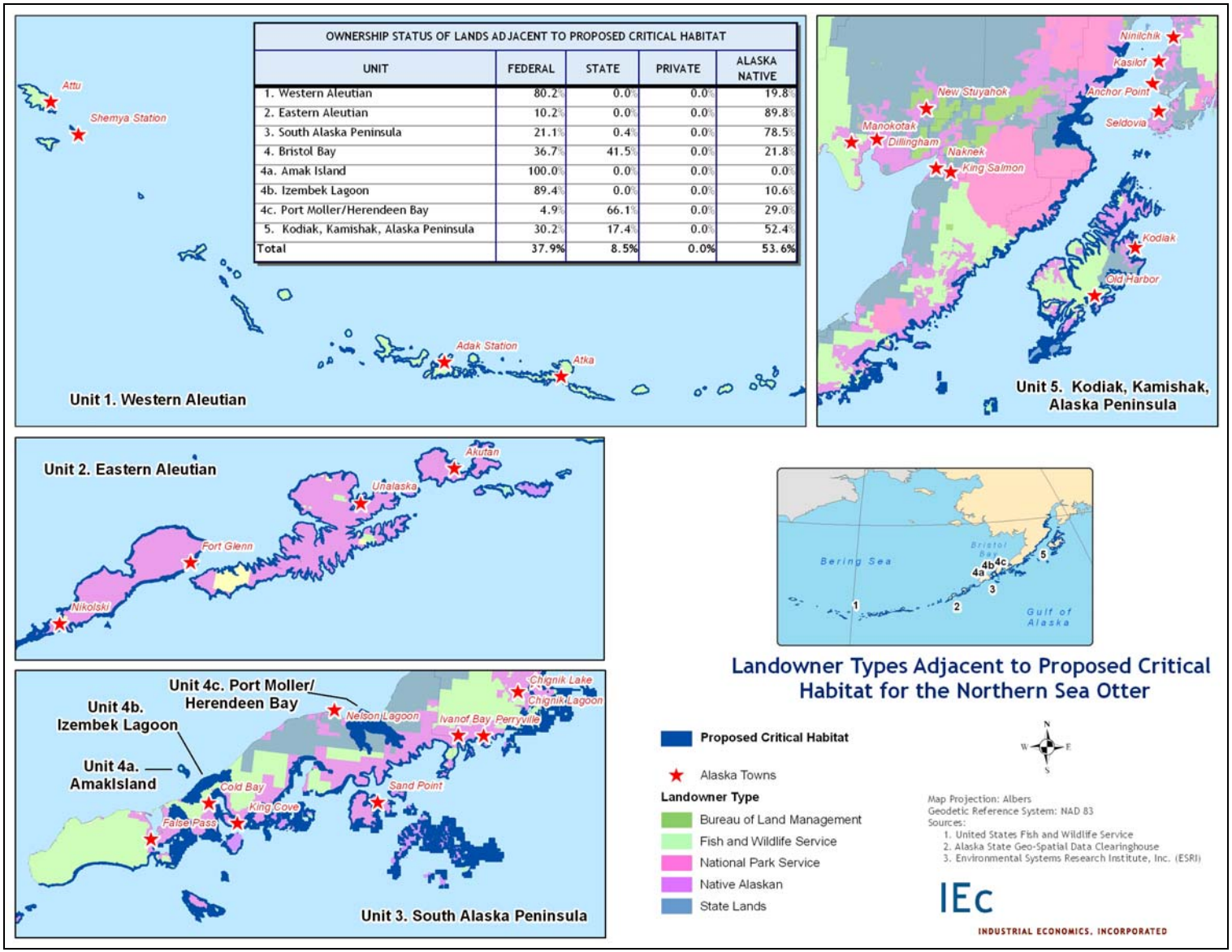
- Chapter 3 - oil spill planning and response;
- Chapter 4 - oil and gas exploration and development;
- Chapter 5 - marine and coastal construction activities;
- Chapter 6 - other water quality management activities;
- Chapter 7 - administrative costs of section 7 consultation; and
- Chapter 8 - economic benefits.

12. In addition, the report includes two appendices: Appendix A, which considers potential impacts on small entities and the energy industry; and Appendix B, which provides information on the sensitivity of the economic impact estimates to alternative discount rate assumptions.

[7] 73 FR 76454, pg. 76459.

[8] North Pacific Fisheries Management Council letter to U.S. Fish and Wildlife Service, February 12, 2009.

EXHIBIT 1-1. MAP OF PROPOSED CRITICAL HABITAT FOR THE OTTER

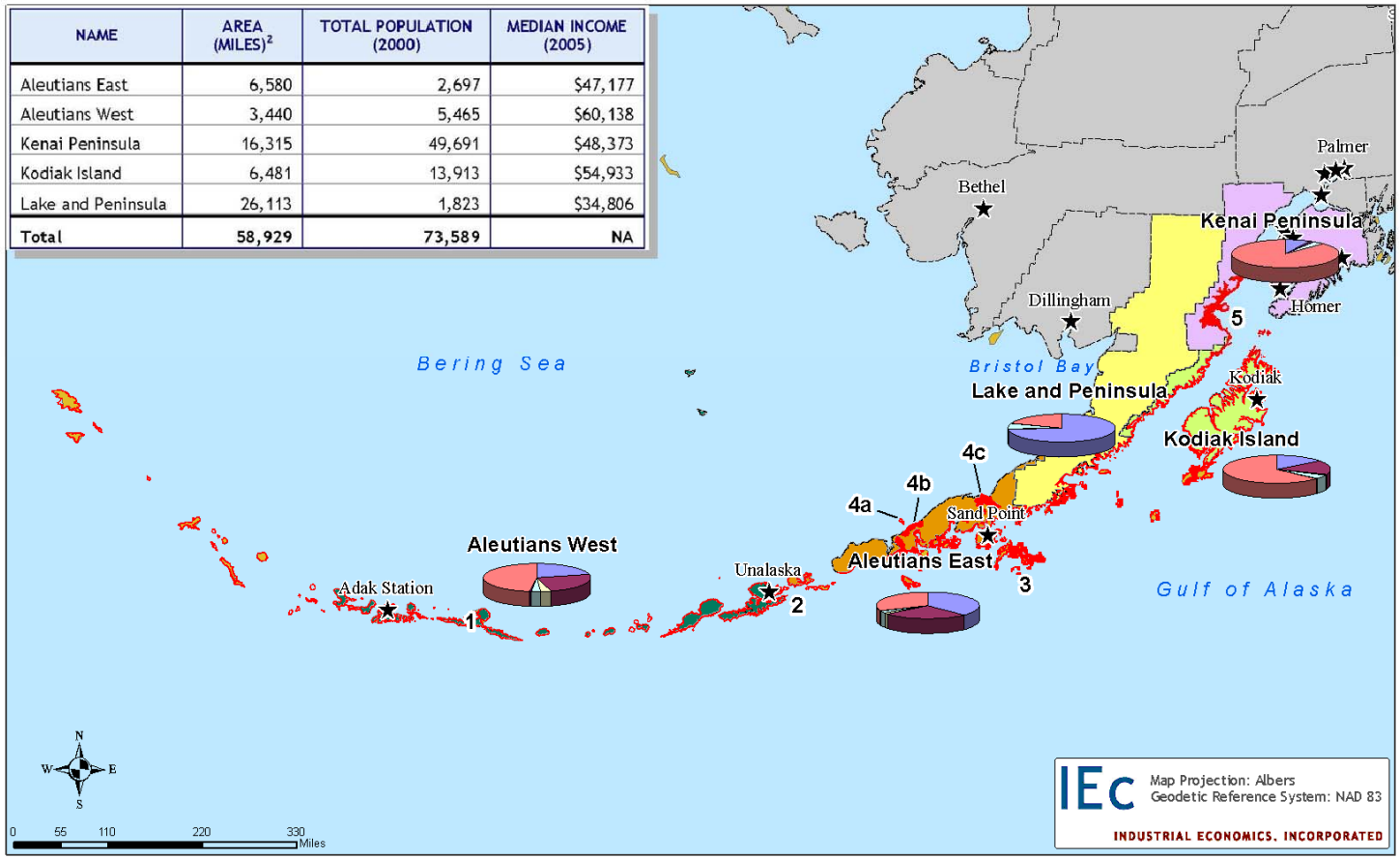


OWNERSHIP STATUS OF LANDS ADJACENT TO PROPOSED CRITICAL HABITAT

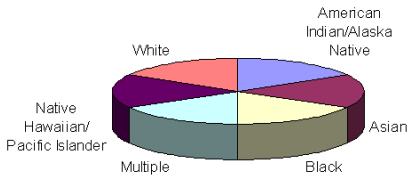
UNIT	FEDERAL	STATE	PRIVATE	ALASKA NATIVE
1. Western Aleutian	80.2%	0.0%	0.0%	19.8%
2. Eastern Aleutian	10.2%	0.0%	0.0%	89.8%
3. South Alaska Peninsula	21.1%	0.4%	0.0%	78.5%
4. Bristol Bay	36.7%	41.5%	0.0%	21.8%
4a. Amak Island	100.0%	0.0%	0.0%	0.0%
4b. Izembek Lagoon	89.4%	0.0%	0.0%	10.6%
4c. Port Moller/Herendeen Bay	4.9%	66.1%	0.0%	29.0%
5. Kodiak, Kamishak, Alaska Peninsula	30.2%	17.4%	0.0%	52.4%
Total	37.9%	8.5%	0.0%	53.6%

EXHIBIT 1-2. BRIEF OVERVIEW OF REGIONAL DEMOGRAPHICS IN OTTER AREAS

NAME	AREA (MILES)^2	TOTAL POPULATION (2000)	MEDIAN INCOME (2005)
Aleutians East	6,580	2,697	$47,177
Aleutians West	3,440	5,465	$60,138
Kenai Peninsula	16,315	49,691	$48,373
Kodiak Island	6,481	13,913	$54,933
Lake and Peninsula	26,113	1,823	$34,806
Total	**58,929**	**73,589**	**NA**



Racial Demographics



Legend

Counties Intersecting PCH

- Aleutians East
- Aleutians West
- Kenai Peninsula
- Kodiak Island
- Lake and Peninsula
- Proposed Critical Habitat
- Other Counties
- ★ Towns

Sources

1.) U.S. Census Bureau. 2009. Table 1: Annual Estimates of the Resident Population for Counties of Alaska: April 1, 2000 to July 1, 2008 (CO-EST2008-01-02).
2.) U.S. Census Bureau. 2005. Small Area Income and Poverty Estimates: Estimates for Alaska Counties, 2005.
3.) Geographic Data Technology, Inc., ESRI. 2004. ESRI Data and Maps: United States Counties. ESRI, Redlands, CA.

CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

13. The purpose of this report is to estimate the economic impact of actions taken to protect the otter 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 proposed critical habitat 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 otter; 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 otter. 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.[9] 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).[10]

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.

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[9] 16 U.S.C. §1533(b)(2).

[10] 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.

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 the world would look absent the proposed action."[11] 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.[12] 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]."[13]

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.[14] 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,

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

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

[13] *Ibid.*

[14] *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).

> "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 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.'"[15]

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 otter 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.[16] 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.[17] 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.

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[15] *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.

[16] 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.

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

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 otter and its habitat (hereinafter referred to collectively as "otter 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 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 otter 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 otter 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.[18]

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

[18] 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.

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 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.[19] 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.[20] 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.[21]

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).

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[19] 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.

[20] 5 U.S.C. §§601 *et seq*.

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

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 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 otter conservation efforts are primarily administrative costs of section 7 consultation and additional direct expenditures for project modification (e.g., re-routing airport runways or barging seafood processing waste out to see). As sea otter conservation is not forecast to change the type or level of economic activity occurring, broader regional economic impacts are not anticipated.

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 proposed critical habitat 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 otter. 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 Chapter 7.
- 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."[22] 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 a land or water use activity or project.[23] 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. 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

[22] 16 U.S.C. 1532.

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

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

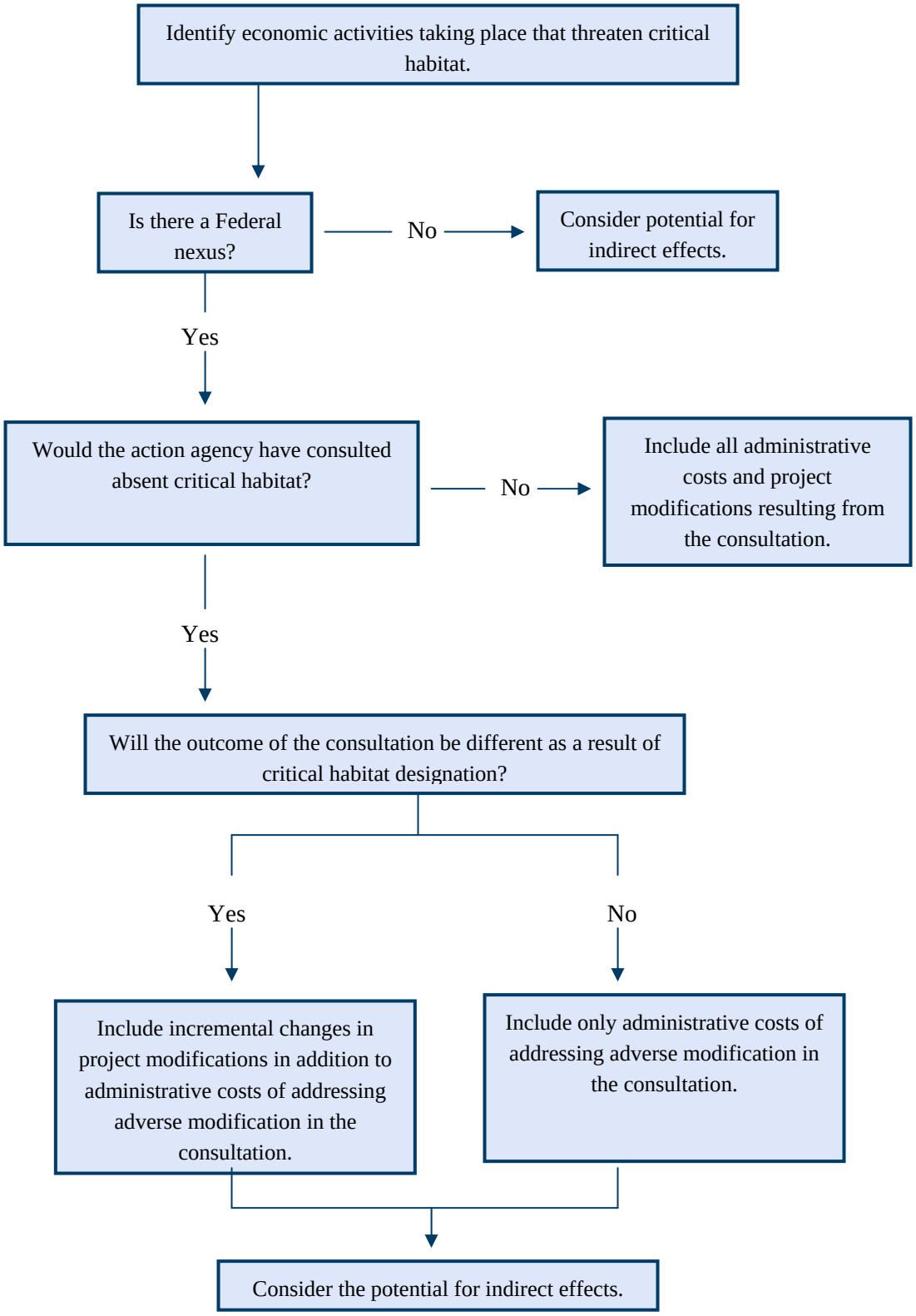
37. This analysis separately quantifies the incremental impacts of this rulemaking. The focus of the incremental analysis is to determine the impacts on land uses and activities from the designation of critical habitat that are above and beyond those impacts due to existing required or voluntary conservation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

38. 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.

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

40. Incremental impacts may be the direct compliance costs associated with additional effort for 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 otter 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

41. 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

42. 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.

43. 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.

44. The administrative costs of these consultations vary depending on the specifics of the project. The estimated administrative costs of section 7 consultation for all activities are described in Chapter 7 of this analysis.

Section 7 Project Modification Impacts

45. 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

46. 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

47. 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.

48. 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.

Other State and Local Laws

49. 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.

Additional Indirect Impacts

50. 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.
- **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.

2.3.3 BENEFITS

51. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[24] 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.[25]

52. 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 conduct new research.[26] *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.*

53. 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.

54. 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

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

[25] 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.

[26] Ibid.

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

55. Economic impacts of otter conservation are considered across the entire area proposed for critical habitat designation, as defined in Chapter 1. Results are presented for each of the seven subunits of proposed critical habitat.

2.3.5 ANALYTIC TIME FRAME

56. Ideally, the time frame of this analysis would be based on the expected time period over which the critical habitat regulation is expected to be in place. Specifically, the analysis would forecast impacts of implementing this rule through species recovery (i.e., when the rule is no longer required). However, absent specific information on the expected time frame for recovery of the otter, this analysis forecasts impacts over a "reasonably foreseeable" time frame. This time frame may vary by category of economic activity, depending on available information regarding activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available. This information may be found, for example, in local government land use plans or Federal agency planning documents.

57. Based on available data, this analysis estimates economic impacts to activities from 2005 (year of the species' final listing) to 2028, 20 years from the expected year of final critical habitat designation. Estimated impacts are divided into pre-designation (2005- 2008) and post-designation (2009-2028) impacts. This time horizon pertains to the forecast of impacts to oil spill response, construction activities, and water quality permitting activities, as these are the suite of activities for which economic impacts are monetized.

58. While a number of specific construction projects are separately identified and analyzed in this report, the majority of the forecast activities (oil spill response, construction, and water quality permitting) are expected to occur at regular intervals for the foreseeable future. For such activities, this analysis uses a 20-year time horizon based on professional judgment regarding how far out the occurrence of these activities can be considered "reasonably foreseeable." For example, NPDES permit reviews forecast in this analysis are expected to occur every five years. This analysis estimates the present value of these regular reviews over the next 20 years assuming the following three conditions do not change within that time frame: 1) critical habitat continues to exist for the duration of the time period; 2) the NPDES review process continues every five years; and 3) new facilities are brought online at the same rate that older facilities are taken offline, i.e., the number of affected facilities remains constant. To the extent that the number of consultations, permit reviews, or affected facilities decreases over the next 20 years, this analysis could overestimate the administrative impacts of otter conservation.

Because it includes costs only to a 20-year time horizon, this analysis could underestimate present value impacts in the case that critical habitat effects continue beyond 20 years.

2.4 INFORMATION SOURCES

59. 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 management plans that consider the otter. 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 | OIL SPILLS: PLANNING AND RESPONSE

60. Exposure to oil spills may affect the otter in multiple ways. Sea otters rely on dense fur for insulation, rather than a thick layer of blubber utilized by other marine mammals.[27] Oil eliminates the insulating properties of sea otter fur and leaves them susceptible to hypothermia. Further, oil spills may limit sea otter feeding efficiency by causing them to expend more time and energy grooming and less time searching for food. Finally, ingesting oil may cause organ injury, dysfunction, or death in sea otters. The Proposed Rule states that, "pollution from various potential sources, including oil spills from vessels, or discharges from oil and gas drilling and production, could render areas containing the identified physical and biological features unsuitable for use by sea otters."[28]

61. The Proposed Rule states that "special management considerations and protections may be needed to minimize the risk of oil and other hazardous-material spills" from commercial shipping and from oil and gas development and production.[29] This section describes ways in which oil spill planning and response efforts may be affected by sea otter conservation.

[27] Alaska Department of Environmental Conservation. 1999. The Alaska Federal and State Preparedness Plan for Response to Oil and Hazardous Substance Discharges and Releases: Unified Plan. Accessed online at: http://www.akrrt.org/UnifiedPlan/index.shtml February 17, 2009.

[28] U.S. Fish and Wildlife Service. Designation of Critical Habitat for the Southwest Alaska Distinct Population Segment of the Northern Sea Otter. Proposed Rule, *Federal Register*, December 16, 2009, Vol. 73, No. 242.

[29] Ibid.

KEY ISSUES AND CONCLUSIONS:

OIL SPILLS PLANNING AND RESPONSE

- For typical small spills, otter conservation is not expected to increase the cost of oil spill response. For mid-sized spills, otter conservation efforts are, in general, only expected to add administrative costs to oil spill planning and response efforts. These administrative impacts are included in Chapter 7, and are the only quantified impacts of otter conservation on oil spill planning and response. While otter conservation efforts are likely for large spills in habitat areas, it is not possible to reliably forecast those spill events. This chapter discusses the scope and scale of past oil spills, existing management of spills, potential otter conservation costs, and the reasons that impacts of otter conservation beyond administrative costs are not quantified.

Pre-designation impacts

- Since the listing of the species in 2005, past efforts associated with otter conservation in the proposed critical habitat area have been administrative in nature. Efforts have included extensive mapping of otter habitat, inclusion of otter as part of contingency planning efforts, and consideration of otter as part of agency coordination efforts following spills. No spills in the proposed critical habitat area have required capturing, cleaning, and rehabilitating otters to date.

Post-designation baseline impacts

- This analysis forecasts only administrative costs of consultations for oil spills In the future. That is, no otter conservation efforts that would generate economic impacts are forecast.

- For typical small spills, otter conservation is not expected to increase the cost of oil spill response. The response to these spills primarily entails containment and cleanup of the oil at the site to avoid any impacts on sensitive areas. For these spills, the Service typically has a brief conversation with the U.S. Coast Guard or other members of the Unified Command to make the response organizations aware of potential otter presence in the general area. A series of short coordinating phone calls among response organizations to be alert for potential wildlife issues may also ensue.

- Data are not available to reliably forecast the potential occurrence of larger oil spills, for which avoidance of sensitive areas may not be possible. For mid-sized spills, the presence of otters may affect the way that resources are prioritized for protection. Surveying for otters may be also be required for mid-sized spills nearby sensitive areas. For large spills in occupied habitat areas, otter protections may be costly and involved, including efforts for capturing, cleaning, and rehabilitating otters. This has not occurred in the past for the otters and, because large spill events are not forecast, these otter conservation efforts are not quantified in the total impacts estimates in this analysis. This chapter does provide information on the potential magnitude of otter conservation costs should a large spill occur. Notably, these impacts would all be considered baseline and not the result of critical habitat designation.

Incremental impacts of critical habitat

- Critical habitat is assumed to add some administrative effort to oil spill response efforts on the part of the Service, Action agencies, and third parties such as oil spill response organizations.

- Critical habitat is also likely to result in some additional administrative efforts on behalf of State planners, primarily associated with incorporation of critical habitat maps into oil spill response planning documents. Costs associated with updating contingency plans to reflect the designation may be borne by industry as well. These administrative efforts are believed to be minor and are not quantified in the analysis.

3.1 EXISTING MANAGEMENT OF OIL SPILLS

62. This section describes the types of spills that have occurred in the vicinity of proposed critical habit, the current Federal and State regulations affecting oil spill response near critical habitat, and the strategies that may be implemented to respond to oil spills in and around proposed critical habitat.

3.1.1 CHARACTERISTICS OF OIL SPILLS THAT AFFECT OTTERS

63. The ecological effects of an oil spill depend on the type and amount of oil spilled, as well as the location of the spill in relation to ecological resources.[30] Since the type and quantity of oil matter, the effects of a spill are influenced by the type of vessel or facility involved in the spill. A variety of vessel types are present in the waters surrounding the proposed critical habitat area, namely, container ships, general freight ships, oil tankers, motor vehicle carriers, refrigerated cargo ships, seismic research ships, processor ships, fishing vessels, ferries, and cruise ships. In general, oil carried on these different vessels can be broken into two categories: persistent oil (i.e., heavy or intermediate fuel oils or crude oil) and non-persistent oil (i.e., less dense, more refined fuel oils, such as diesel fuel). Large vessels, such as cargo ships, freight ships, tankers, and cruise ships generally carry persistent fuel oil, while smaller vessels, such as fishing vessels, ferries, processing vessels, and seismic research vessels generally carry non-persistent fuel oil.[31]

64. Large spills of persistent oil (e.g. crude oil) are more dangerous than smaller spills of non-persistent oil (e.g. diesel fuel) because the former remain in marine systems longer, thereby affecting a greater number of organisms. Oil spills involving large vessels carrying persistent fuel oil have the greatest potential to negatively impact sea otters and the marine ecosystems they inhabit. In particular, releases from oil tankers have the greatest potential to damage marine ecosystems due to the large amount of oil these vessels carry. Specifically, oil tankers typically carry around 400 million gallons of persistent oil as cargo and fuel. Container ships carry the next largest amount of oil after tankers: approximately 1.6 million gallons of persistent fuel oil.[32]

65. Oil spills around the proposed critical habitat area have typically involved relatively small vessels carrying non-persistent fuels. Specifically, the Special Report on the Risk of Vessel Accidents and Spills in the Aleutian Islands notes that past spill data for spills larger than 1,000 gallons in the Aleutian Islands from 1981 through 2005: "show that in the recent past, fishing vessels have contributed to the largest number of spills compared with all other vessel categories, although the largest volume spilled has been from just a few significant commercial vessel incidents."[33] Further, the assessment reports that

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[30] Natural Resource Council. 2001. Oil in the Sea III: Inputs, Fates, and Effects (Prepublication Copy). National Academies Press. Washington, D.C.

[31] Transportation Research Board. 2008. Risk of Vessel Accidents and Spills in the Aleutian Islands: Designing a Comprehensive Risk Assessment. Published by the Transportation Research Board of the National Academies. Washington, D.C.

[32] Ibid.

[33] Ibid.

between 1996 and 2005, 98 percent of spills in the Aleutians were of non-crude oil. Since the otter was listed in 2005, there have been 481 spills in the vicinity of critical habitat.[34] The average size of these spills was 417 gallons, with a minimum size of less than one gallon and a maximum size of 145,000 gallons. However, the median sized spill of approximately five gallons is more typical of an oil spill in the proposed critical habitat area. There have been no spills of crude oil in the vicinity of proposed critical habitat since the otter was listed.

66. The largest spill in the vicinity of proposed critical habitat since 2005 occurred near Unit 1 and was caused by the sinking of the *F/V Alaska Ranger* in 2008, 60 nautical miles northwest of Umnak Island.[35] This accident resulted in the release of 145,000 gallons of hydraulic fluid. In the recent past, the most ecologically detrimental spill in the proposed critical habitat area was the *Selendang Ayu* spill, which occurred in 2004. The *Selendang Ayu*, a Malaysian bulk carrier, lost power and ran aground, spilling roughly 336,000 gallons of persistent fuel oil along the North Shore of Unalaska Island near Dutch Harbor (in the vicinity of Unit 2 of proposed critical habitat).[36]

3.1.2 OIL SPILL RESPONSE PLANNING

67. Oil spill response in Alaska is regulated by the 1990 Oil Pollution Act (OPA), which requires the U.S. Coast Guard (USCG) and the Environmental Protection Agency (EPA) develop a statewide oil spill response plan, and by Alaska Statute 46.04, which requires the Alaska Department of Environmental Conservation (ADEC) develop a statewide response plan and individual response plans for ten geographic subareas spanning the State of Alaska.[37,38] Further, Alaska Statute 46.04 requires that the oil industry develop oil discharge prevention and contingency plans.

68. Exhibit 3-2 describes the purpose and content of each level of oil spill planning and the interaction between the different plans. Exhibit 3-3 presents planning subareas in relation to proposed critical habitat.

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[34] Past spills in and around the study area (i.e., past spills within the Aleutian Islands, Bristol Bay, Cook Inlet, and Kodiak Island subareas) were queried from the Statewide Oil and Hazardous Substance Spills Database by Camille Stephens of the Alaska Department of Environmental Conservation on March 16, 2009.

[35] Review of F/V Alaska Ranger Incident Description written by the Alaska Department of Environmental Conservation, Division of Spill Prevention and Response accessed online at: http://www.dec.state.ak.us/spar/perp/response/sum_fy08/080323201/080307201_index.htm on March 20, 2009.

[36] Transportation Research Board. 2008. Risk of Vessel Accidents and Spills in the Aleutian Islands: Designing a Comprehensive Risk Assessment. Published by the Transportation Research Board of the National Academies. Washington, D.C.

[37] Oil Pollution Act of 1990 (33 U.S.C. 2701-2761). Accessed online at http://www.uscg.mil/NPFC/About_NPFC/opa.asp on March 20, 2009.

[38] Alaska Statute Title 46, Water, Air, Energy and Environmental Conservation. Accessed online at http://www.dec.state.ak.us/SPAR/statutes_regs.htm on March 20, 2009.

Otter Sensitive Areas

69. Oil spill responders rely on delineated sensitive areas to identify areas where the potential for oil spill effects on wildlife are the greatest.[39] These areas are then prioritized for protection during oil spill response. In Alaska, "sensitive areas" are defined by a Sensitive Areas Work Group for each oil spill planning subarea. The work group considers information provided by local agencies on the location of areas with high biological and human-use value and Environmental Sensitivity Index maps (these maps delineate sensitive shoreline types and resources) developed by the National Oceanic and Atmospheric Administration (NOAA). Areas with large otter populations (greater than 20 individuals at a site) are considered sensitive areas of "major concern," while otter "general distribution areas" are considered sensitive areas of "moderate concern." Exhibit 3-4 illustrates areas of high otter density and lesser or unknown otter density, as defined in the Environmental Sensitivity Index, in relation to proposed critical habitat areas. These otter density classifications are thought to provide close approximations for the areas of major and moderate concern for the otter in the vicinity of the proposed critical habitat area.[40]

3.1.3 OIL SPILL RESPONSE ACTIONS IN OTTER AREAS

70. The level and specific strategy for an oil spill response depends on a number of factors including, but not limited to: weather; the type of oil spilled; the amount of oil spilled; the response equipment available to respond to a spill; and the location of the spill in relation to environmentally sensitive resources and areas with high human-use value.[41] In general, the goal of oil spill response is to utilize available response equipment in the most efficient and effective manner possible to limit the effects of spilled oil.

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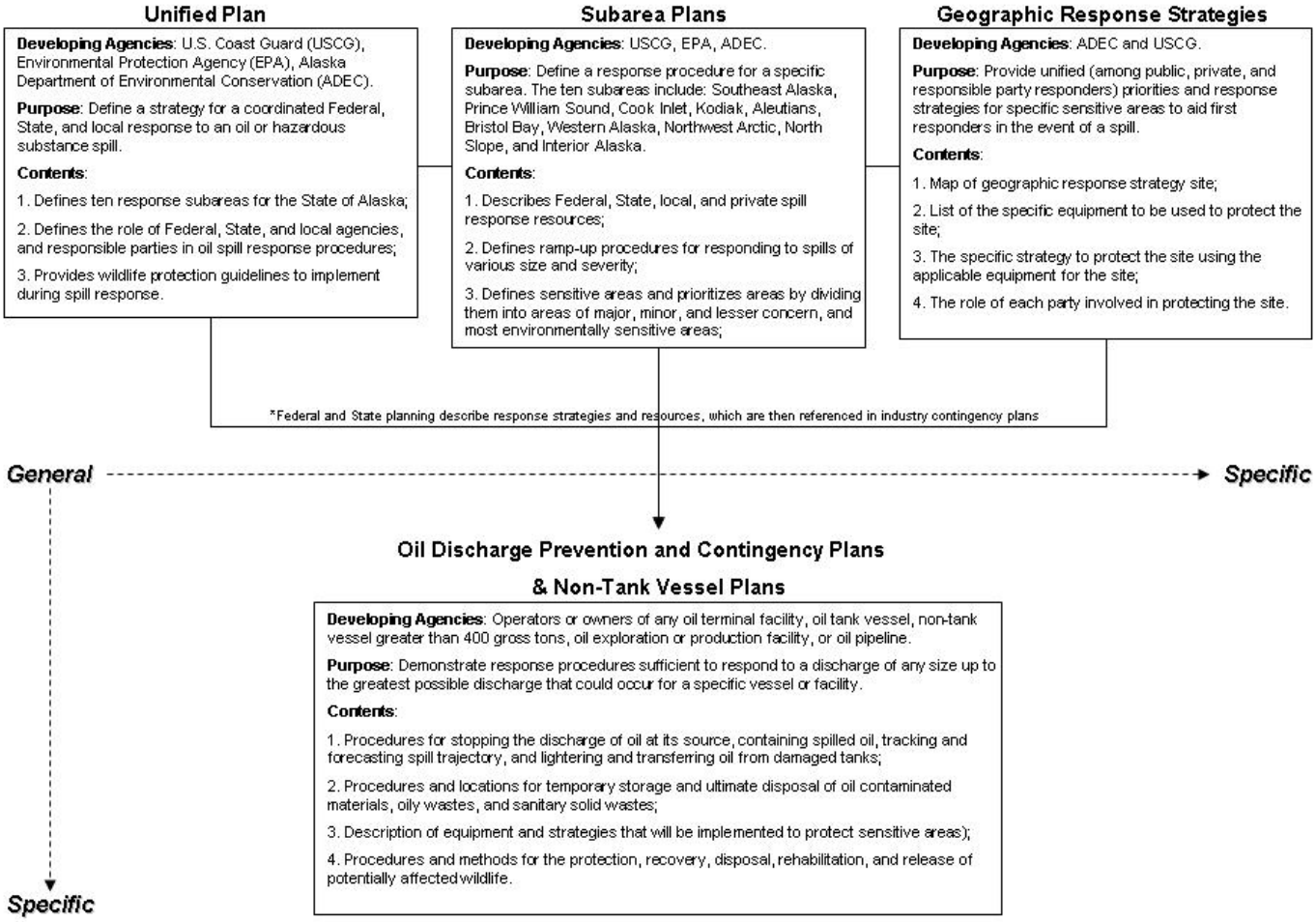
[39] Alaska Department of Environmental Conservation. 1999. Aleutians Subarea Contingency Plan for Oil and Hazardous Substance Discharges/Releases: A Subarea Plan of the Unified Plan for the State of Alaska. Alaska Department of Environmental Conservation, Prevention and Emergency Response Program. Anchorage, AK. Prepared in conjunction with the U.S. Coast Guard, Captain of the Port, Western Alaska; and, the U.S. Environmental Protection Agency, Alaska Operations Office.

[40] Personal communication with Samantha Smith and Martin Ferris, Environmental Program Specialists, Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Industry Preparedness Program, Marine Vessels Section on February 18, 2009.

[41] 18 AAC 75.4. Accessed online at http://www.dec.state.ak.us/SPAR/statutes_regs.htm on March 20, 2009.

EXHIBIT 3-2. OVERVIEW OF THE LEVELS OF FEDERAL, STATE, AND PRIVATE OIL SPILL RESPONSE PLANNING[42, 43, 44, 45]



[42] Alaska Department of Environmental Conservation. 1999. Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan, Volume I). Alaska Department of Environmental Conservation, Prevention and Emergency Response Program. Anchorage, AK. Prepared in conjunction with the U.S. Coast Guard, Seventeenth District, Marine Safety Division; and, the U.S. Environmental Protection Agency, Alaska Operations Office.

[43] Alaska Department of Environmental Conservation. 1999. Aleutians Subarea Contingency Plan for Oil and Hazardous Substance Discharges/Releases: A Subarea Plan of the Unified Plan for the State of Alaska. Alaska Department of Environmental Conservation, Prevention and Emergency Response Program. Anchorage, AK. Prepared in conjunction with the U.S. Coast Guard, Captain of the Port, Western Alaska; and, the U.S. Environmental Protection Agency, Alaska Operations Office.

[44] Review of Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Prevention and Emergency Response Program, Geographic Response Strategy website accessed online at http://www.dec.state.ak.us/SPAR/perp/grs/home.htm on February 24, 2009.

[45] 18 AAC 75.4. Accessed online at http://www.dec.state.ak.us/SPAR/statutes_regs.htm on March 20, 2009.

EXHIBIT 3-3. OIL SPILL PLANNING SUBAREAS IN RELATION TO PROPOSED CRITICAL HABITAT

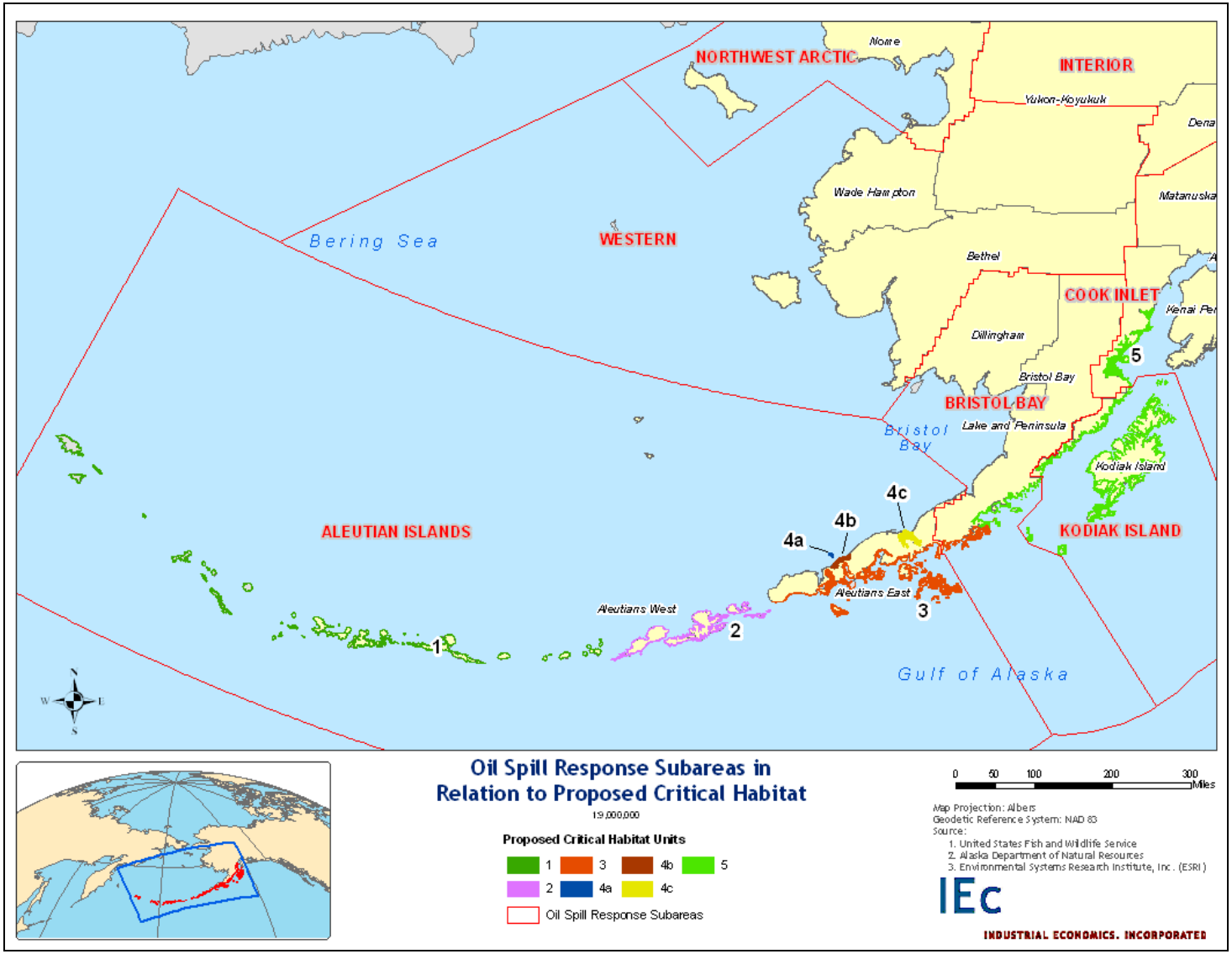
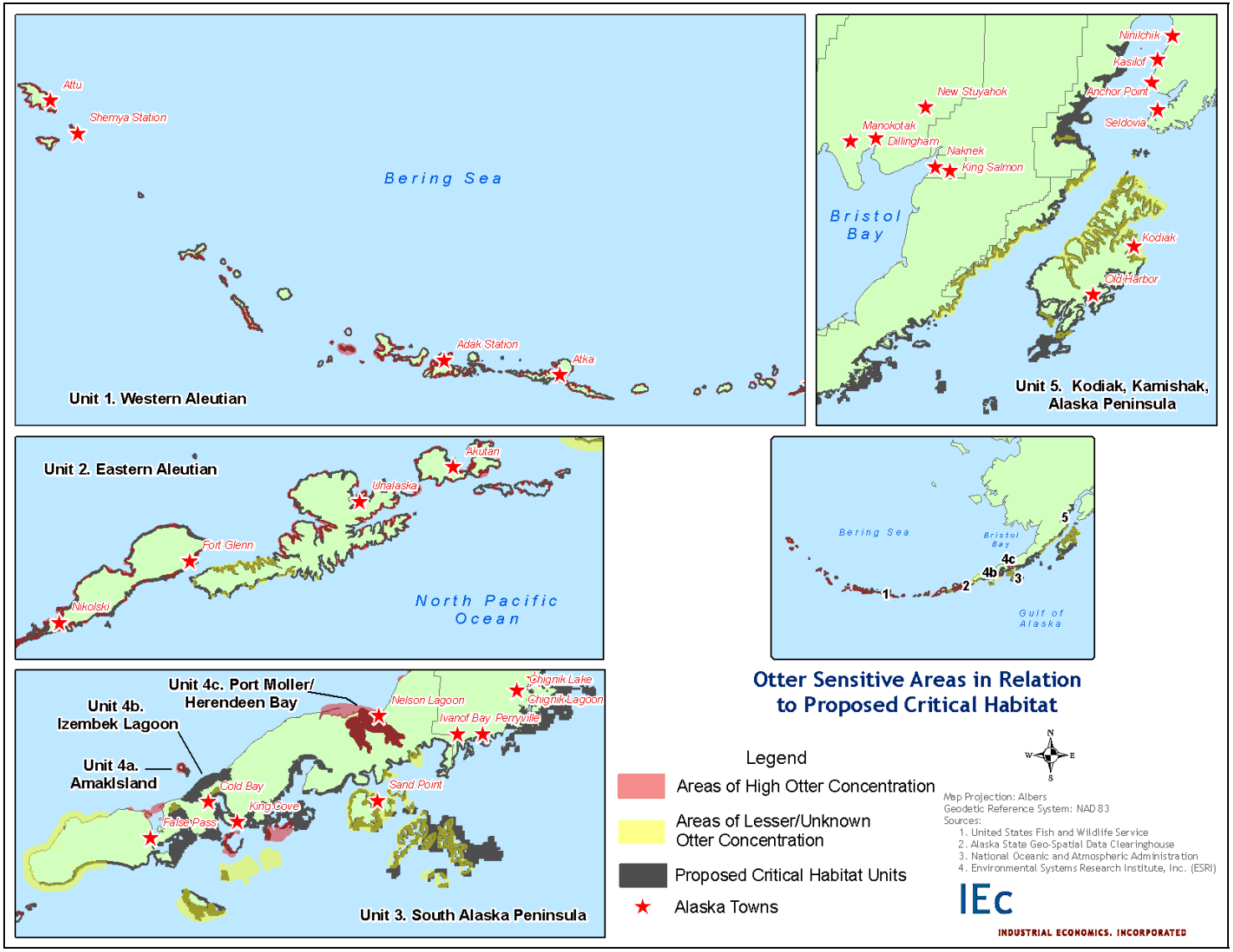


EXHIBIT 3-4. SENSITIVE AREAS FOR THE OTTER IN RELATION TO PROPOSED CRITICAL HABITAT



71. Oil spill response for sea otters, and for wildlife in general, can be broken into three phases.[20] Phase One is focused on eliminating the source of the spill, containing the spilled oil, and protecting sensitive areas. Most spill response efforts do not advance beyond Phase One. Phase Two involves efforts to herd or haze potentially affected wildlife away from the spill area. Phase Three, the most involved and most infrequently undertaken phase of oil spill response for wildlife, includes the capture and rehabilitation of wildlife affected by spilled oil. No spill has required Phase 3 response for otters since the species was listed in 2005.

72. When a spill occurs in the vicinity of sensitive areas for the otter, the species is specifically considered during the development of response strategies. Typically, the responsible party, the USCG, or the primary response action contractor will contact the Service to discuss potential impacts to otter and other Service trust resources.[21,22] If necessary and practicable, the otter sensitive area may be protected by concentrating oil spill response equipment and efforts in these areas.[23] Protection of sensitive areas occurs on a priority basis.[24] The areas with the greatest ecological or human-use value have the highest priority and, thus, are protected first. In extreme cases where a large amount of persistent oil has been spilled, otters may be captured to preempt oil spill impacts; or, affected otters may be captured and cleaned to minimize oil spill damages (i.e., phases two and three of oil spill response may be implemented).

3.2 PRE-DESIGNATION IMPACTS ON OIL SPILL PLANNING AND RESPONSE ACTIVITIES

3.2.1 PAST OIL SPILLS IN CRITICAL HABITAT AREAS

73. This analysis reports the number of past spills in the vicinity of each proposed critical habitat unit using the Statewide Oil and Hazardous Substance Spills Database maintained by ADEC, which specifies the subarea, region, and location of past oil spills, as well as the amount and type of oil spilled.[25] Exhibit 3-5 presents the number and size of all spills

[20] Alaska Department of Environmental Conservation. 1999. Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan, Volume I). Alaska Department of Environmental Conservation, Prevention and Emergency Response Program. Anchorage, AK. Prepared in conjunction with the U.S. Coast Guard, Seventeenth District, Marine Safety Division; and, the U.S. Environmental Protection Agency, Alaska Operations Office.

[21] Primary response action contractors are response contractors that may be called on by responsible parties or by the USCG, if the responsible party is unknown, to respond to a spill.

[22] Personal communication with Contaminants Biologist, U.S. Fish and Wildlife Service on March 17, 2009.

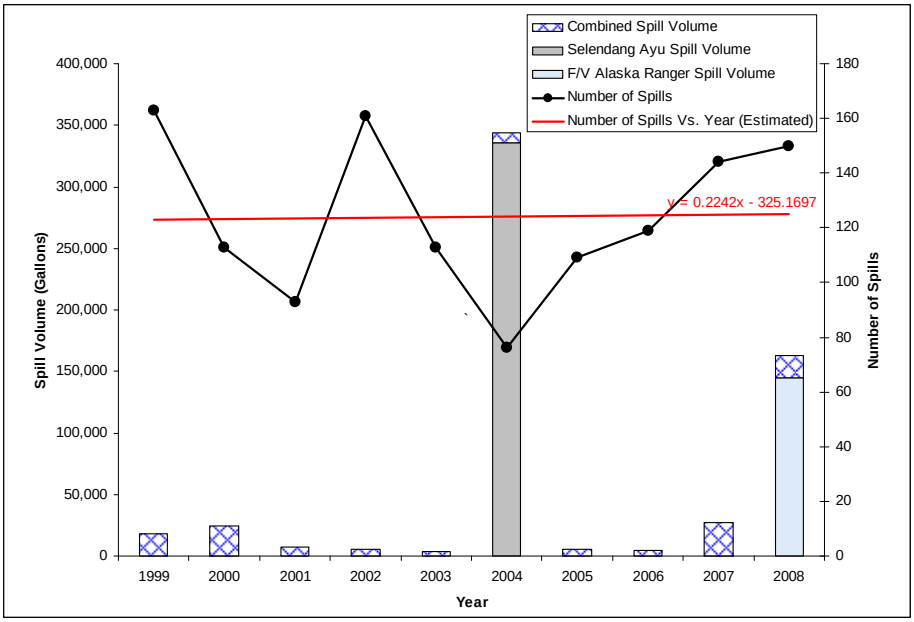
[23] Alaska Department of Environmental Conservation. 1999. Alaska Federal/State Preparedness Plan for Response to Oil and Hazardous Substance Discharges/Releases (Unified Plan, Volume I). Alaska Department of Environmental Conservation, Prevention and Emergency Response Program. Anchorage, AK. Prepared in conjunction with the U.S. Coast Guard, Seventeenth District, Marine Safety Division; and, the U.S. Environmental Protection Agency, Alaska Operations Office.

[24] Personal communication with Doug Lentsch, Cook Inlet Spill Prevention and Response Inc. (CISPRI) on February 28, 2009 and Pete Pritchard, Response Supervisor, and Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on March 17, 2009.

[25] Past spills in and around the study area (i.e., past spills within the Aleutian Islands, Bristol Bay, Cook Inlet, and Kodiak Island subareas) were queried from the Statewide Oil and Hazardous Substance Spills Database by Camille Stephens of the Alaska Department of Environmental Conservation on March 16, 2009.

occurring in the vicinity of critical habitat in the past ten years. Between 1999 and 2008, the total quantity of oil spilled each year was relatively constant and less than 50,000 gallons per year, except in 2004 and 2008. The large quantities of oil spilled in 2004 and 2008 are due to the *Selendang Ayu* spill and *F/V Alaska Ranger* spill, respectively (see section 3.2.1). There is no clear trend in the number of spills occurring in the vicinity of critical habitat in the past ten years.[26] Rather, the number of spills varies widely across the years with a minimum of 76 spills in 2004 and a maximum of 163 spills in 1999.[27]

EXHIBIT 3-5. NUMBER AND SIZE OF SPILLS IN THE VICINITY OF PROPOSED CRITICAL HABITAT, 1999-2008[28]



[26] A regression analysis was conducted using Intercooled Stata 7.0 to determine if the year is a significant predictor for the number of spills in the past ten years (*t-test, p = 0.949, df = 9, α = 0.05*).

[27] Past spills in and around the study area (i.e., past spills within the Aleutian Islands, Bristol Bay, Cook Inlet, and Kodiak Island subareas) were queried from the Statewide Oil and Hazardous Substance Spills Database by Camille Stephens of the Alaska Department of Environmental Conservation on March 16, 2009.

[28] Past spills in and around the study area (i.e., past spills within the Aleutian Islands, Bristol Bay, Cook Inlet, and Kodiak Island subareas) were queried from the Statewide Oil and Hazardous Substance Spills Database by Camille Stephens of the Alaska Department of Environmental Conservation on March 16, 2009.

74. To determine where oil spills have occurred relative to the proposed critical habitat units, oil spills were allocated to units based on the reported region of the spill. Spills were considered to be in the vicinity of a critical habitat unit if the region the spill was within five miles of a critical habitat unit.[29] The total number of spills in the vicinity of a critical habitat unit was estimated by summing the number of spills from each region in the vicinity of the unit.[30] The total number of past oil spills by critical habitat unit are reported in Exhibit 3-6 for years since the otter was listed (2005-2009).

EXHIBIT 3-6. NUMBER OF PAST SPILLS IN THE VICINITY OF CRITICAL HABITAT, 2005-2009

UNIT	NUMBER OF PAST SPILLS
1	27
2	24
3	141
4a	0
4b	1
4c	0
5	288
Total	**481**

Note: Assumes all past spill responses within five miles of critical habitat areas needed to consider otter.
Source: Alaska Department of Environmental Conservation. 2009. Statewide Oil and Hazardous Substance Spills Database. Queried by Camille Stephens of Alaska Department of Environmental Conservation on March 16, 2009.

75. The methodology utilized here appears likely to overestimate the number of spills for which otter was considered as a concern in the past. In particular, NOAA mapping of past spills in Cook Inlet (a portion of Unit 5) indicates that only one of the oil spills that occurred between 1984 to 2001 occurred in the vicinity of critical habitat.[31] All remaining spills occurred in the Forelands area in Middle Cook Inlet, which NOAA states is unlikely to travel to the vicinity of critical habitat.[32] However, these spills are likely to have been counted within estimates of past spills potentially affecting otter using the

[29] Five miles is thought to be the largest distance away from otter sensitive areas that the effects of an oil spill on the otter or its habitat would be considered during oil spill response.

[30] If a spill region was located within five miles of multiple critical habitat units, the past spills in the region were distributed across the different critical habitat units in the region by the relative size of each unit. For example, if critical habitat unit one represents 25 percent of the area of all the critical habitat units in a region, then 25 percent of the past spills in the region would be considered to have occurred in the vicinity of unit one.

[31] Whitney, John. "Cook Inlet, Alaska, Oceanographic and Ice Conditions and NOAA's 18-year oil spill response history, 1984-2001," Hazardous Materials and Response Assessment Division, Office of Response and Restoration, National Ocean Services, Anchorage, Alaska. HAZMAT Report 2003-01, October 2002.

[32] Personal communication with J. Whitney, Hazardous Materials and Response Assessment Division, Office of Response and Restoration, National Ocean Services, on March 2, 2009.

current methodology because these were included in the Cook Inlet region in the ADEC database. As such, estimates of spills in Cook Inlet that may have affected otter are likely to be overstated.

3.2.2 PAST ECONOMIC IMPACTS OF OTTER CONSERVATION ON OIL SPILL PLANNING AND RESPONSE

76. Although sensitive areas are defined in subarea plans and are referenced in industry contingency plans, interviews with oil spill response contractors and the Service indicate that the USCG, ADEC, the responsible party, or primary response action contractors typically contact the Service and/or the Alaska Department of Fish and Game (ADFG) directly to identify the environmentally sensitive areas in the vicinity of the spill.[33] This analysis assumes that the USCG or other response parties contacted the Service to identify otter sensitive areas for each past spill that occurred in the regions surrounding proposed critical habitat for the otter. For a subset of these spills, approximately eight per year, informal consultation with the Service was conducted. These informal consultations were generally conducted for mid-sized spill events. Administrative costs associated with these past efforts are included in Section 7 of this analysis.

77. Some oil spill responders have incurred costs associated with investing in sea otter response equipment in preparation for an extreme spill. For example, Cook Inlet Spill Prevention and Response Inc. (CISPRI), a response contractor servicing the Cook Inlet, spent roughly $500,000 on a mobile otter hospital in the late 1990s.[34] Further, the Alaska Chadux Corporation, a response contractor servicing the entire State of Alaska, spent roughly $10,000 on floating cages and other response equipment to be utilized during the preemptive capture of otters.[35] These costs were incurred prior to the listing of the otter and, thus, are not included in the pre-designation cost estimates presented in this analysis. Both of these response contractors have also established annual retainers for teams of biologists, such as International Wildlife Research, who are qualified to capture and rehabilitate otters, in the case that a spill response requires such measures.[36]

3.3 POTENTIAL POST-DESIGNATION IMPACTS ON OIL SPILL PLANNING AND RESPONSE ACTIVITIES

78. This section highlights the proposed critical habitat units most likely to be affected by an oil spill. Further, it describes the potential costs of responding to spills in these areas.

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[33] Personal communication with: Doug Lentsch, Cook Inlet Spill Prevention and Response Inc. (CISPRI) on February 28, 2009; Pete Pritchard, Response Supervisor, and Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on March 17, 2009; and, Contaminants Biologist, U.S. Fish and Wildlife Service on March 17, 2009.

[34] Personal communication with Doug Lentsch, Cook Inlet Spill Prevention and Response Inc. (CISPRI) on February 28, 2009.

[35] Personal communication with Pete Pritchard, Response Supervisor, and Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on March 17, 2009.

[36] Personal communication with Pete Pritchard, Response Supervisor, and Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on March 17, 2009 and Doug Lentsch, Cook Inlet Spill Prevention and Response Inc. (CISPRI) on March 17, 2009.

3.3.1 FUTURE NUMBER OF OIL SPILLS NEAR PROPOSED CRITICAL HABITAT AREAS

79. Given the lack of a clear trend in the number of spills in the last ten years, this analysis concludes that the best forecast of future spills is the recent spill history. Thus, this analysis relies on the annual average number of spills that occurred in the vicinity of each critical habitat unit since the otter was listed in 2005. Annual averages are calculated by dividing the total number of spills in the vicinity of each critical habitat unit since 2005 by 4.33 years, the time between listing and the year critical habitat is expected to be finalized (2009). These annual averages are used as estimates of the annual frequency of future oil spills in and around each critical habitat unit.[37]

80. Exhibit 3-7 presents the number of past spills, the annual frequency of spills, and the forecast number of spills over the next 20 years in the vicinity of each critical habitat unit. Exhibit 3-8 illustrates the proposed critical habitat units where future spills are considered most likely to occur based on the estimated annual frequency of oil spills. As with past spills, the number of spills projected for Cook Inlet may be overstated due to the inclusion of the Forelands area in the regional dataset. It is also possible that past oil spills did occur in the vicinity of units 4a and 4c and were not counted, which would result in an underestimate of the risk of spills around these units in the future.

81. There have been no spills of crude oil in the vicinity of proposed critical habitat since the otter was listed. Future spills are most likely to occur in and around Unit 5, followed by Unit 3. Given these data, the likelihood of future spills in the vicinity of Units 1, 2, or 4 is small. However, this analysis recognizes that changes in resource use, particularly future oil and gas development activities, could affect the future frequency of oil spills. Specifically, expansion of oil and gas development activities in Bristol Bay, Northern Alaska, and Cook Inlet are expected to increase over time. Increased need for provisioning of supplies for these activities could result in additional vessel traffic in the proposed critical habitat area, resulting in additional oil spill risk.[38] The potential for oil and gas development is discussed in Chapter 4 of this analysis. In addition, unexpected onshore events, such as oil storage equipment failure, are possible. In particular, there have been recent concerns about the stability of the Drift River oil storage facilities near Redoubt Volcano in light of recent volcanic activity.[39]

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[37] Regression analyses were also conducted to determine if time (i.e., unique year-month combinations) is a significant predictor for the number of spills in each region since the otter was listed. However, time is a significant predictor for the number of spills in only one of the six regions of interest. Specifically, time is a significant predictor for the number of spills in the Aleutian Chain region (*t-test*, $p = 0.002$, $df = 35$, $\alpha = 0.05$). Thus, the average number of spills per year in the recent past was considered the best estimate of the annual frequency of future oil spills.

[38] Written communication with Scott Goldsmith, Economist, Institute of Social and Economic Research, University of Alaska to Industrial Economics, April 30, 2009.

[39] For example, see "Alaska's Mount Redoubt Volcano Has Another Large Eruption After Quiet Week ," Fox News, April 4, 2009. Accessed at http://www.foxnews.com/story/0,2933,512576,00.html.

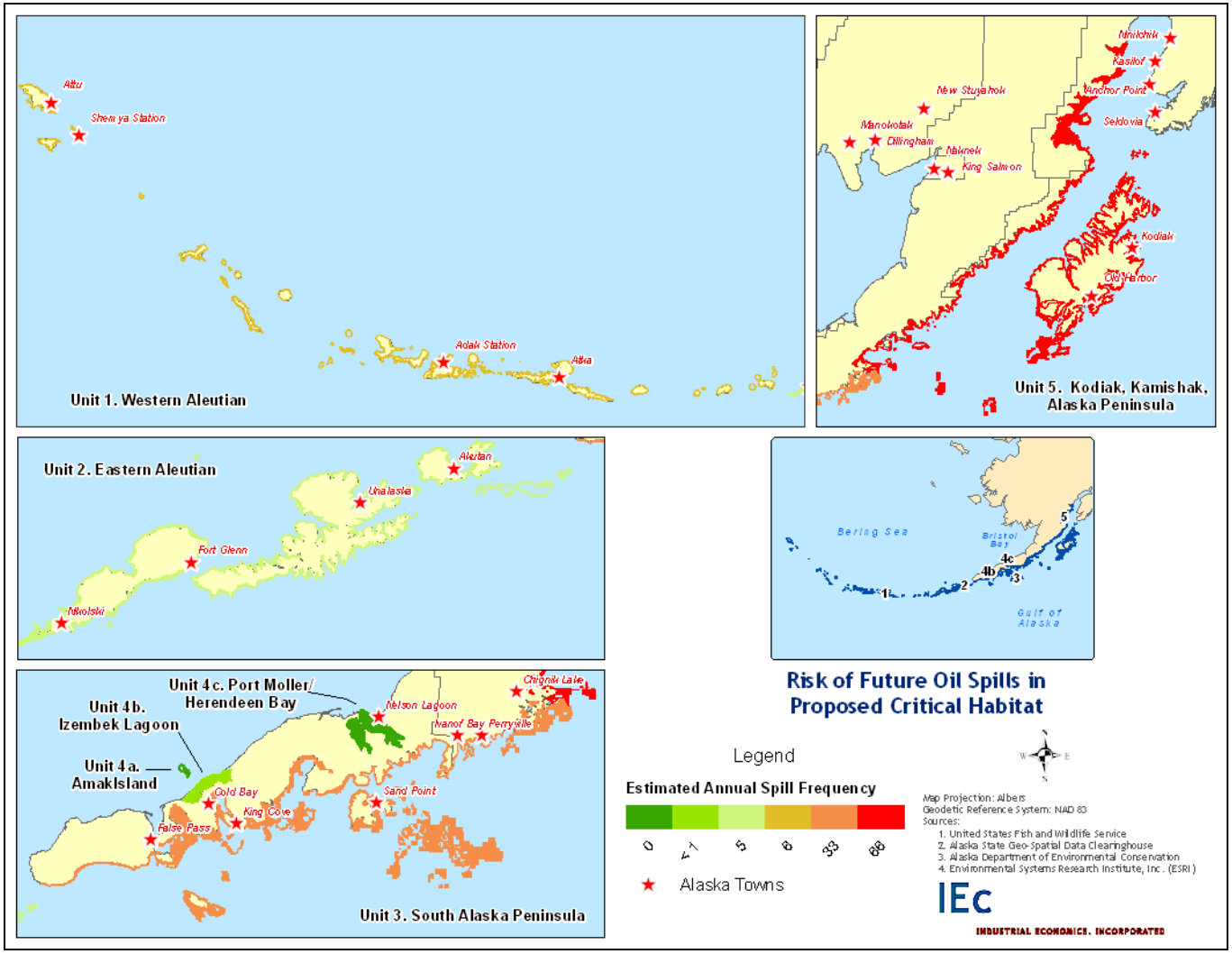
EXHIBIT 3-7. SUMMARY OF PAST AND FORECAST SPILLS IN THE VICINITY OF PROPOSED CRITICAL HABITAT UNITS

UNIT	NUMBER OF PAST SPILLS (2005-2009)	ANNUAL SPILL FREQUENCY	ESTIMATED NUMBER OF SPILLS, 2009-2028
1	27	6	124
2	24	5	110
3	141	33	652
4a	0	0	0
4b	1	<1	7
4c	0	0	0
5	288	66	1,327
Total	**481**	**111**	**2,220**

Notes: Geographic information on past spills is poor. The number of spills projected for Cook Inlet may be overstated due to the inclusion of the Forelands area in the regional dataset. It is also possible that past oil spills did occur in the vicinity of units 4a and 4c and were not counted, which would result in an underestimate of the risk of spills around these units in the future.

Source: Alaska Department of Environmental Conservation. 2009. Statewide Oil and Hazardous Substance Spills Database. Queried by Camille Stephens of Alaska Department of Environmental Conservation on March 16, 2009.

EXHIBIT 3-8. LIKELIHOOD OF FUTURE OIL SPILLS FOR EACH PROPOSED CRITICAL HABITAT UNIT



3.3.2 POTENTIAL BASELINE ECONOMIC IMPACTS TO OIL SPILL PLANNING AND RESPONSE

82. The presence of sea otters and their habitat have the potential to affect oil spill response planning and actual oil spill response efforts. This section considers the potential effects and associated costs of sea otter conservation on oil spill planning and response even absent critical habitat designation (baseline conservation efforts).

Oil Spill Response Planning

83. Oil spill response planning costs for sea otters are related to the identification of sensitive areas for the sea otter and determining whether or not sea otters require special protection following an oil spill. Sensitive areas for the otter were defined prior to the species' listing in 2005, thus, costs related the identification of sensitive areas are not quantified in this analysis.[40]

Oil Spill Response Efforts

84. The unified command of an oil spill response team, consisting of Federal, State, responsible party, and/or response contractor representatives, consider potential impacts on sensitive areas, including otter areas, when planning their response strategy, among many factors considered when determining priority areas for protection following a spill.[41]

85. For typical small spills, otter conservation is not expected to increase the cost of oil spill response, as the response primarily entails containment and cleanup of the oil at the site to avoid causing any impacts on sensitive areas (Phase 1). For these spills, the Service typically has a brief conversation with the U.S. Coast Guard or other members of the Unified Command, to makes the response organizations aware of otter presence in the general area.[42] A series of short coordinating phone calls among response organizations to be alert for potential wildlife issues may also ensue.[43]

86. For spills where impacts to sensitive areas cannot be avoided, surveying of areas for otter and other wildlife presence may be required, and possible hazing of wildlife may be needed (Phase 2). In one recent example, Alaska Chadux, a large spill response organization, estimated that it spent approximately $25,000 to $30,000 in staff and boat time investigating possible effects to wildlife from a spill. Alaska Chadux reported that

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[40] Personal communication with Samantha Smith and Martin Ferris, Environmental Program Specialists, Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Industry Preparedness Program, Marine Vessels Section on February 18, 2009.

[41] Personal communication with Pete Pritchard, Response Supervisor, and Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on March 17, 2009.

[42] Personal communication with Contaminants Biologist, U.S. Fish and Wildlife Service on March 17, 2009.

[43] For example, Alaska Chadux has a contract with the IBRRC, who handles their wildlife concerns. In cases where wildlife concerns may arise, Chadux may contact IBRRC to alert them to the possibility that mobilization could be needed. Personal communication with Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on May 5, 2009.

this was the only incident that required extensive wildlife considerations in 2008 (and it did not involve otters).[44]

87. In cases of persistent oil spilled in the vicinity of otter habitat areas that cannot be contained prior to impacts on the species, extensive cleaning and rehabilitation of otters could be required. Cleanup for the *Selendang Ayu*, which was the largest oil spill in the Aleutian Islands in recent history, required extensive wildlife rehabilitation. This spill resulted in the design and initiation of a response plan for sea otters, including the mobilization of a floating hospital for otter that was ultimately never used. Total oil spill response costs for the *Selendang Ayu* are estimated at $74 million, including surveying for the otter of approximately $74,000.[45]

88. This analysis does not forecast the occurrence of large oil spills such as the *Selendang Ayu* or *Exxon Valdez* in the vicinity of proposed critical habitat in the next 20 years as data to forecast the frequency or location of such spills within the proposed critical habitat areas are not available. Nonetheless, if an extreme spill were to occur, it is possible that otter-specific conservation measures would need to be implemented. Example costs of otter-specific spill response measures are presented in Exhibit 3-9.

[44] Personal communication with Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on May 5, 2009.

[45] As noted above, this spill occurred prior to species listing, and hence costs of conservation efforts for otters and other wildlife are not included in this analysis.

EXHIBIT 3-9. EXAMPLE OTTER-SPECIFIC OIL SPILL RESPONSE MEASURES AND ASSOCIATED COSTS

DESCRIPTION OF CONSERVATION MEASURES	COSTS ($2009)	SOURCE
Capture. Capture of 300 otters, of which 200 were successfully rehabilitated and released following the *Exxon Valdez* oil spill in 1989. Costs are associated with procuring and transporting response equipment, staff time and transportation costs, otter capture, rehabilitation, and release costs, and monitoring costs.	**$20 million** in 1989 ($31.2 million in 2009 dollars)[1]	Personal communication with Randall Davis, International Wildlife Research on March 19, 2009.
Surveying. The surveillance of 140 miles of coastline for otters affected by spilled oil following the *Selendang Ayu* spill in 2004. Required four full-time staff members on location for three weeks. Surveying occurred over a one-week period. Costs are associated with staff time and ship rental fees.	**$60,000** - staff time **$11,000 to $14,000** - ship rental fees	
Otter Rehabilitation. The construction and operation of an otter rehabilitation center capable of housing at least 4 otters following the *Selendang Ayu* spill in 2004.[2]	**$63,000** - center construction **$16,000/month** - center rental fees **$10,000** - operation fees (assumes the rehabilitation of 4 otters for a six week period)	Memorandum from International Wildlife Research to Responsible Party on February 3, 2005 addressing a sea otter rehabilitation facility at Seward, Alaska.

Notes:
1.) 1989 costs adjusted to 2009 dollars using the implicit price deflator for gross domestic product accessed online at http://www.bea.gov on March 20, 2009.
2.) The rehabilitation center was never constructed. However, the cost of constructing a similar otter rehabilitation center following a future extreme spill is considered comparable to the construction cost estimate from the *Selendang Ayu* spill.

3.3.3 POTENTIAL INCREMENTAL ECONOMIC IMPACTS TO OIL SPILL PLANNING AND RESPONSE

Oil Spill Response Planning

89. The designation of critical habitat creates the potential for incremental planning costs. Specifically, critical habitat areas should be delineated as "areas of major concern" for otters in State maps used as reference for oil spill response planning. However, ADEC states that incorporating otter critical habitat into currently defined sensitive areas would be a minor amendment to subarea plans and, thus, is expected to have negligible cost.[46]

90. Oil response organizations have stated that any significant expansion of sensitive areas to include critical habitat could cause oil industry stakeholders to move or store additional response equipment in the vicinity of critical habitat areas in preparation for spills.[47] However, as shown in Exhibit 3-4, all critical habitat for the sea otter is located in the

[46] Written communication with Samantha Smith, Environmental Program Specialist, Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Industry Preparedness Program, Marine Vessels Section on February 19, 2009.

[47] Personal communication with Doug Lentsch, Cook Inlet Spill Prevention and Response Inc. (CISPRI) on February 28, 2009.

vicinity of currently defined sensitive areas. Thus, ADEC staff state that it is unlikely that industry stakeholders would need to increase their equipment and resources in order to be adequately prepared to protect critical habitat areas in the event of an oil spill.[48]

Oil Spill Response Efforts

91. For most spills, critical habitat is not expected to add to the cost of response. For larger spills, critical habitat is assumed to add some administrative effort to oil spill response efforts on the part of the Service, Action agencies, and third parties such as oil spill response organizations. Administrative costs are presented in Section 7 of this analysis. Critical habitat is also likely to result in some additional administrative efforts on behalf of State planners, primarily associated with incorporation of critical habitat into oil spill response planning documents. Costs associated with updating contingency plans to reflect the designation may be borne by industry as well. These administrative efforts are believed to be minor and are not quantified in the analysis.

3.4 SOURCES OF UNCERTAINTY

92. There are several sources of uncertainty related to oil spill response that may affect the results of this analysis. These sources of uncertainty and their potential effects on this analysis are described below:

- **Number of Past Oil Spills**: This analysis relies on the number of spills that occurred in the vicinity of critical habitat in the recent past (i.e., since the otter was listed) to estimate the number of spills that will occur in the future following the designation of critical habitat. Geographic data on the specific location of past spills is poor. In particular, the number of spills in Cook Inlet critical habitat areas may be overstated due to the inclusion of the Forelands area in the regional dataset. It is also possible that past oil spills did occur in the vicinity of Units 4a and 4c and were not counted, which would result in an underestimate of the risk of spills around these units in the future.
- **Number of Future Oil Spills**: This chapter forecasts the relative likelihood of oil spills across the critical habitat based on the frequency and location of past spills. The potential for future spills in the vicinity of critical habitat, however, depends on a number of factors, including, future oil and gas development (described in Chapter 4), vessel traffic routes, and vessel technology.
- **Oil Spill Response for Sea Otters**: To forecast the number of consultations on oil spills considering sea otters in Chapter 7, this analysis does not apply the total number of spills forecast in this chapter but instead relies on the historical section 7 consultation rates for oil spills. That is, although this chapter forecasts approximately 111 spills per year across the proposed critical habitat area (based on historical rates), the Service has only consulted regarding the sea otter on an average of eight of these

[48] Written communication with Samantha Smith, Environmental Program Specialist, Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, Industry Preparedness Program, Marine Vessels Section on February 19, 2009.

spills per year since the listing of the species. Chapter 7 therefore forecasts administrative costs of consultation regarding oil spills assuming a future rate of eight consultations per year.

CHAPTER 4 | OIL AND GAS EXPLORATION AND DEVELOPMENT

93. The Proposed Rule states that "pollution from various potential sources, including oil spills from vessels, or discharges from oil and gas drilling and production, could render areas containing the identified physical and biological features unsuitable for use by sea otters."[49] This chapter discusses potential impacts of sea otter conservation on oil and gas exploration and development activities. It first describes baseline protection afforded the sea otter as part of State and Federal regulation of oil and gas development activities absent critical habitat designation. It then discusses recent research describing the potential future extent of oil and gas exploration activity within and adjacent to the proposed critical habitat. Finally, it discusses the potential for impacts of otter conservation on future oil and gas exploration and development.

KEY ISSUES AND CONCLUSIONS:
OIL AND GAS EXPLORATION AND DEVELOPMENT

- Oil and gas development has not occurred within the critical habitat area to date, though a small amount of leasing activity has occurred in Unit 4c. Thus, no pre-designation impacts of sea otter conservation have occurred.
- Oil and gas development is reasonably foreseeable within or in offshore areas that may affect critical habitat areas in the future. Experts in the field of oil and gas development in Alaska, however, assert that forecasting any specific scenario predicting the scope and scale of oil and gas development in this area would be speculative. This is not only because of the uncertainties regarding the quantity and characteristics of any resources discovered, but also because of the history of opposition to oil and gas development within the region.
- Consequently, this analysis does not quantify impacts of otter conservation on future potential oil and gas development activities within proposed critical habitat. This chapter does, however, profile the activity and highlight critical habitat units where oil and gas development or the development of support facilities may be particularly attractive. These are Unit 4c (Port Moller/Herendeen Bay) and Unit 2 (Unalaska).
- While the Service has not consulted on this activity as relates to the sea otter, this chapter discusses potential project modifications that the Service might request for sea otter based on past examples from Steller's eider. In past examples, project modifications have resulted in increased costs to operators rather than limitations on the industry's ability to survey and develop resources in critical habitat areas.

[49] U.S. Fish and Wildlife Service. Threatened and Endangered Wildlife and Plants; Designation of Critical Habitat for the Southwest Alaska Distinct Population Segment of the Northern Sea Otter (*Enhydra lutris kenyoni*): Proposed Rule. 73 Federal Register 76454, December 16, 2008.

4.1 EXISTING MANAGEMENT OF OIL AND GAS EXPLORATION AND DEVELOPMENT

94. The regulatory environment for oil and gas exploration and development is restrictive even absent otter conservation. Oil and gas developers must: develop an oil spill discharge prevention and contingency plan (C-Plan); acquire a National Pollution Discharge Elimination System (NPDES) permit for discharges; avoid siting new facilities in identified sensitive areas (such as within one half mile of Cook Inlet); and must operate within a six-month window in some areas (November 15 through April 6). Exhibit 4-1 summarizes existing requirements that may offer protection to the sea otter and its habitat.[50]

95. Alaska statute provides the Division of Oil and Gas (DO&G) "with the authority to impose conditions or limitations, in addition to those imposed by statute, to ensure that a resource disposal is in the state's best interests. Consequently, to mitigate the potential adverse social and environmental effects of specific lease-related activities, DO&G has developed mitigation measures and will condition plans of operation, exploration, or development and other permits based on these mitigation measures." Mitigation measures are identified in the "Best Interest Finding" for each sale, and are developed for ten year periods. These mitigation measures are then included as terms of the lease in all sales during the effective period of a finding.[51] Some of these mitigation measures specifically address beluga whales and Steller's eiders; none is targeted at the sea otters in particular. Mitigation measures also address disturbance avoidance, particularly in several State game refuges and critical habitat areas; seismic activities; siting of facilities; pipelines; oil spill prevention and control; and discharges and waste from drilling and production.[52]

96. NPDES general permit AKG-31-5000, issued by the Environmental Protection Agency (EPA) in 2006, covers oil and gas exploration, development, and production facilities located in State and Federal waters of Cook Inlet through June 2012. This program, covering a broad range of pollutants, enforces State and Federal clean water quality standards by requiring a permit to discharge wastes into the Nation's waters. NPDES permits specify the type and amount of pollutant discharge allowed, and include monitoring and reporting requirements to ensure that discharges are not harmful to water quality and human health. As a result of these requirements, the State of Alaska does not expect marine fish, mammals, and other aquatic organisms to be affected by drilling muds, cuttings, produced waters, and other effluents associated with oil and gas exploration, development, and production until that point.[53] Because discharges from oil

[50] This exhibit does not provide a comprehensive list of all regulatory requirements applicable to oil and gas exploration and development activities, but identifies those most likely to offer a conservation benefit to the sea otter.

[51] State of Alaska, Five Year Program of Proposed Oil and Gas Lease Sales, January 2009.

[52] Alaska Department of Natural Resources, Division of Oil and Gas. January 20, 2009. *Cook Inlet Areawide Oil and Gas Lease Sale: Final Finding of the Director*.

[53] Alaska Department of Natural Resources, Division of Oil and Gas. January 20, 2009. *Cook Inlet Areawide Oil and Gas Lease Sale: Final Finding of the Director*.

and gas drilling and production are the primary threat to the sea otter and its habitat from oil and gas development, as described in the proposed rule, little threat from oil and gas development is anticipated for Cook Inlet (other than the potential threat of oil spills, as discussed in Chapter 3). Specifically, the "Best Interest Finding" for the Cook Inlet Areawide Oil and Gas Lease Sale states, "Although oil and gas activities subsequent to leasing could potentially have cumulative effects on marine habitats, fish, and wildlife, measures in this Best Interest finding, along with regulations imposed by other state, federal and local agencies, are expected to avoid, minimize, and mitigate those potential effects."[54]

97. The construction and operation of pipelines to support the transport of oil and gas development activities is subject to substantial Federal Regulation in the United States. The Federal Pipeline and Hazardous Materials Safety Administration, an agency of the Department of Transportation, is charged with regulating the movement of hazardous materials, including oil and gas, by pipelines under its jurisdiction. The Agency reviews projects to ensure safety in the design, construction, and operation of pipelines, including spill response planning.[55]

98. The Pipeline Safety Improvement Act was promulgated in 2002. In accordance with this Act, the Office of Pipeline Safety issued a final rule in 2003 requiring natural gas pipeline operators to develop integrity management plans for gas transmission pipelines where a leak could do the most harm. Subsequently, in 2006, the "Pipeline Inspection, Protection, Enforcement, and Safety Act" was signed into law and describes requirements for integrity management plans for pipelines. The State Pipeline Coordinator's Office and the AK DEC also closely monitor corrosion of pipelines and regulate education, preparation of oil spills, and spill response. In addition, as described in Exhibit 4-1, according to the Best Interest Findings, mitigation measures related to pipeline construction describe that pipelines crossing marine waters will be constructed beneath the marine waters using directional drilling techniques unless otherwise approved by the Director of the AK DNR.

[54] Alaska Department of Natural Resources, Division of Oil and Gas. January 20, 2009. *Cook Inlet Areawide Oil and Gas Lease Sale: Final Finding of the Director*. Pg. 8-11.

[55] Ibid.

EXHIBIT 4-1. SUMMARY OF BASELINE OIL AND GAS CONSERVATION REQUIREMENTS

REGULATING ENTITY/SOURCE	RELEVANT CHD UNITS	MITIGATION MEASURE
Alaska Peninsula Best Interest Finding (AKDNR Division of Oil and Gas)	Unit 4	To minimize impacts to important waterfowl habitats in Kvichak Bay, Egegik Bay, Ugashik Bay, Cinder River Estuary, Port Heiden, Seal Islands Lagoon, Port Moller, Herendeen Bay, and Nelson Lagoon exploration, development, and major maintenance within these areas will only be allowed between November 16 and April 6, unless an exception is approved by the Director, in consultation with OHMP . Routine maintenance and emergency repairs will be permitted on a year-round basis during the production phase. A detailed plan describing routine maintenance activities to be conducted between April 7 and November 15 in these areas must be included in the plan of operations.
	Unit 4	Pipelines that must cross marine waters will be constructed beneath the marine waters using directional drilling techniques, unless the Director, in consultation with OHMP and the local borough and CRSAs, approves an alternative method based on technical, environmental, and economic justification.
	Unit 4	Cape Seniavin Walrus Haulout: Above ground lease-related facilities and structures will be prohibited within one mile inland from the coast, in an area extending one mile northeast and one mile southwest of the Cape Seniavin walrus haulout.
Cook Inlet Best Interest Finding (AKDNR Division of Oil and Gas)	Northern tip of Unit 5 in Cook Inlet	(General) The siting of onshore facilities, other than roads, docks, utility or pipeline corridors, or terminal facilities will be prohibited within one-half mile of the mean high water of Cook Inlet, except where land use plans classify an area for development, or established usage and use history show development. The siting of facilities other than docks, roads, utility, and pipeline crossings will also be prohibited within 500 feet of all fish bearing streams and waterbodies and 1,500 feet of all current surface drinking water sources. Additionally, to the extent practicable, the siting of facilities will be prohibited within one-half mile of the banks of the main channel of the Harriet, Alexander, Lake, Deep, and Stariski creeks, and the Drift, Big, Kustatan, McArthur, Chuitna, Lewis, Theodore, Beluga, Susitna, Little Susitna, Kenai, Kasilof, Ninilchik, and Anchor rivers. Facilities may be sited within these buffers if the lessee demonstrates to the satisfaction of the Director, in consultation with ADF&G, that site locations outside these buffers are not practicable or that a location inside the buffer is environmentally preferred. Road, utility, and pipeline crossings must be consolidated and aligned perpendicular or near perpendicular to watercourses.
		For Belugas (also have measures for bear and caribou): The siting of onshore facilities, other than roads, docks, utility or pipeline corridors, or terminal facilities will be prohibited within one-half mile of the mean high water of Cook Inlet, except where land use plans classify an area for development, or established usage and use history show development. The siting of facilities other than docks, roads, utility, and pipeline crossings will also be prohibited within 500 feet of all fish bearing streams and waterbodies and 1,500 feet of all current surface drinking water sources. Additionally, to the extent practicable, the siting of facilities will be prohibited within one-half mile of the banks of the main channel of the Harriet, Alexander, Lake, Deep, and Stariski creeks, and the Drift, Big, Kustatan, McArthur, Chuitna, Lewis, Theodore, Beluga, Susitna, Little Susitna, Kenai, Kasilof, Ninilchik, and Anchor rivers. Facilities may be sited within these buffers if the lessee demonstrates to the satisfaction of the Director, in consultation with ADF&G, that site locations outside these buffers are not practicable or that a location inside the buffer is environmentally preferred. Road, utility, and pipeline crossings must be consolidated and aligned perpendicular or near perpendicular to watercourses.
Rules for State Critical Habitat Areas	Unit 4, Unit 5	Exploration, development, and major maintenance activities within wetlands and upland areas will only be allowed between November 16 and April 6, unless an exception is approved by ADF&G and DO&G. Routine maintenance and emergency repairs will be permitted on a year-round basis during the production phase. A detailed plan describing routine maintenance

REGULATING ENTITY/SOURCE	RELEVANT CHD UNITS	MITIGATION MEASURE
(Alaska Department of Fish and Game)		activities to be conducted between April 7 and November 15 must be submitted to ADF&G and DO&G for review and approval. c. Gravel pads and wellheads are the only permanent above ground structures that will be allowed on wetlands and uplands. Gravel roads will not be allowed during exploration. d. Construction, operation, and maintenance activities shall minimize the visual, environmental, and physical impacts to the CHA. e. Surface discharge of produced waters will be prohibited. f. Disposal of drilling muds and cuttings will be allowed only at upland sites approved by the director, DO&G, and ADF&G, after consultation with DMLW and DEC. g. Facilities within a critical habitat area must be designed to minimize the risk of spills or fires resulting from vandalism or accidents. Upon abandonment of facilities, such facilities must be removed and the site rehabilitated to the satisfaction of ADF&G and DNR, unless the departments determine that such removal and rehabilitation is not in the state's best interests.
Alaska Statute (AKDNR, Office of Habitat Management and Permitting)	Units 1-5 Note: these protections generally apply to fresh water areas.	Under the provisions of Title 41 of the Alaska Statutes, the measures listed below may be imposed by OHMP below the ordinary high water mark to protect designated anadromous fish-bearing streams: Alteration of riverbanks may be prohibited. b. The operation of equipment, excluding boats, in open water areas of rivers and streams may be prohibited. c. Bridges or non-bottom founded structures may be required for crossing fish spawning and important rearing habitats. d. Culverts or other stream crossing structures must be designed, installed, and maintained to provide free and efficient passage of fish. 2. Removal of water from fish-bearing water bodies requires prior written approval by DMLW and OHMP.
U.S. Coast Guard Advisory (USCG)	Unit 4	Lessees are advised of the U.S. Coast Guard Advisory: United States Department of the Interior, Fish and Wildlife Service is asking for mariners' cooperation in minimizing disturbances to walrus resting at Cape Seniavin. Mariners are asked to stay 1,000 yards from shore when transiting past Cape Seniavin 56°24'00"N 160°09'00"W.
Marine Mammal Protection Act (Service and NMFS)	Unit 4	Walrus Haul Outs: Disturbance of walrus is a violation of the Marine Mammal Protection Act (MMPA) of 1972, as amended (16 USC 1361-1407). The USFWS shares authority over marine mammals with the National Marine Fisheries Service (NMFS), per the MMPA. Oil and gas activities, including exploration and development, in areas where walrus or other marine mammals occur, may result in their disturbance. The unintentional, or incidental, disturbance of marine mammals may be allowed under the MMPA, provided the USFWS or NMFS determine that the proposed activity will have a negligible impact on marine mammals and will not adversely impact subsistence hunting activities. The USFWS reviews requests for the incidental take of marine mammals on a case by case basis, and if authorized, may require certain mitigative measures to minimize industry disturbance and impact to marine mammals. In areas such as the Cape Seniavin walrus haulout, mitigative measures are likely to include protective buffer areas landward and seaward of the haulout, seasonal closures and monitoring programs. The USFWS concurs with the Federal Aviation Administration and U.S. Coast Guard advisories for pilots and mariners operating near Cape Seniavin, and refers pilots and mariners to those advisories for recommendations to avoid walrus disturbance.
National Pollution Discharge Elimination	Unit 5	NPDES general permit AKG-31-5000 (EPA 2007a), issued in 2006, covers oil and gas exploration, development, and production facilities located in state and federal waters of Cook Inlet through June 2012. Therefore, the State asserts that marine fish, mammals, and other aquatic organisms are not expected to be impacted by drilling muds, cuttings, produced waters, and other effluents associated with oil and gas exploration, development, and production.

REGULATING ENTITY/SOURCE	RELEVANT CHD UNITS	MITIGATION MEASURE
System (EPA/AKDEC)		
Alaska Regulations/Oil Pollution Act (AKDEC)	Units 1-5	Pursuant to state regulations administered by ADEC, lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations. The plan must include a response action plan to describe how spill response will occur, a prevention plan to describe the spill prevention measures taken at the facility, and supplemental information to provide background and verification information.
		Unless authorized by a DEC permit, surface discharge of reserve pit fluids and produced waters is prohibited.
		Unless authorized by a NDPES or state permits, discharge of wastewater into surface water or groundwater is prohibited.
		Secondary containment shall be provided for the storage of fuel or hazardous substances.
		Containers with an aggregate storage capacity of greater than 55 gallons which contain fuel or hazardous substances shall not be stored within 100 feet of a waterbody, or within 1,500 feet of a current surface drinking water source.
		During equipment storage or maintenance, the site shall be protected from leaking or dripping fuel and hazardous substances by the placement of drip pans or other surface liners designed to catch and hold fluids under the equipment, or by creating an area for storage or maintenance using an impermeable liner or other suitable containment mechanism.
		During fuel or hazardous substance transfer, secondary containment or a surface liner must be placed under all container or vehicle fuel tank inlet and outlet points, hose connections, and hose ends. Appropriate spill response equipment, sufficient to respond to a spill of up to five gallons, must be on hand during any transfer or handling of fuel or hazardous substances. Trained personnel shall attend transfer operations at all times.
		Vehicle refueling shall not occur within the annual floodplain, except as addressed and approved in the plan of operations. This measure does not apply to water-borne vessels. All independent fuel and hazardous substance containers shall be marked with the contents and the lessee's or contractors name using paint or a permanent label.
		A fresh water aquifer monitoring well, and quarterly water quality monitoring, is required down gradient of a permanent storage facility, unless alternative acceptable technology is approved by ADEC.
		Waste from operations must be reduced, reused, or recycled to the maximum extent practicable. Garbage and domestic combustibles must be incinerated whenever possible or disposed of at an approved site in accordance with 18 AAC 60.
		New solid waste disposal sites, other than for drilling waste, will not be approved or located on state property during the exploration phase of lease activities. Disposal sites may be provided for drilling waste if the facility complies with 18 AAC 60.
		Drilling mud and cuttings cannot be discharged into lakes, streams, rivers, or important wetlands. On pad temporary cuttings storage will be allowed. Impermeable lining and diking, or equivalent measures, will be required for reserve pits. Injection of non-hazardous oilfield wastes is regulated by AOGCC through its Underground Injection

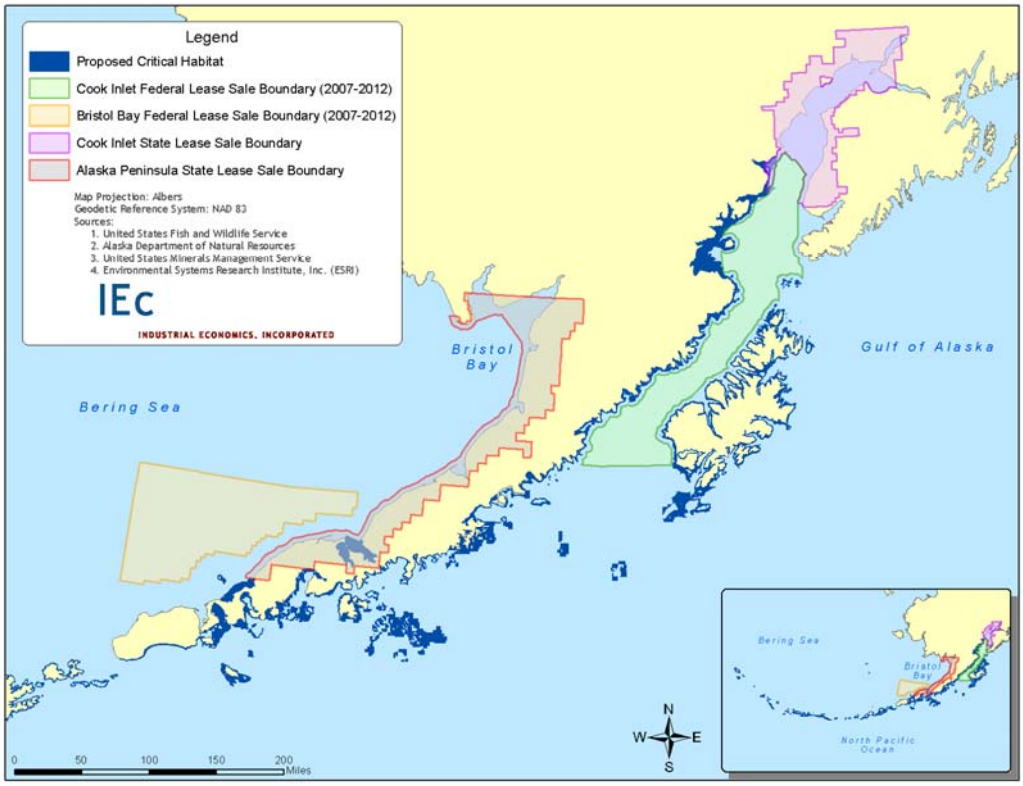
Sources: Alaska Department of Natural Resources, Division of Oil and Gas. January 20, 2009. *Cook Inlet Areawide Oil and Gas Lease Sale: Final Finding of the Director;* Alaska Department of Natural Resources, Division of Oil and Gas. July 25, 2005. Alaska Peninsula *Areawide Oil and Gas Lease Sale: Final Finding of the Director.*

4.2 SCOPE AND SCALE OF OIL AND GAS DEVELOPMENT ACTIVITIES

99. The State of Alaska owns the mineral rights under State-owned lands and submerged lands within three miles of shore. Beyond three miles from shore, the Minerals Management Service (MMS) manages the leasing of mineral rights on behalf of the Federal government. Both the State and MMS have delineated lease sale areas for oil and gas resources in the vicinity of proposed otter critical habitat, shown graphically in Exhibit 4-2. These sales are planned over five-year leasing schedules. Because proposed critical habitat is directly adjacent to the shore, it is primarily State-owned mineral rights that stand to be directly affected by the designation. In addition, if the development of Federal leases in offshore areas lead to a need for supporting infrastructure in critical habitat areas, impacts associated with these leases could also occur.

100. The State and Federal lease sale areas are shown in Exhibit 4-2 in relation to proposed otter critical habitat. A very small portion of the Federal Cook Inlet lease sale area overlaps proposed critical habitat in Unit 5.

EXHIBIT 4-2. FEDERAL AND STATE LEASE SALE AREAS IN THE VICINITY OF PROPOSED OTTER CRITICAL HABITAT



4.2.1 BRISTOL BAY/ALEUTIAN BASIN AREA (UNITS 1 THROUGH 4)

101. There is a long history of interest in the oil and gas potential of the region north of the Alaska Peninsula, including Bristol Bay and the Aleutian Basin. To date, however, active exploration and development has not occurred due to a moratorium on drilling in Bristol Bay. For a variety of reasons, including the decline in oil production from the North Slope of Alaska and a limit on the potential for other sources of employment within the region, interest in exploration and development has recently been renewed.[56]

Federal Oil and Gas Leases

102. The U.S. Department of the Interior sold approximately $100 million in leases to a number of oil companies in a sale held in the Aleutian Basin in 1985 (Sale 92) on the Outer Continental Shelf (OCS). Due to court challenges, however, the leases were never transferred to the companies and eventually, in 1995, were bought back by the Federal government.[57] For many years, the leasing of acreage in the OCS in the Aleutian Basin was banned, but a lease sale is currently scheduled for 2011 (see Exhibit 4-2). Most recently, however, the White House ordered a review of the OCS lease schedule to determine whether the sale should be postponed or eliminated.[58]

State Oil and Gas Leases

103. Leases on Alaska State lands in the Bristol Bay region were sold in the early 1970s, but by 1972 the State had imposed a ban on leasing for oil and gas exploration which remained in place until a few years ago.[59] The State has recently conducted a series of three area wide lease sales in the region, with limited success. In 2005, 38 leases were sold to Shell Offshore Inc (33 tracts) and Hewitt Mineral Corp (5 tracts). The total cost of the leases was approximately $1.2 million. In 2007, one additional lease was sold to Hewitt Mineral Corp, but the 33 tracts leased by Shell Offshore were relinquished.[60] The lease sale held in 2008 did not yield any bidders. These data are summarized in Exhibit 4-3. The five active leases are located both onshore and offshore in the vicinity of Port Moller, as shown in Exhibit 4-4. The State DNR Oil and Gas Permitting department

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[56] Memorandum from Scott Goldsmith, Economist, Institute of Social and Economic Research, University of Alaska to Industrial Economics, March 24, 2009.

[57] Ibid.

[58] The current lease schedule covers the period 2007 to 2012, and includes a sale in the North Aleutians in 2011. However, the new Administration is considering a revised lease schedule that would cover the period 2010 through 2015, which has some overlap with the existing schedule. The Administration is conducting a review that will include review of the North Aleutian sale. Minerals Management Service, Offshore Energy and Minerals Management Program, Frequently Asked Questions, accessed at http://www.mms.gov/5-year/FrequentlyAskedQuestions.htm on March 27, 2009.

[59] Memorandum from Scott Goldsmith, Economist, Institute of Social and Economic Research, University of Alaska to Industrial Economics, March 24, 2009.

[60] Written communication with M. Pritchard, Cartographer, Alaska Department of Natural Resources, Division of Oil and Gas on March 25, 2009.

states that no pre-application materials or Plan of Operations have been submitted for oil and gas development in the area to date.[61]

EXHIBIT 4-3. HISTORY OF STATE LEASE SALES IN THE ALEUTIAN BASIN SINCE 2005 [A]

LEASE SALE AREA	YEAR OF SALE	NUMBER OF TRACTS LEASED	ACRES	BIDDER	CASH BONUS
Alaska Peninsula Areawide Sale (State)[b]	2005	33[c]	867,811[c]	Shell Offshore Inc.	$842,414
	2005	5	22,682	Hewitt Mineral Corp.	$306,837
	2007	1	5,728	Hewitt Mineral Corp.	$38,778
	2008	0	0	No bids received	$0

[a] No sales occurred in the Basin in Federal OCS areas during this period.
[b] These data include all tracts leased within the Sale Area. See Exhibit 4-4 for a spatial presentation of these data.
[c] Relinquished in 2007.
Source: Alaska DNR, Division of Oil and Gas, Historic Lease Sales, accessed at: http://www.dog.dnr.state.ak.us/oil/programs/leasing/leasesales/historic.htm on March 23, 2009.

104. The State is currently scheduled to conduct an area wide sale for the Alaska Peninsula in each of the years 2009 through 2013, as part of the current five-year statewide lease schedule. The lease sale history indicates, however, that the State lands in the Aleutian Basin are a low priority area for oil and gas interests in Alaska at the present time.[62] Staff at the State DNR Oil and Gas Permitting department suggest that if a significant find and development were to occur in the Federal OCS area near state lands, this could spark future interest, bidding, and potential development of State lands.[63]

4.2.2 COOK INLET AREA (NORTHERN PORTION OF UNIT 5)

105. Unit 5 of proposed critical habitat includes the southwestern portion of Cook Inlet. Historically, oil and gas development in Cook Inlet has been concentrated in middle Cook Inlet, between the Forelands and North Forelands area, north of proposed critical habitat for otter.[64]

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[61] Personal communication with M. Rader, AKDNR, Natural Resource Specialist, Division of Oil & Gas, Oil & Gas Permitting, Permitting Section on March 17, 2009.

[62] Personal communication with, Economist, Institute of Social and Economic Research, University of Alaska March 26 2009.

[63] Personal communication with M. Rader, AKDNR, Natural Resource Specialist, Division of Oil & Gas, Oil & Gas Permitting, Permitting Section on March 17, 2009.

[64] Whitney, John. "Cook Inlet, Alaska, Oceanographic and Ice Conditions and NOAA's 18-year oil spill response history, 1984-2001," Hazardous Materials and Response Assessment Division, Office of Response and Restoration, National Ocean Services, Anchorage, Alaska. HAZMAT Report 2003-01, October 2002.

Federal Oil and Gas Leases

106. MMS manages a large number of tracts that parallel at a distance of three miles from the coastline where critical habitat is proposed, as shown in Exhibit 4-2. As shown, a very small portion of the lease sale area identified for the current MMS planning period (2007-2012) intersects proposed Unit 5 of critical habitat. The Cook Inlet Lease Sale area was offered in 2004 and 2006. No active leases exist within or adjacent to proposed critical habitat, as shown in Exhibit 4-4. Future sales are planned for 2010 and 2011. One seismic surveying company reports that they have not conducted any seismic surveys in the proposed critical habitat in the past ten years.[65]

State Oil and Gas Leases

107. Since 1998, the State of Alaska has offered the entire Cook Inlet lease sale area up for lease annually. This area is depicted in Exhibit 4-2 in relation to proposed critical habitat areas for otter. A small portion of the State lease sale area overlaps proposed otter critical habitat, although none of this area has been leased to date. Because all available State acreage within the region is currently included in the sale area, no additional critical habitat areas are anticipated to be included in future sales.[66]

4.3 PRE-DESIGNATION IMPACTS ON OIL AND GAS DEVELOPMENT

108. Although a few State-owned tracts have been leased in and around Port Moller and Herendeen Bay area (Unit 4c), no development in this area appears imminent. The State DNR Oil and Gas Permitting Department reports that no pre-application materials or Plan of Operations have been submitted for oil and gas development in the Port Moller/Herendeen Bay area to date.[67] The lack of development in the Aleutian Basin is likely due, at least in part, to the long-term moratorium on drilling in Bristol Bay. All of the past oil and gas development to date in Cook Inlet has centered on the Forelands area in Middle Cook Inlet, and has not occurred in proposed critical habitat areas.[68] Oil and gas development has not occurred elsewhere in proposed sea otter critical habitat areas since the listing of the otter in 2005. Thus, no pre-designation impacts of otter conservation associated with oil and gas exploration or development are quantified in this analysis.

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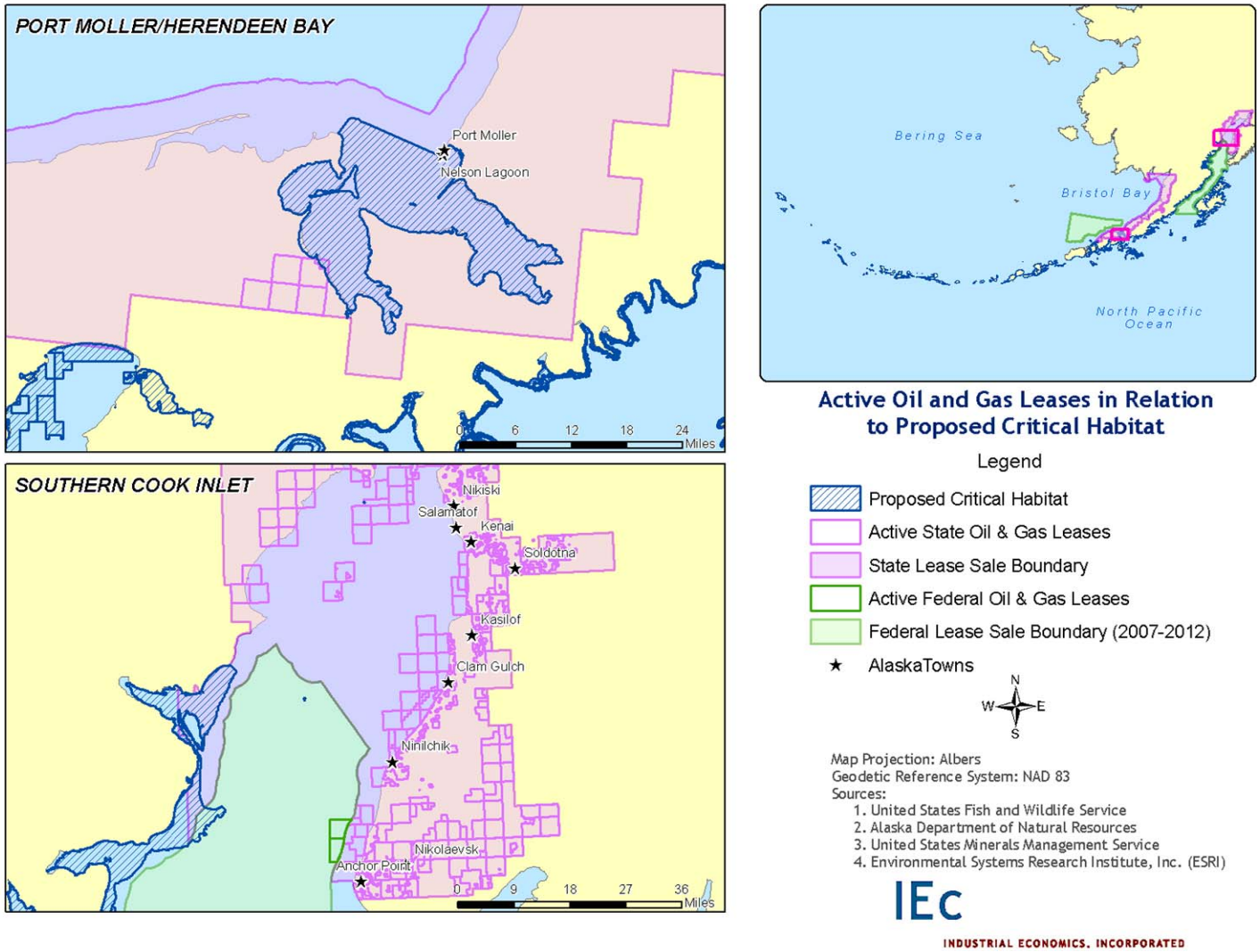
[65] Veritas Geophysical, March 26 2009.

[66] State of Alaska, Five-Year Program of Proposed Oil and Gas Lease Sales, Alaska Department of Natural Resources, January 2009.

[67] Personal communication with M. Rader, AKDNR, Natural Resource Specialist, Division of Oil & Gas, Oil & Gas Permitting, Permitting Section on March 17, 2009.

[68] Whitney, John. "Cook Inlet, Alaska, Oceanographic and Ice Conditions and NOAA's 18-year oil spill response history, 1984-2001," Hazardous Materials and Response Assessment Division, Office of Response and Restoration, National Ocean Services, Anchorage, Alaska. HAZMAT Report 2003-01, October 2002; Personal communication with J. Whitney, Hazardous Materials and Response Assessment Division, Office of Response and Restoration, National Ocean Services, on March 2, 2009.

EXHIBIT 4-4. ACTIVE FEDERAL AND STATE LEASES IN THE VICINITY OF PROPOSED OTTER CRITICAL HABITAT



4.4 POST-DESIGNATION IMPACTS ON OIL AND GAS DEVELOPMENT

4.4.1 FUTURE OIL AND GAS DEVELOPMENT ACTIVITIES IN PROPOSED CRITICAL HABITAT AREAS

109. Despite a significant body of research regarding the potential for oil and gas development activities in Alaska, no forecast of the activity exists for the proposed critical habitat area. Research instead has focused primarily on offshore Federal lease areas on the North Slope (including the Beaufort and Chukchi Seas, the National Petroleum Reserve, and the Central North Slope), and the North Aleutian Basin (offshore areas north of the proposed critical habitat). The following section details potential oil and gas development activities in the Bristol Bay/Aleutian Basin Area due to the relative proximity of that area to critical habitat. Oil and gas development is not expected to affect other critical habitat areas in the foreseeable future.

Bristol Bay/Aleutian Basin Area (Units 1 through 4)

110. Although no exploration, development, or production activity has occurred in the Aleutian Basin, there have been wells drilled in the past which have indicated the presence of hydrocarbons. A 2006 Mineral Management Service (MMS) Oil and Gas Assessment estimates Aleutian Basin reserves (mean undiscovered, economically recoverable, at a price of $60 per barrel for oil and $9.07 per mcf of gas) to be 0.71 billion barrels of oil and 7.65 tcf of gas. No estimate exists, however, regarding the extent of reserves on State lands, which make up the majority of the proposed critical habitat area.[69]

111. As stated above, a Federal lease sale is scheduled for 2011 in the Aleutian Basin. The lease area would be restricted to the same area that was leased in Sale 92, covering the southwest portion of the basin (See Exhibit 4-2). As discussed above, the White House has ordered review of the OCS lease schedule; thus, the future of this sale remains uncertain.[70]

112. Experts in the field of oil and gas development in Alaska assert that, while there is the potential for these activities to occur within the proposed critical habitat in the future, forecasting any specific scenario for oil and gas development in this area would be speculative. This is not only because of the usual uncertainties regarding the quantity and

[69] Minerals Management Service, 2006 Oil and Gas Assessment: North Aleutian Basin Planning Area, Alaska-Province Summary; Personal communication with, Economist, Institute of Social and Economic Research, University of Alaska March 26 2009.

[70] Memorandum from Scott Goldsmith, Economist, Institute of Social and Economic Research, University of Alaska to Industrial Economics, March 24, 2009.

characteristics of any resources discovered, but also because of the history of opposition to oil and gas development within the region.[71]

113. The most recent oil and gas development scenario for the Aleutian Basin/Bristol Bay area was developed as part of a 2009 study for the Shell Oil Company, entitled "Economic Analysis of Offshore Oil and Gas Development" by Northern Economics and the Institute of Social and Economic Research."[72] The scenario developed for this study assumes the seismic exploration begins prior to leasing, and that production begins in 2020 extending through 2043. It also assumes that:

- Production occurs from offshore platforms;
- Two major shore-based facilities are required;
- One supply base is required on the Bering Sea side of the Alaska Peninsula for the supply boats and helicopters, and a second facility on the Pacific Ocean side of the Peninsula.
- The Pacific facility would include an LNG plant and provide marine terminals for oil and LNG tankers.

114. While development such as that described in this study could affect critical habitat areas, the 2009 oil and gas study does not explicitly include the proposed critical habitat area (i.e., Alaska State waters, Cook Inlet, or the southern Alaska Peninsula area). Even for activities projected to occur within the Aleutian Basin, the study does not specifically predict the location of onshore facilities, as the specific location of these facilities depends upon a number of factors that cannot be determined at this time. For example, the siting of support infrastructure will be related to the location of the potential discoveries, which are unknown at this time. In addition, one of the authors of this report states that this scenario should be considered optimistic (i.e., more likely to overstate the potential for development rather than understate this potential).[73] This scenario assumes the lease sale is conducted, leases are successfully acquired, discovery of the resource occurs, and no additional administrative or legal delays are present. As such, this analysis is not explicitly used to forecast oil and gas development within critical habitat areas. The findings of this analysis are summarized in Exhibit 4-5.

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[71] As an example of a past attempts to project drilling activity that did not bear out, the 1985 EIS for lease sale 92 assumed that the conditional mean resource estimates of 364 MMbbls of oil and 2.662 TCF of gas could be discovered and produced. In the original EIS under alternative 1, oil and gas production was scheduled to begin in 1993 and 1994, respectively, and reach a peak annual production in 1994 to 1999 for oil (31 MMbbls) and in 1995 to 2012 for gas (0.126 TCF).) None of this development has occurred to date.

[72] Northern Economics, "Economic Analysis of Future Offshore Oil and Gas Development: Beaufort Sea, Chukchi Sea, and North Aleutian Basin. Prepared for Shell Exploration and Production, March 2009.

[73] Personal communication with Scott Goldsmith, Economist, Institute of Social and Economic Research, University of Alaska March 26 2009.

EXHIBIT 4-5. ONE SCENARIO FOR OIL AND GAS DEVELOPMENT EXPLORATION ACTIVITIES IN THE NORTH ALEUTIAN BASIN (OCS AREA), 2008-2024

ACTIVITY	LOCATION OF ACTIVITY	NUMBER ANTICIPATED IN ALEUTIAN OCS AREA
Seismic Surveys	Unknown	11
Exploration/delineation wells	Unknown	10
Exploration drilling rig seasons	Unknown	8
Production platforms	Offshore	2
Production/injection wells	Offshore	61
Miles of offshore/onshore pipelines	Offshore and on Alaska Peninsula, possibly LNG facility near Sand Point	300
Shore-based facilities	Alaska Peninsula, possibly Unalaska or Port Moller depending on location of oil or gas discovery	2

Note: This scenario is not specific to critical habitat areas, but includes the entire North Aleutian Basin. Specific locations of facilities were not estimated in this study.
Source: Northern Economics, "Economic Analysis of Future Offshore Oil and Gas Development: Beaufort Sea, Chukchi Sea, and North Aleutian Basin. Prepared for Shell Exploration and Production, March 2009, pp 38-39.

115. One potentially significant oil and gas associated infrastructure development project that could affect critical habitat in Units 1-4 is the construction and operation of a pipeline to transport oil and gas from Bristol Bay and points northward to an outlet on the south side of the Alaska Peninsula. This project may include building a pipeline across the Alaska Peninsula. The recent study by Northern Economics and the University of Alaska estimates that of 1,215 additional miles of pipeline that will need to be constructed within the State of Alaska to support the oil and gas industry, 300 miles will need to be located within the North Aleutian Basin. Specifically, the State of Alaska has identified the Port Moller/Herendeen Bay area (Unit 4c) as being a promising area for locating this pipeline.[74] The Northern Economics study forecasts construction on the pipeline in the Basin beginning in 2017 and ending by 2021, with portions operational by 2020.[75] To date, however, specific plans for timing and location of the pipeline's potential development do not exist. Siting of the pipeline and associated support facilities will depend on where the natural gas resources are located, as well as other logistical and cost considerations.

[74] Public comments of Doug Vincent-Lang, "Re: State of Alaska Comments: Proposed Designation of Sea Otter Critical Habitat." Alaska Department of Fish and Game, February 17, 2009.

[75] Northern Economics, "Economic Analysis of Future Offshore Oil and Gas Development: Beaufort Sea, Chukchi Sea, and North Aleutian Basin. Prepared for Shell Exploration and Production, March 2009.

4.4.2 POTENTIAL ECONOMIC IMPACTS TO FUTURE OIL AND GAS DEVELOPMENT ACTIVITIES

116. Although past impacts to oil and gas activities have not occurred in sea otter habitat since listing, at least two past consultations on oil and gas exploration and development have occurred associated with Steller's eiders in habitat areas prior to the listing of the otter. While outcomes of these consultations are not directly relevant to this analysis, these examples may provide insights into the types of modifications to oil and gas development activities that the Service may request in the future related to otter and its habitat. Project modifications associated with these consultations are summarized in Exhibit 4-6.

EXHIBIT 4-6. EXAMPLE PROJECT MODIFICATIONS FOR OIL AND GAS DEVELOPMENT PROJECTS ASSOCIATED WITH STELLER'S EIDER

PROJECT	PROJECT MODIFICATION	ESTIMATED COSTS
Upgrade and expansion of bulk fuel storage facility in Nelson Lagoon	Limit the number of times fuel is delivered to the facility to once per year.	Minimal
	Design and construction of a secondary containment apparatus to house the barge distribution hose.	Minimal
	Development of a Geographic Response Strategy for Nelson Lagoon. As part of this, the BIA was required to conduct a site test, ensure that equipment to implement the GRS was procured and readily available, including acquiring, permitting and training use of hazing equipment for eiders.	$10,000 to $25,000
3-D seismic surveys in Cook Inlet	Perform aerial monitoring biweekly until an eider is spotted, and every day thereafter.	$2,500-$6,000 per flight, including cost of additional biologist
	Perform monitoring surveys (conducted by a qualified biologist).	Included below in monitor cost
	Maintain a distance of 300 meters from bird flocks.	Varying from none to project delay
	Supply its vessel operators with GRS for the areas in Lower Cook Inlet;.	Minimal
	If surveys occur between November 15 and April 15, have a qualified, experienced biologist aboard the source vessel to monitor for disturbance to eiders and report to the Service.	$1000/day for 60 days

Note: Costs associated with developing a GRS have varied. Typically, a GRS mapping and planning effort is conducted for multiple sites simultaneously, resulting in economies of scale. Costs to develop a GRS also vary according to the remoteness of the location requiring mapping, and the size of the area being assessed. The State estimates that costs of developing a set of GRS's may range from $25,000 to $50,000. Costs associated with developing a GRS for a single site may cost nearly as much as for a set, with estimates ranging from $10,000 to $25,000.

Sources: Final Biological Opinion: Effects of Upgrading and Expanding a Bulk Fuel Facility in Nelson Lagoon, Alaska, on the Threatened Steller's Eider (*Polysticia stelleri*), Service, Anchorage Field Office, March 13, 2003; Final Biological Opinion: The Effects of 3-D seismic surveys in the nearshore waters of Lower Cook Inlet, Alaska, on the Threatened Steller's Eider (*Polysticia stelleri*), Service, Anchorage Field Office, February 3, 2003; Personal communication with R.Trupp, Veritas Geophysical, March 26, 2009. Personal communication with D. Lentsh, Cook Inlet Spill Prevention and Response, on February 26, 2009; Personal communication with P. Pritchard and C. Burns, Alaska Chadux, on March 17, 2009. Personal communication with Dale Gardner, Environmental Program Specialist, Alaska Department of Environmental Conservation on March 18, 2009.

117. As shown, during a consultation on an upgrade and expansion of a bulk fuel storage facility in Nelson Lagoon (2003), the Service recommended development of a Geographic Response Strategy (GRS) for Nelson Lagoon (see Chapter 3 for more detail about these strategies). This lagoon is nearby Unit 4c of proposed critical habitat for otters. As part of the GRS effort, the BIA was required to conduct a site test, ensure that equipment to implement the GRS was procured and readily available, including acquiring, permitting and training use of hazing equipment for eiders.[76] The Service has stated that requesting additional GRS's in Unit 4c are foreseeable if future oil and gas development is planned.[77] Costs associated with developing a GRS are expected to vary from $10,000 to $25,000.[78]

118. During a consultation on the effects of 3-D seismic surveys in Cook Inlet, the Service requested that the USACE require the operator to have a qualified, experienced biologist aboard the source vessel to monitor disturbance to eiders and report to the Service for all surveys occurring between November 15 and April 15.[79] Costs associated with hiring an onboard monitor would vary according to the length of the project, or number of days the monitor is used. The survey company who was responsible for implementing the eider conservation efforts reports that monitors typically cost $1,000 per day, and are often hired for 60 days at a time.

119. The past consultation on eiders also requested that the operator perform aerial monitoring biweekly until an eider is spotted, and every day thereafter. Additional costs of overflights, cost approximately $1,500 to $5,000 per day plus an additional cost of a biological observer at $1,000 per day.[80]

120. Similar to the consultation that occurred in Nelson Lagoon, a request for building additional oil and gas infrastructure in critical habitat areas could lead the Service to request that additional GRS's be developed to protect otter habitat.[81] Specifically, it is possible that additional GRS could also be requested in the Cook Inlet portion of

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[76] Final Biological Opinion: Effects of Upgrading and Expanding a Bulk Fuel Facility in Nelson Lagoon, Alaska, on the Threatened Steller's Eider (*Polysticia stelleri*), Service, Anchorage Field Office, March 13, 2003.

[77] Personal communication with Service Section 7 biologist, Anchorage Field Office, on March 16, 2009.

[78] Costs associated with developing a GRS have varied. Typically, a GRS mapping and planning effort is conducted for multiple sites simultaneously, resulting in economies of scale. Costs to develop a GRS also vary according to the remoteness of the location requiring mapping, and the size of the area being assessed. The State estimates that costs of developing a set of GRS's may range from $25,000 to $50,000. Costs associated with developing a GRS for a single site may cost nearly as much as for a set, with estimates ranging from $10,000 to $25,000. Personal communication with D. Lentsh, Cook Inlet Spill Prevention and Response, on February 26, 2009; Personal communication with P. Pritchard and C. Burns, Alaska Chadux, on March 17, 2009. Personal communication with Dale Gardner, Environmental Program Specialist, Alaska Department of Environmental Conservation on March 18, 2009.

[79] Final Biological Opinion: The Effects of 3-D seismic surveys in the nearshore waters of Lower Cook Inlet, Alaska, on the Threatened Steller's Eider (*Polysticia stelleri*), Service, Anchorage Field Office, February 3, 2003.

[80] Personal communication with R.Trupp, Veritas Geophysical, March 26, 2009.

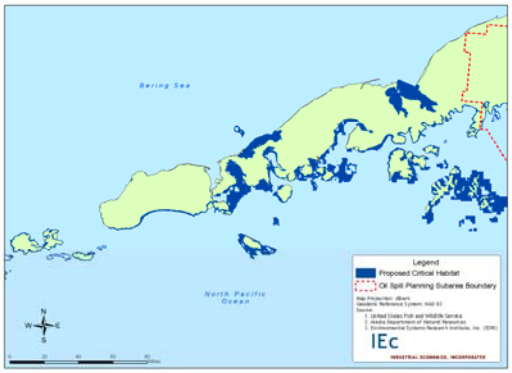
[81] Personal communication with section 7 biologist, Service, Anchorage Ecological Services Office, March 16, 2009.

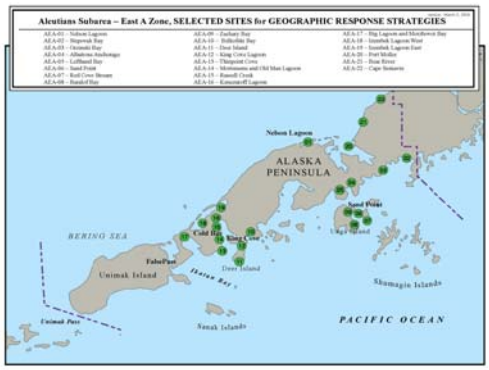
proposed critical habitat (Unit 5). However, identifying specific additional locations for GRS sites is not possible at this time. Exhibit 4-7 presents existing locations of GRS sites in on near Units 4 and 5 of proposed critical habitat.

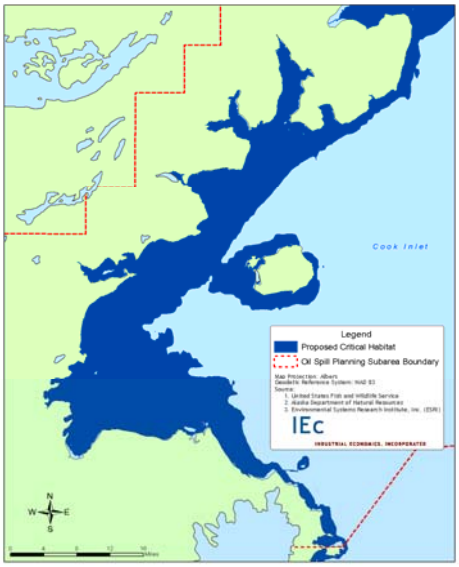
121. As described above, it is too early in the leasing process to understand where any onshore oil and gas facilities might be located in the Aleutian Basin. It is therefore not possible to predict specific locations of future oil and gas development within critical habitat or specific conservation requirements associated with consultations on otters and their habitat at this time. However, if areas adjacent to existing infrastructure are more likely to experience near-term development pressure,[82] and if the six active leases are indicative of interest level, development potential would appear to exist in Unit 4c (Port Moller/Herendeen Bay) and Unalaska (Unit 2). The State of Alaska has also identified Port Moller as a promising location for the offshore-onshore gas pipeline outlet in Bristol Bay-North Aleutian Basin.

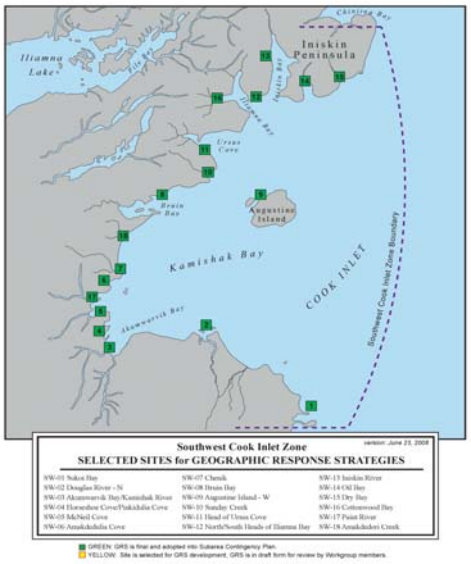
[82] Note that it typically requires eight to nine years from the point of lease to production, and none of the active leases in critical habitat have yet filed a Plan of Operations with the State.

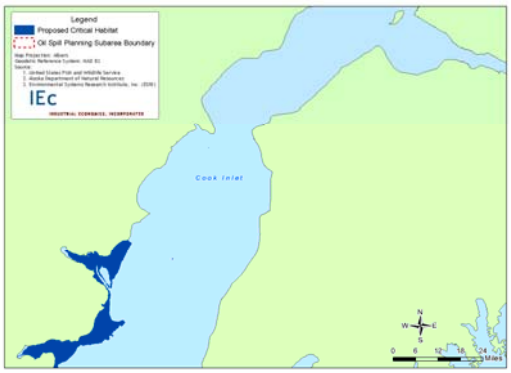
EXHIBIT 4-7. MAPS OF EXISTING GEOGRAPHIC RESPONSE STRATEGIES IN RELATION TO UNIT 4C OF PROPOSED CRITICAL HABITAT

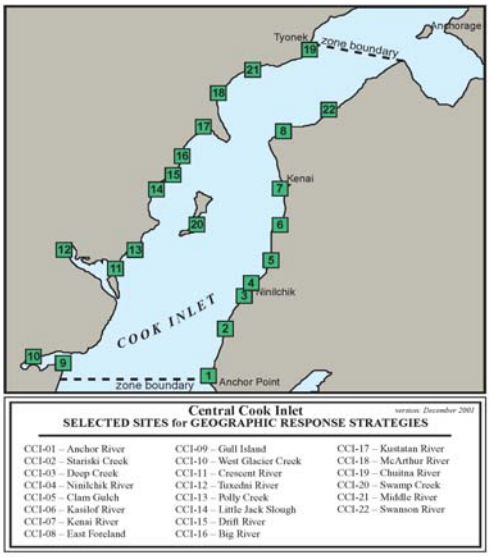












CHAPTER 5 | MARINE AND COASTAL CONSTRUCTION

122. The proposed critical habitat rule notes, "Potential activities that could harm the identified physical and biological features include, but are not limited to, dredging or filling associated with construction of airports, seaports, and harbors..." This chapter accordingly evaluates the potential effect of otter conservation efforts on marine and coastal construction activities within or affecting the proposed critical habitat. In addition to airport development and port and harbor construction, this chapter considers mariculture operations, and tidal energy developments.

123. Construction activities may affect the otter or its habitat by compromising water quality through dredge and fill activities and introducing noise disturbance.[83] These potential threats may be minimized or avoided, at some cost, through conservation efforts, such as:

- Avoiding dredging where possible;
- Minimizing dredging and fills if dredging cannot be avoided; and
- Developing new routes and operational procedures to minimize disturbance.

124. These conservation efforts may result in project delays for the associated marine and coastal construction activities as the agencies plan their projects around these constraints. The potential costs of such construction delays are quantified in this analysis. In addition, water quality issues from marine and coastal construction activities may result from an increased incidence of fuel spills occurring at ports, harbors, and airports. The management of oil spills is discussed in Chapter 3.

125. This chapter first forecasts potential construction projects within or adjacent to the proposed critical habitat area. Second, this chapter provides a description of the existing management of these activities as relates to otter conservation. It then describes the analytic approach used to quantify impacts of otter conservation efforts and describes the estimated pre- and post-designation costs. The final section discusses uncertainties in the analysis.

[83] US Fish and Wildlife Service, *Conservation Plan for the Sea Otter in Alaska*, June 1994.

KEY ISSUES AND CONCLUSIONS:
MARINE AND COASTAL CONSTRUCTION

This chapter forecasts reasonably foreseeable marine and coastal construction projects that may affect the otter within the proposed critical habitat area. It then quantifies the associated potential conservation efforts for the sea otter and its habitat. Administrative costs associated with section 7 consultation for marine and coastal construction activities are quantified in Chapter 7. All estimated post-designation impacts are expected to occur in Units 2 and 5.

Pre-designation impacts

- Since 2005, impacts associated with otter conservation have consisted of environmental research and reporting and time delays for a number of construction projects. Total pre-designation impacts of these otter conservation efforts are: **$27.8 million.**

Post-designation baseline impacts

- Similar to pre-designation impacts, this analysis forecasts impacts associated with environmental research and reporting environmental studies for reasonably foreseeable construction projects. Total potential baseline impacts are: **$3.53 million** for four forecast construction projects.

- Forecast post-designation impacts are less than the pre-designation impacts because three pre-designation construction projects involved dredging and, as a result, experienced some project delays. None of the forecast construction projects involve dredging and so no time delays are forecast. While time delays are still ongoing for three airport construction projects (two expected to be completed in 2009 and one in 2012), because these delays began pre-designation of critical habitat (in 2006 and 2007), the impacts of the delays are included in the pre-designation impacts.

- There has been recent interest in potential tidal energy development in Cook Inlet, overlapping Unit 5 of the proposed critical habitat designation. Of the four feasibility studies that have occurred regarding the potential for tidal energy developments in this area, however, two projects were abandoned and two studies are still ongoing. In addition to the uncertainties regarding the potential number and location of future projects, the potential for related otter conservation efforts is also unknown as the potential otter conservation efforts that may be related is unknown. The impact of tidal energy projects on the otter and its habitat has not been extensively studied. This analysis therefore does not quantify impacts associated with future tidal energy projects but highlights their potential in Unit 5.

Incremental impacts of critical habitat

- Critical habitat is not expected to result in additional sea otter conservation efforts for marine and coastal construction activities. Incremental impacts are therefore limited to administrative costs of consultation quantified in Chapter 7 of this report.

Note: All cost estimates presented in this Chapter describe present value impacts assuming a seven percent discount rate. Appendix B reports forecast cost impacts assuming a discount rate of three percent to highlight the sensitivity of the results to the discount rate.

5.1 EXTENT OF KNOWN FUTURE CONSTRUCTION PROJECTS

126. Management agency schedules and planning documents were used to determine the likely scope of future marine and coastal construction projects in the proposed critical habitat. Project plans were obtained from the Federal Aviation Administration (FAA)'s Alaskan Region, Airports Division' Airport Improvement Program (AIP) as well as the Alaska Department of Transportation's (AK DOT) current Statewide Transportation Improvement Program.

127. The existing plans cover projects that are expected to begin by 2010; because the projects in the proposed critical habitat area are generally large scale, involving long term planning, projects forecast to begin in 2010 often involve construction activities in stages over multiple years. This analysis also references the State transportation plan that considers potential projects through 2030, the *Alaska Statewide Long-Range Transportation Policy Plan*[84]. This longer term plan, however, does not identify any specific construction projects as occurring within the proposed critical habitat area over that extended timeline. As such, this document serves as a scoping document (i.e., sets a foundation for policy development), but is not used to explicitly forecast projects in critical habitat areas.

128. This analysis does not attempt to forecast specific projects beyond those cited in available plans. These plans include all marine and coastal construction activities that the State considers foreseeable and are therefore considered to be the best available information regarding future activity.

5.1.1. AIRPORTS

129. Based on discussion with the FAA's Alaskan Region, as well as FAA schedules and planning documents, five airport projects may occur within or adjacent to the proposed critical habitat area in the foreseeable future, as described in more detail below and in Exhibit 5-1. A number of these projects have already begun or are currently experiencing project delays (related to multiple factors) but the construction phase is not yet complete on any of these five projects. These airport construction activities are centered in the areas adjacent to Units 1, 2, and 5, with the two largest projects occurring in Unit 2.

- *Atka Airport.* Existing plans for this project are to extend, reconstruct, and realign the runway at Atka Airport in Unit 1. As part of this process, Runway 15/33 will be rotated three degrees and extended to 4,500 feet.[85] Currently, the project is expected to utilize uplands areas and not enter marine waters.[86]

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[84] Alaska Department of Transportation and Public Facilities, Let's Get Moving 2030: Alaska Statewide Long-Range Transportation Policy Plan." February 2008.

[85] FAA Airports Division, Alaskan Region, *Airport Improvement Program: Project Schedule, 2008-2010,* February 2, 2009.

[86] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009.

- *Akutan Airport.* Planning for the Akutan Airport, located adjacent to Unit 2, began in 2005; the project is still ongoing. Future stages of development include: the construction of an airport terminal on nearby Akun Island; construction of supporting airport access roads; and construction of a hovercraft terminal. This project has been subject to past section 7 consultation with the Service.[87] The original plan was for the project to occur in 2006; it is now expected to be completed in 2009.
- *Dutch Harbor Airport.* Located near the city of Unalaska adjacent to Unit 2, construction at the existing Dutch Harbor airport is in the beginning design and planning stages. At this time, some marine dredging and/or fill is expected as part of the construction, possibly associated with runway correction or runway safety area expansion. The project is expected to cost around $90 million absent any otter conservation efforts.[88] The original plan was for the project to occur in 2007; it is now expected to be completed in 2012.
- *Kodiak Airport.* The FAA plans to expand the existing Runway Safety Areas (RSAs) in compliance with FAA safety regulations at the Kodiak Airport adjacent to Unit 5. This effort will include expanding a runway embankment about 800 feet into marine waters. The current construction cost is estimated at $60 million. The project has already been subject to section 7 consultation regarding potential effects on the otter.[89] The original plan was for the project to occur in 2006; it is now expected to be completed in 2009.
- *Ouzinkie Airport.* The construction of Ouzinkie airport on Kodiak Island adjacent to Unit 5 is forecast to begin in 2009. Currently, the project is expected to be relatively small, costing between $20 and $25 million absent any otter conservation efforts. Runway construction is expected to take place on land and not require marine dredging or fill.[90]

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[87] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009. Alaska Department of Transportation and Public Facilities, Statewide Transportation Improvement Program, 2006-2009 STIP, Amendment #17, July 2, 2008, Updated with Administrative Modifications through December 23, 2008. Service, *Biological Opinion on the Effects of the Akutan Airport Project on Steller's Eiders and Northern Sea Otter,* Section 7 consultation #2007-069.

[88] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009. Alaska Department of Transportation and Public Facilities, Statewide Transportation Improvement Program, 2006-2009 STIP, Amendment #17, July 2, 2008, Updated with Administrative Modifications through December 23, 2008.

[89] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009. Service, *Kodiak Airport RSA Expansion EIS Scoping Comments,* Section 7 Consultation #2007-R-0084, April 9, 2007.

[90] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009.

EXHIBIT 5-1. AIRPORT CONSTRUCTION PROJECTS BY UNIT

UNIT	PROJECT NAME	PROJECT DESCRIPTION
1	Atka Airport	Extend, reconstruct, and realign existing runway.
2	Akutan Airport	Development of a new airport on Akun Island, including a hovercraft terminal.
	Dutch Harbor Airport	Marine fill anticipated as part of construction.
5	Kodiak Airport Runway Expansion	Addition to Runway Safety Areas (RSAs) in order to comply to Federal Aviation Administration (FAA) standards.
	Ouzinkie Airport	Construct airport beginning in 2009.

Source: Section 7 consultation #2007-F-0069 #2, Section 7 consultation #2007-R-0084. Federal Aviation Administration Alaskan Region, Airports Division, *Airport Improvement Program: FY1982-FY2008,* November 26, 2008. Alaska Department of Transportation and Public Facilities, Statewide Transportation Improvement Program, 2006-2009 STIP, Amendment #17, July 2, 2008, Updated with Administrative Modifications through December 23, 2008.

5.1.2. HARBORS

130. Based on AK DOT planning documents and comments received from the State of Alaska, three port or harbor construction projects are anticipated to take place within or adjacent to the study area in Units 2 and 5 over the next twenty years (as described in Exhibit 5-2).[91]

- *Akutan Ferry.* As part of the Akutan Airport construction project described above, AK DOT is also planning the development of a ferry to facilitate airport access as part of the Airport Master Plan. The project is still in the design stages, with approximately $1.6 million funded for project design.[92]
- *Pebble Mine.* The proposed Pebble Mine project is inland of Unit 5 near Lake Iliamna and Lake Clark and is in the pre-feasibility and pre-permitting stage of development. The deposit contains an estimated 94 million ounces of gold, 72 billion pounds of copper, and 4.8 billion pounds of molybdenum as well as commercially significant amounts of silver, rhenium and palladium. The Pebble Partnership has been undertaking environmental and socioeconomic impact studies, including monitoring the sea otter populations, since before the listing of the species. These studies will support the preparation of a proposed

[91] Another harbor is in the process of being constructed at False Pass. However, False Pass is not located directly adjacent to the study area. Therefore, construction of this facility is not expected to result in dredging, fill, or disturbance occurring within the proposed designation. See Service, *False Pass Harbor Construction,* Section 7 consultation #2009-0006, October 27, 2008.

[92] Alaska Department of Transportation and Public Facilities, Statewide Transportation Improvement Program, 2006-2009 STIP, Amendment #17, July 2, 2008, Updated with Administrative Modifications through December 23, 2008.

development plan that will be submitted for government and public review in the next few years. According to the current timeline, construction would not begin until following permit approvals (assumed to occur in 2012) and production would not occur until 2016.[93] Particularly relevant to sea otter conservation, the mine project would include the development of a port or harbor to facilitate the transport of materials to and from the mine. Specific design for the port construction, however, is unclear at this time. Section 7 consultation has not been initiated for this project.[94]

- *Kodiak Ferry Terminal.* Plans exist for the construction of a new ferry terminal on Kodiak Island adjacent to Unit 5. The terminal would form part of the Alaska Marine Highway System (AMHS), which has been operating since 1963 and carries an average of 400,000 people per year. It currently serves 30 communities in Alaska, and has regular service to some cities in British Columbia and Washington. Approximately $14 million has been budgeted for construction of the terminal in 2009. Section 7 consultation has not been initiated for this project.[95]

EXHIBIT 5-2. PORT AND HARBOR CONSTRUCTION PROJECTS

UNIT	PROJECT NAME	PROJECT DESCRIPTION
2	Akutan Ferry Planning	In addition to the airport project, there are plans to design and build a ferry terminal.
5	Pebble Mine	Large scale mining operation proposed. Port development at the mine is of particular relevance to the sea otter.
	Kodiak Ferry Terminal	Construct a ferry terminal for the Alaska Marine Highway System (AMHS).

Source: Section 7 consultation #2007-0220, Section 7 consultation #2008-0129. Section 7 consultation #2007-F-130. Alaska Department of Transportation and Public Facilities, Statewide Transportation Improvement Program, 2006-2009 STIP, Amendment #17, July 2, 2008, Updated with Administrative Modifications through December 23, 2008.

[93] The Pebble Partnership. September 12, 1008. *Draft Environmental Baseline Studies: Proposed 2008 Study Plans*; The Pebble Partnership. Project Status and Timeline. Accessed at http://www.pebblepartnership.com/pages/project-information/project-status.php in March 30, 2009.

[94] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. *Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat*.

[95] Alaska Department of Transportation, *Alaska Marine Highway System: Our Mission,* accessed at: http://www.dot.state.ak.us/amhs/our_mission.shtml on March 30, 2009. Alaska Department of Transportation and Public Facilities, Statewide Transportation Improvement Program, 2006-2009 STIP, Amendment #17, July 2, 2008, Updated with Administrative Modifications through December 23, 2008.

5.1.3. MARICULTURE

131. Mariculture is not a prevalent activity within the proposed critical habitat area; existing operations are primarily concentrated in the areas to the north and east of the proposed designation.[96] Currently, three permitted mariculture operations are located within the proposed critical habitat, all in Unit 2. These operations all are owned by the Tanadgusix Corporation, which is an Alaska native village corporation created under the Alaska Native Claims Settlement Act.[97]

132. The Alaska Native Claims Settlement Act was approved in 1971 and authorized Alaska Natives to select and receive title to 44 million acres of public land in Alaska, as well as $962 million in cash as settlement of their aboriginal claim to the land. The Act also established a series of village and regional Native corporations, like the Tanadgusix Corporation, to manage the lands and cash payments. Notably, the Act placed special provisions and restrictions on the selections of lands within existing National Wildlife Refuges.[98] Given that the selection of these lands was a one-time settlement, this analysis does not forecast any additional mariculture operations under the Alaska Native Claims Settlement Act within the study area.

133. In addition, no information was identified that suggests additional mariculture operations may be developed by the Tanadgusix Corporation or other entities within the proposed critical habitat area. In the case that demand exists for this activity within the proposed critical habitat area in the future, this analysis may understate impacts associated with this activity.

5.1.4. TIDAL ENERGY PROJECTS

134. The Federal Energy Regulatory Commission (FERC) issues permits and licenses for tidal energy projects. At present, no tidal energy facilities are located within the proposed critical habitat area. However, four tidal energy interests received preliminary permits to explore the feasibility of projects in Cook Inlet (Unit 5). The relative attractiveness of the proposed critical habitat area for tidal energy projects is likely dependent upon the outcome of the ongoing feasibility studies. In light of the interest in this emerging technology, the analysis considers potential impacts on tidal energy facilities.

135. A preliminary permit does not authorize in-water work or construction; therefore, the issuance of such permits will most likely not require section 7 consultation as the action

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[96] Alaska Department of Game and Fish, *Mariculture and Aquatic Farming,* accessed: http://www.cf.adfg.state.ak.us/geninfo/enhance/maricult/images/maricult_maps/sc_maps/sc_aquaticfarms.pdf on February 20, 2009.

[97] Tanadgusix Corporation, *Tanadgusix Corporation*, accessed at: http://www.tanadgusix.com/ on March 30, 2009.

[98] Fish and Wildlife Service, *Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service,* accessed at: http://www.fws.gov/laws/lawsdigest/alasnat.html on March 30, 2009.

permitted is unlikely to have the potential to affect the species.[99] Consultation regarding critical habitat for the otter would likely be required, however, if construction on these projects moves forward. Significant uncertainty exists, however, regarding whether these projects, or other tidal energy projects within proposed critical habitat, may move forward. Of the four preliminary permits issued for the Cook Inlet: one originally requested consultation with the Service regarding potential affects on listed species but relinquished the permit before moving forward with the consultation; one has surrendered its permit; and the feasibility studies are still in progress for two.

- *FERC Permit # 12744 for Chevron Technology Ventures, LLC:* Chevron initially applied for preliminary permit in 2006; FERC granted the permit in June of 2007. The proposed project included an array of tidal and in-stream energy conversion (TISEC) devices. The installed capacity of the project was expected to be in the range of two to 60 megwatts.[100] On March 19, 2009, FERC submitted a letter to the Service designating Chevron as a non-Federal representative to conduct informal section 7 consultation regarding this proposed project.[101] However, Chevron subsequently relinquished this permit before moving forward with the consultation.
- *FERC Permit # 12694 for Alaska Tidal Energy Company:* Alaska Tidal Energy initially applied for preliminary permit for the Kachemak Bay Tidal Energy Project in 2006; FERC granted the permit in May of 2007. One year later, Alaska Tidal Energy surrendered the permit citing feedback from State and Federal Agencies regarding the sensitive nature of the aquatic ecosystem. No specific mention was made of the otter.[102]
- *FERC Permit # 12679 for ORPC Alaska, LLC:* ORPC applied for a preliminary permit for the OCGen Project to be located in the Knik Arm of Cook Inlet in 2006; FERC granted the permit in April of 2007. The U.S. Department of the Interior submitted comments on the preliminary permit application and noted potential affects on fisheries but did not make mention of the otter and, in fact, noted that no listed species were present in the project area.[103]

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[99] National Marine Fisheries Service to Federal Energy Regulatory Commission. June 16, 2006. *Comments: Kennebec Tidal Energy Hydroelectric Project, Project No. 12666-000 Application for Preliminary Permit*; and National Marine Fisheries Service to Federal Energy Regulatory Commission. Undated. *Project No. 12668-000 Comments.*

[100] Letter from Brunenkant and Cross, LLC to Federal Energy Regulatory Commission. October 6, 2006. Competing Application for Prelimary Permit Preject No. 12744-000.

[101] Letter from FERC to Service. March 19, 1009. Designation of Non-Federal Representative to Conduct Informal Endangered Species Consultation.

[102] Letter from Alaska Tidal Energy Company to FERC. April 30, 2008. Notice of Surrender of Preliminary Permit P-12694-000-Alaska (Kachemak Bay Tidal Energy Project.

[103] Letter from U.S. Department of the Interior to FERC. October 25, 2006. Comments on Notice of Application Accepted for Filing and Soliciting Motions to Intervene, Protest, and Comment- Cool Inlet OCGen Power Project (FERC No. P-12679-000).

- *FERC Permit # 12705 for Alaska Tidal Energy Company:* Alaska Tidal Energy initially applied for a preliminary permit for the Central Cook Inlet Tidal Energy Project in 2006; FERC granted the permit in June of 2007. The most recent progress report for this project (November 2008) notes that Alaska Tidal Energy will have continuing discussions with resource agencies regarding the potential environmental effects of the project.[104]

136. The preliminary permits within or adjacent to the proposed critical habitat for the otter have been met with varying degrees of success. Of the four preliminary permits issued, only one has moved toward section 7 consultation but relinquished the permit before moving forward. It is uncertain whether the tidal energy projects will ultimately be developed and, if so, what the specific design of the projects may be. It is therefore speculative at this time to forecast whether additional interest will be inspired for tidal energy projects in Cook Inlet and other parts of the proposed critical habitat.

137. In addition to the uncertainties regarding the potential number and location of future projects, the potential for related otter conservation efforts is also unknown. The impact of tidal energy projects, such as the above, on the otter and its habitat has not been extensively studied.

138. Consideration of the effects of hydrokinetic projects on sensitive species in other regions, however, may provide some sense of the potential impact of otter conservation on tidal energy projects. As a point of reference, this analysis therefore provides information on a recent hydrokinetic project in Washington State: the Makah Bay Offshore Wave Energy Pilot Project in Clallam County, Washington. FERC recently completed an Environmental Assessment (EA) of this project.[105] The EA considered the effects of the wave energy project on the northern sea otter in Washington, among other species, and concluded that the construction and operation of the project may affect the species due to ship noise during construction, ship strike, and entanglement and collision with cable and marine debris. Because the otter prefers inshore waters, it would not be exposed to operation noise on a regular basis post-construction.

139. Minimizing or avoiding these threats were expected to increase the cost of the project. The EA also noted the potential for additional costs associated with species conservation attributable either to changes in facility operations, or to regular monitoring and reporting requirements. These measures would not be undertaken solely for otter conservation purposes, but for multiple wildlife and habitat concerns.

140. The Makah Bay EA sheds light on the potential threats hydrokinetic projects may pose to the otter. It also offers insights to potential types of project modifications that may be implemented to reduce these threats. This analysis does not assume, however, that the

[104] Letter from Alaska Tidal Energy to FERC. November 30, 2008. Six Month Progress Report #3: P-12705-000-Alaska (Central Cook Inlet Tidal Energy Project).

[105] Federal Energy Regulatory Commission. Environmental Assessment for Hydropower License: Makah Bay Offshore Wave Energy Pilot Project. FERC Project No. 12751-000. May 2007.

same threats and conservation efforts would necessarily apply to tidal energy projects being considered in Cook Inlet. Specifically, the design of the Makah Bay project (a wave energy project) in Washington is likely to differ significantly from the design of tidal energy projects in Alaska. While it is possible that incorporating otter conservation may increase the cost of tidal energy projects, it would be speculative to quantify impacts absent information on the location and design of potential future projects, and on the scope of otter conservation efforts that may be requested.

5.2 EXISTING MANAGEMENT OF MARINE AND COASTAL CONSTRUCTION ACTIVITIES

5.2.1. CLEAN WATER ACT

141. The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States. It gives the Environmental Protection Agency (EPA) the authority to implement pollution control programs such as setting wastewater standards for industry. The CWA also mandates continued requirements to set water quality standards for all contaminants in surface waters. According to Section 402 of the CWA and under the National Pollution Discharge and Elimination System (NPDES) program, EPA sets pollutant-specific limits on the point source discharges for major industries and provides permits to individual point sources that apply to these limits.

142. Pursuant to Section 404 of the CWA, it is unlawful for any person to discharge dredged or fill materials into the navigable waters of the United States unless a permit is obtained under the provisions of the Act. Any construction project that would involve the discharge of dredged or fill materials into navigable waters would therefore require a Section 404 permit.

143. Of particular relevance to construction activities, the CWA governs and permits stormwater discharges associated with construction activity. As discussed in greater detail in Chapter 6, while EPA has authorized Alaska's NPDES program, authority for the stormwater component of the NPDES program does not transfer to AK DEC until August 31, 2009. Until that time, EPA remains the permitting authority in Alaska for stormwater permits.

144. EPA has issued a general permit that authorizes the discharge of pollutants in stormwater discharges. The construction general permit (CGP) covers discharges associated with both small and large construction activity. Large construction activity is defined as the disturbance of five or more acres, as well as the disturbance of less than five acres as part of a larger common plan of development that will ultimately disturb five acres or more. Small construction activity is defined as the disturbance of at least one and less than five acres, as well as the disturbance of less than one acre of land as part of a larger common

plan of development that will ultimately disturb less than five acres. Originally issued in 2003, the CGP was reissued in 2008.[106]

145. To be covered under the CGP, a construction project must comply with certain standards and requirements, including requirements related to listed species. In particular, coverage under the permit is available only if the project is not likely to jeopardize the continued existence of any species that are federally-listed or result in the adverse modification of critical habitat. The permit outlines certain criteria that a project must meet in order to demonstrate that it complies with these endangered species requirements, which may include formal or informal section 7 consultation with the Service.[107]

146. Section 3 of the CGP sets technology-based and water quality-based effluent limits that apply to all dischargers. The permit requires that projects "select, install, and maintain control measures (e.g., Best Management Practices ("BMPs"), controls, practices, etc.) for each major construction activity."[108] These BMPs govern sediment controls, runoff management, erosion control and stabilization, post-construction stormwater management, construction and waste materials, other types of spills, as well as attainment of water quality standards. Under Section 3.6 of the CGP, projects must maintain all of these control measures in effective operating condition, and implement additional BMPs as necessary.

5.2.2. COASTAL ZONE MANAGEMENT ACT AND ALASKA COASTAL MANAGEMENT PROGRAM

147. The Coastal Zone Management Act (CZMA) was promulgated in 1972 to promote the development and protection of U.S. coastal resources. The CZMA established a voluntary partnership between the Federal government, coastal States, and local governments to develop State programs for managing coastal resources. As part of this cooperative effort, Alaska passed the Alaska Coastal Management Act in 1977, creating the Alaska Coastal Management Program (ACMP).[109]

148. The ACMP requires that projects in Alaska's coastal zone be reviewed by the program and be found consistent with the statewide standards of the ACMP. A finding of consistency with the ACMP must be obtained before permits can be issued for the project.[110]

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[106] EPA, *NPDES General Permit for Stormwater Discharges from Construction Activities – Fact Sheet*, accessed at: http://www.dot.state.ak.us/stwddes/dcsenviron/assets/pdf/cgp2008_finalfactsheet.pdf accessed at on March 30, 2009.

[107] EPA, *NPDES General Permit for Stormwater Discharges from Construction Activities*, accessed at: http://www.dot.state.ak.us/stwddes/dcsenviron/assets/pdf/cgp2008_finalpermit.pdf accessed at on March 30, 2009.

[108] Ibid.

[109] Kenai River Center, *What is the Alaska Coastal Management Program*?, accessed at: http://www.borough.kenai.ak.us/kenairivercenter/Agencies/Coastal/ACMP.htm on March 30, 2009.

[110] Ibid.

149. The US Army Corps of Engineers (USACE) has received concurrence from the ACMP that its proposed regional conditions are consistent with the program. That is, USACE proposed certain additional conditions for the nationwide permits that regulate certain activities subject to USACE jurisdiction. These conditions were found to be consistent with the goals of the ACMP; therefore, this analysis assumes that conditions imposed in USACE permits (as discussed in greater detail below) already encompass ACMP requirements.

5.2.3. RIVERS AND HARBORS APPROPRIATIONS ACT

150. Section 10 of the Rivers and Harbors Act regulates the construction of structures such as wharves, docks, piers, etc. in navigable waters of the United States. Under Section 10, these projects require approval from USACE and are subject to USACE permitting requirements.[111]

151. Under Section 10 of the Rivers and Harbors Act as well as Section 404 of the Clean Water Act, USACE has issued certain nationwide and general permits governing construction, dredging, and fill activities. For example, general permit #2007-032 governs dredge activities within the State of Alaska. This permit authorizes the dredging and/or discharge of dredged material into the waters of the United States. The permit includes conditions protecting endangered and threatened species, including time restrictions on dredging activities in certain areas.[112]

5.3 ANALYTIC METHODS

152. The consultation history, existing otter management documents, and the proposed critical habitat rule were reviewed to determine potential otter conservation efforts that may be recommended for future marine and coastal construction projects. Exhibit 5-3 summarizes conservation efforts that the Service has recommended in order to minimize or avoid affects on the otter and its habitat. These conservation efforts are primarily changes to project planning and design in order to limit the extent of possible disturbance to the species and its habitat.

[111] Note, the construction of docks and piers also may be subject to State permitting requirements; however, Alaska does not appear to have any state-specific requirements governing dock and pier construction. See NOAA Residential Dock and Pier Management Database. Accessed at https://www8.nos.noaa.gov/docks/publicview.aspx on March 30, 2009.

[112] US Army Corps of Engineers, *General Permit 2007-372: Suction Dredge Activities within the State of Alaska,* accessed at: http://www.poa.usace.army.mil/reg/gps_scanned/GP%202007-372FINAL.pdf on March 30, 2009.

EXHIBIT 5-3. BASELINE CONSERVATION EFFORTS

CONSERVATION EFFORT	ESTIMATED IMPACT	SOURCE
Dredging and Fill		
Avoid and/or reduce dredging Where possible, avoiding dredging or pile-driving during construction. Design projects so as to reduce the need for extensive marine dredging or fills.	$3 million in environmental studies per project related to endangered species (estimated $1 million for studies related to sea otter).	Section 7 consultation #2007-F-0069 #2 Section 7 consultation #2007-R-0084
Establish avoidance areas Establishment of avoidance areas for otters or creation of other habitat offsets.	While this conservation effort was suggested for several projects in the past, it does not appear to have been implemented for any project. Consequently, no impacts associated with the avoidance of projects or habitat offsets efforts are quantified.	Section 7 consultation #2007-F-0069 #2 Section 7 consultation #2007-0220
Move the project Move the project outside of areas inhabited by sea otter.	Most of the proposed projects are designed to fit a specific community need (i.e., compliance with FAA standards at an existing airport). Therefore, moving projects outside the study area does not appear to have been feasible for proposed projects.	Section 7 consultation #2008-0129
Noise Disturbance		
Minimize disturbance where possible Develop routes and operational procedures that avoid and minimize disturbance.	Potential for minor delays associated with re-routing hovercraft mid-flight to navigate around sea otters at the Akutan Airport (not quantified).	Section 7 consultation #2007-F-0069 #2 Aleutians East Borough Coastal Management Plan
Course Changes When practicable and safe, change speed or course of vehicle to avoid disturbance.		Section 7 consultation #2007-F-00 Section 7 consultation #2007-F-0069 #2

153. Based on discussions with project managers of the past construction projects that have resulted in consultation for the otter, this analysis focuses on impacts associated with reducing or avoiding dredging as the most likely conservation effort. While the establishment of avoidance areas or other habitat offsets was suggested for several projects in the early stages of project development, it does not appear to have been implemented for any project in the study area.[113] This analysis consequently assumes that projects generally can be designed to sufficiently avoid or minimize affects on the otter.

[113] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009. Personal communication with Gary Lincoln, Alaska Department of Transportation, on March 20, 2009.

154. Impacts on construction projects of avoiding and minimizing dredging primarily manifest in two ways. First, reducing or avoiding dredging or filling is incorporated into the project design and planning stage through the development of environmental research and reporting undertaken as part of broader environmental impact studies. The portion of the costs of these related to otter research and planning projects to avoid affects on the otter and its habitat are relevant to this analysis. Second, time delays may result from the additional effort to consider otters and their habitat in project planning. Essentially, construction may be delayed until research is gathered (e.g., via survey or monitoring for species) and projects can be planned to incorporate recommended otter conservation. More detail on these types of impacts and the methods employed to quantify them are described below.

Costs of Environmental Research and Reporting

155. The cost of conducting research and developing an environmental impact statement (EIS) or environmental assessment (EA) for a construction project may vary widely depending on the size of the project and the presence of endangered species. A project-specific environmental impact study, such as an EIS, generally covers a broad suite of activities and habitat requirements, including consideration of endangered species and critical habitats. For example, the ongoing EIS for the Kodiak Airport project considers: the development of possible project alternatives, the generation of a number of technical reports on coastal modeling and the floodplain, small mammal surveys, vegetation mapping, boat-based surveys for the otter.[114] Exhibit 5-4 describes a range of costs for recent environmental studies that considered the sea otter.

EXHIBIT 5-4. ENVIRONMENTAL STUDY COSTS

AIRPORT	DESCRIPTION	TOTAL COST
Akutan	Construct New Airport (Environmental Studies) Phase 1	$1,000,000
Angoon	Construct New Airport (EIS, Phase 1)	$1,147,523
False Pass	Conduct Environmental Study Specialty Marine Studies	$303,390
Kodiak	Extend Runway Safety Area (EIS)	$2,943,000
Sitka	Conduct Environmental Study	$2,000,000
Unalaska	Conduct Environmental Study (EIS)	$4,656,017
Source: FAA Alaskan Region, Airports Division, Airport Improvement Program: FY1982-FY2008, November 26, 2008.		

[114] Kodiak Airport EIS, *Documents*. Accessed at: http://www.kodiakairporteis.com/documents/documents.htm on May 8, 2009. SWCA Environmental Consultants, *Kodiak Airport EIS: Technical Report on Terrestrial Vegetation and Wildlife, and Marine Mammals and Seabirds*, February 2009. Accessed at: http://www.kodiakairporteis.com/documents/Terrestrial_and_Marine_Wildlife_Technical_Report.pdf on May 8, 2009.

156. It is difficult to determine the portion of the total EIS cost that may be attributable specifically to consideration of the sea otter conservation. Given that the Akutan Airport EIS is process considers three listed species present in the project area, one of which is the sea otter, this analysis attributes approximately one third of the cost of the environmental study to the otter, or $1 million per project. As shown in Exhibit 5-4, this estimate appears to be relatively in line with environmental study costs across a range of several projects.

157. Importantly, the estimated $1 million per study for construction projects is likely a high-end estimate considering all of the other factors being considered in these impact studies. Further information would be required to break this number down any further to make it otter-specific. Absent information to do this, this analysis reports the $1 million and notes that it is a joint cost likely considering multiple issues, including the otter. These costs are considered baseline costs of otter conservation in this analysis and not resulting from the designation of critical habitat.

Impacts of Time Delays

158. The FAA notes that significant impacts may resulting from time delays related to the consideration of otter conservation for construction projects. These delays may result from time spent for the action agency like the FAA or AKDOT to gather information, design projects to avoid affects on sensitive species and habitats, and prepare environmental studies, as well as from observing any work windows during the actual construction process. For ongoing projects, time delays have ranged from three to five years, and during this period of time real construction costs have increased, resulting in costs to the project developers.[115]

159. To calculate delay impacts, this analysis assumes that investment in the airport represents the optimum use of the designated funds. Time delays force the agency to invest in other, less preferred options (e.g., treasury bills or other government securities) throughout the period of delay. Thus, the impact to the agency is represented by the opportunity cost of delaying investment in the agency's preferred option. This process is further detailed in Exhibit 5-5.

[115] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009.

EXHIBIT 5-5. TIME DELAY CALCULATION

STEP	DESCRIPTION	RATES APPLIED
1	**Calculate estimated cost of the project in planned year of construction.** This is calculated by applying the US Army Corps' Civil Works Construction Cost Index System to estimate the real change in construction cost over time.	US Army Corps, *Civil Works Construction Cost Index*.[a]
2	**Using estimated cost of project in planned year of construction, estimate the opportunity cost of not constructing the project.** This is calculated by applying a seven percent rate of return minus the rate the money would have earned in a less preferred investment (i.e., a treasury bill). The analysis uses seven percent to represent the opportunity cost of capital.	Rate of return on the 3-year and 5-year treasury bills.[b] Implicit price deflator.[c]
3	**Subtract cost of project in expected construction year from value of project given return on investment (as calculated in Step 3).** This step calculates the estimated opportunity cost of delaying the project.	US Army Corps, *Civil Works Construction Cost Index*.[a]

Sources: [a]U.S. Army Corps of Engineers, Civil Works Construction Cost Index System (CWCCIS), Appendix A Revised 31 March 2009, EM 1110-2-1304.

[b]Federal Reserve, Release H15: Market yield on U.S. Treasury securities at 3-year constant maturity, available at: http://www.federalreserve.gov/releases/H15/data/Annual/H15_TCMNOM_Y3.txt.

[c]Bureau of Economic Analysis, Table 1.1.9. Implicit Price Deflators for Gross Domestic Product, Last Revised April 29, 2009, Accessed at http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=13&Freq=Qtr&FirstYear=2007&LastYear=2009# on March 8, 2009.

160. Based on this methodology, for certain projects with estimated costs of $60 to $90 million, added costs associated with time delays may be anywhere between $1.1 and $14.6 million per project depending on the length of the delay (see Exhibit 5-6). This analysis has attributed these delay costs only to the three airport construction projects where the FAA specifically noted delays, and does not forecast delays for other future projects. These impacts are applied in the year in which the project would have been constructed absent any delays and are therefore considered pre-designation impacts.

5.4 ESTIMATED PRE-DESIGNATION IMPACTS OF OTTER CONSERVATION ON CONSTRUCTION ACTIVITIES

161. This analysis assumes that each past construction project resulted in approximately $1 million to fund environmental studies related to the otter and that these costs were incurred in the year in which the project initiated or re-initiated section 7 consultation. In addition, costs of project delays are incorporated in pre-designation impacts as they began in 2006 for two project and 2007 for another.

162. Pre-designation impacts also include annual costs from 2005-2008 for sea otter surveying and monitoring associated with the Pebble Mine project adjacent to Unit 5. Total pre-designation costs are estimated at $27.8 million (see Exhibit 5-6), with the greatest share of impacts occurring in Unit 5. Administrative costs of consultation for these projects are included in Chapter 7 of this report.

EXHIBIT 5-6. ESTIMATED PRE-DESIGNATION IMPACTS BY UNIT (SEVEN PERCENT DISCOUNT RATE)

UNIT	QUANTIFIED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1	None.	$0	$0
2	▪ $1 million in environmental studies for Akutan Airport in 2006. ▪ $1 million in environmental studies for Akutan Harbor in 2007. ▪ $1.6 million in time delays associated with Akutan airport construction. ▪ $15.0 million in time delays associated with Dutch Harbor airport construction.	$21,520,000	$6,350,000
3	▪ $1 million in environmental studies for Sand Point Harbor in 2007.	$1,140,000	$338,000
4a	None.	$0	$0
4b	None.	$0	$0
4c	None.	$0	$0
5	▪ $3 million total in environmental studies for Kodiak Airport, Chignik Harbor, and Chignik Lagoon in 2007. ▪ $1.1 in time delays associated with Kodiak airport construction. ▪ $1 million in environmental studies for Pebble Mine between 2005 and 2016.	$5,180,000	$1,530,000
	Total	**$27,850,000**	**$8,220,000**

Note: Estimates are rounded to three significant digits and may not sum due to rounding.

5.5 ESTIMATED POST-DESIGNATION BASELINE IMPACTS OF OTTER CONSERVATION ON CONSTRUCTION ACTIVITIES

163. Based on discussion with the FAA and AK DOT, the Ouzinkie and Atka Airport projects do not include any marine dredging or fill. Because the primary impacts to construction projects are environmental studies and project delays associated with minimizing or avoiding dredging the otter habitat area, no impacts to these two projects related to otter conservation are anticipated.[116] This analysis therefore does not forecast any project delays associated with the known, future construction projects.

164. For projects that have completed section 7 consultation (e.g., Akutan and Kodiak airport projects), impacts associated with the environmental studies and project delays associated with efforts to avoid and minimize dredging are included in the pre-designation. For

[116] Personal communication with John Lovett, Federal Aviation Administration, Alaska Airports Division, on March 20, 2009. Personal communication with Gary Lincoln, Alaska Department of Transportation, on March 20, 2009.

those projects for which the timing of the future project is known, estimated costs of the environmental studies ($1 million per project) are assigned to that year.

165. As described in Exhibit 5-7, total estimated post-designation costs are forecast to be $3.5 million (discounted at seven percent). The largest impacts occur in Unit 2 and are associated with environmental study costs at Akutan Ferry Terminal and the Dutch Harbor Airport projects.

166. For the Pebble Mine project where project timing is unknown, continued costs of otter surveying and monitoring are forecast to extend through 2016 according to the project's forecast timeline.[117] Because environmental impact and feasibility studies are ongoing, the level and type of otter conservation efforts that may be requested associated with this project are uncertain. In the case that port construction in Iniskin Bay or use of chemicals for mining and refining cyanide may affect the otter and its habitat, additional project modifications may be recommended. In this case, this analysis underestimates baseline impacts of otter conservation associated with this project.

EXHIBIT 5-7. ESTIMATED POST-DESIGNATION BASELINE IMPACTS BY UNIT (SEVEN PERCENT DISCOUNT RATE)

UNIT	QUANTIFIED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1	None.	$0	$0
2	▪ $1 million in environmental studies for Akutan Ferry Terminal in 2009. ▪ $1 million in environmental studies for Dutch Harbor Airport in 2009.	$2,000,000	$176,000
3	None.	$0	$0
4a	None.	$0	$0
4b	None.	$0	$0
4c	None.	$0	$0
5	▪ $1 million in environmental studies for Pebble Mine between 2005 and 2016. ▪ $1 million in environmental studies for the Kodiak Ferry Terminal in 2009.	$1,532,000	$135,000
	Total	**$3,530,000**	**$312,000**

Note: Estimates are rounded to three significant digits and may not sum due to rounding.

[117] The Pebble Partnership. Project Status and Timeline. Accessed at http://www.pebblepartnership.com/pages/project-information/project-status.php in March 30, 2009.

5.6 ESTIMATED POST-DESIGNATION INCREMENTAL IMPACTS OF OTTER CONSERVATION ON CONSTRUCTION ACTIVITIES

167. At this time, the Service cannot envision a scenario in which the presence of critical habitat would influence or change the outcome of a section 7 consultation. That is, project modification recommendations resulting from consultation are expected to be the same regardless of the additional consideration of adverse modification.[118] All conservation efforts are therefore expected to be baseline. The only incremental impacts forecast are related to administrative costs associated with section 7 consultation, which are described in Chapter 7.

5.7 SOURCES OF UNCERTAINTY

168. The primary sources of uncertainty associated with the analysis in this Chapter are:

1) the forecast of construction activities;

2) the potential for additional sea otter conservation efforts to be recommended in the future; and

3) the costs associated with considering the sea otter as part of broader environmental impact studies.

169. This analysis estimates costs associated with known and reasonably foreseeable construction projects, and does not forecast any additional mariculture operations occurring within the study area. To the extent that additional projects are proposed or developed within the next twenty years, this analysis may underestimate impacts associated with those projects. In addition, in the case future section 7 consultations results in implementation of conservation efforts beyond those considered in this analysis, including establishment of avoidance areas or habitat offsets, this analysis may underestimate impacts associated with marine and coastal construction activities.

170. Costs of environmental studies related to sea otter conservation should be considered high-end estimates as they are likely joint costs generated not solely by consideration of sea otter, but also additional environmental impacts of construction projects. Absent information on the otter-specific portion of environmental study costs, this analysis conservatively reports the joint cost and caveats that this is likely an overestimate.

171. Projects which contribute significant uncertainty to the future impacts of sea otter conservation are:

- *Pebble Mine: Unit 5.* While administrative consultation costs and continued monitoring and reporting on the otter are quantified in this analysis, potential additional project modification requests are unknown.

[118] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

- *Tidal Energy: Unknown Units(s).* Significant uncertainty exists regarding the potential for tidal energy projects within or adjacent to the proposed critical habitat. Absent information on the number and location of projects that may be proposed, and the potential project modifications that may be recommended, this analysis is unable to quantify impacts.

CHAPTER 6 | OTHER WATER QUALITY MANAGEMENT ISSUES

172. The previous chapters of this report consider water quality issues associated with oil spills as well as dredge and fill activities from marine and coastal construction projects. Discharge of waste products from industry into the waters of the proposed critical habitat is also a conservation threat to the otter.[119] Economic activities occurring within and adjacent to critical habitat that may discharge waste material from industrial facilities into the proposed critical habitat area including seafood processing, log transfer facilities, and effluents from oil and gas development activities.[120] Oil and gas development activities are addressed in Chapter 4 of this report.

173. The remainder of this chapter is divided into five sections. The first provides background on the scope and scale of seafood processing and log transfer facilities that may affect water quality within the proposed critical habitat area. The second discusses current management of these activities, including the review and revision of water quality standards. The third section describes the methods employed to estimate the impacts of critical habitat designation on seafood processing and log transfer facilities. The fourth section presents the economic impacts of sea otter conservation on these activities according to proposed critical habitat unit. Finally, this chapter describes the major areas of uncertainty in the analysis of impact to water quality management activities.

6.1 EXTENT OF ECONOMIC ACTIVITIES AFFECTING WATER QUALITY IN PROPOSED CRITICAL HABITAT

174. Seafood processing plants and log storage and transfer facilities which occur within or adjacent to the proposed critical habitat may compromise water quality through the discharge of waste and bark into the water. The distribution of these facilities across the proposed critical habitat area is described below.

[119] U.S. Fish and Wildlife Service, Marine Mammals Management. June 1994. *Conservation Plan for the Sea Otter in Alaska.*

[120] *Ibid.*

KEY ISSUES AND CONCLUSIONS:

OTHER WATER QUALITY MANAGEMENT ISSUES

This chapter describes how water quality management activities may be affected by otter conservation and forecasts impacts of otter conservation efforts on these activities. Administrative costs associated with section 7 consultation for water quality management activities are quantified in Chapter 7.

Economic activities occurring within the proposed critical habitat that may result in water quality issues (in addition to the oil spill issues discussed in Chapter 3) include seafood processing facility and log transfer facility operations. Review of the otter consultation history indicates that sea otter conservation efforts have not been requested of log transfer facility operations. Two log transfer facilities are operating within the proposed critical habitat. EPA conducted a Biological Evaluation as part of a past informal section 7 consultation and concluded that these log transfer facilities were not likely to adversely affect the otters within the vicinity of the discharge. The Service does not anticipate this will change following critical habitat designation. While section 7 administrative costs are still quantified for log transfer facilities as described in Chapter 7, the impacts of otter conservation efforts quantified in this chapter are solely related to the management of seafood processing facilities.

The primary source of uncertainty in the analysis of impacts to water quality management is the indefinite effect of considering sea otter conservation on review and revision of State water quality standards. Consultation is ongoing for some water quality standards and not yet begun for others. Consequently, uncertainty exists regarding whether consideration of the otter and its habitat is may affect the water quality standards and subsequent compliance within the proposed critical habitat area.

Pre-designation impacts

- Past otter conservation recommendations associated with water quality permits, such as National Pollution Discharge Elimination System (NPDES) permits, focused on seafood processing facilities barging their processing waste outside of otter habitat. This analysis estimates an annual cost for waste barging of $118,000 per facility for 24 seafood processing facilities directly adjacent to the study area. Total pre-designation impacts of these otter conservation efforts are: **$13.5 million.**
- The estimate of $118,000 per year assumes the facilities operate ten months of the year. It further assumes that facilities have opted to barge their waste to avoid affecting the sea otter rather than employing alternative land-based disposal methods. In the case that some of these facilities operate less or more than ten months per year, this analysis over or underestimates impacts of barging waste. In the case that land-based disposal has been utilized as a less costly alternative to barging waste, this analysis overestimates past impacts of sea otter conservation on seafood processing facilities.

Post-designation baseline impacts

- Similar to pre-designation impacts, this analysis estimates an annual cost for waste barging of $118,000 per facility for 24 seafood processing facilities over the next twenty years. Total potential baseline impacts are: **$32.2 million.**

Incremental impacts of critical habitat designation

- Critical habitat is not expected to result in additional sea otter conservation efforts for other water quality management activities. Incremental impacts are therefore limited to administrative costs of consultation as quantified in Chapter 7 of this report.

Note: All cost figures presented in this Chapter describe present value impacts assuming a seven percent discount rate. Appendix B reports forecast cost impacts assuming a discount rate of three percent to highlight the sensitivity of the results to the discount rate.

6.1.1 SEAFOOD PROCESSING FACILITIES

175. The *Conservation Plan for the Sea Otter in Alaska* states, "Contamination of sea otter habitat could also result from seafood processing activities (both land-based and floating) and associated dumping of shells, bones, and other organic wastes."[121] The commercial fishing industry is a substantial private sector employer in Alaska, with more than 19,000 people employed in the seafood processing sector alone. Seafood processing plants may be shoreside processors or on-board, at-sea catcher-processor ships. Shoreside processors are generally large ships or barges that anchor near shore and receive harvested fish for processing, while at-sea catcher-processors are ships that both catch and process fish, ranging in size from large factory trawlers to independent salmon fishermen.[122] Alaska Department of Environmental Conservation (AK DEC) has issued permits to approximately 116 vessel processors.[123] While these vessel processors may sometimes operate within the proposed study area, the analysis assumes that waste disposal generally takes place outside of near-shore areas.[124] Because the primary project modification for seafood processing is that waste be barged out to sea, the analysis assumes that waste disposal from vessel processors does not pose a threat to the otter or its habitat.

176. A total of 170 permits exist for land-based seafood processors in Alaska.[125] Of these, 24 facilities are located on lands adjacent to the proposed critical habitat area and therefore may discharge seafood processing waste into the proposed critical habitat. Eleven of these permits have either lapsed or the permit is being reviewed for re-approval, leaving approximately 13 facilities with active permits. However, a seafood processing activity may continue even at facilities with lapsed permits. Eight of the 13 active, land-based seafood processing facilities are located on Kodiak Island within Unit 5 (Exhibit 6-1). An additional three facilities are located in Unit 2 (at Dutch Harbor), and one facility occurs in each of Units 1 and 3. No permitted facilities are currently operating within Unit 4 of proposed critical habitat.

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[121] *Ibid.*

[122] Alaska Department of Commerce, Office of Fisheries Development . Accessed at http://www.dced.state.ak.us/oed/seafood/seafoodprocessors.htm on March 27, 2009.

[123] Alaska Department of Environmental Conservation, *Vessel Processors*. Accessed at http://alaska.state.gegov.com/alaska/seafood_listing.cfm?step=vessel on March 23, 2009.

[124] Service, ESA Determination of the NPDES General Permit for Offshore Seafood Processors, AKG524000, Section 7 Consultation #2008-0165, December 15, 2008.

[125] Alaska Department of Environmental Conservation, *Land-Based Processors*. Accessed at http://alaska.state.gegov.com/alaska/seafood_listing.cfm?step=land-based on March 23,2009; Alaska Department of Labor and Workforce Development, *Seafood Processing Jobs in Alaska*. Accessed at http://labor.state.ak.us/esd_alaska_jobs/process.htm on March 23, 2009.

177. In addition to the permits described in Exhibit 6-1, plans currently exist for additional land-based seafood processing plants at False Pass Harbor and Nelson Lagoon.[126] While these areas are located in the vicinity of proposed Units 4a and 4b, it does not appear that either processor is directly adjacent to proposed critical habitat; therefore, neither processor would likely discharge waste into the proposed critical habitat area.[127]

6.1.2 LOG AND LOG TRANSFER FACILITIES

178. The majority of timber harvested within coastal Alaska originates in areas that are generally inaccessible via roads or other land-based transportation. As such, most timber is transported either in or on marine waters. In one transport method, log bundles are consolidated into log rafts. These log rafts are then stored in marine waters until the logs are moved to a ship for loading and transport. Storage in water results in the release of bark and wood debris. Bark and debris in the waters surrounding these facilities may affect benthic food resources for sea otters at these sites.[128]

179. While the majority of the regional log transfer and storage facilities are located to the south of the proposed critical habitat designation in the islands surrounding Sitka, Alaska, two log transfer facilities are located on lands adjacent to Unit 5:

- Barefoot Beach Log Transfer Facility (LTF); and
- Lookout Cove LTF.[129]

180. Both facilities are located on Afognak Island, which is owned primarily by the Afognak Native Corporation. The Barefoot Beach LTF was constructed beginning in 1989. It was owned by Koncor Forest Products, which operated the facility until 2000. After 2000, another company, TransPac, took over operations at the facility. Operations ceased at the facility in February 2005 when Transpac moved its operations to the Lookout Cove facility. While not currently active, the Barefoot Beach LTF still exists and may be used for "overflow" transfer operations in the future.[130]

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[126] A consultation on Steller's eider occurred that included a discussion of the processing facility in Nelson Lagoon: Final Biological Opinion: Effects of Upgrading and Expanding a Bulk Fuel Facility in Nelson Lagoon, Alaska, on the Threatened Steller's Eider (*Polysticia stelleri*), Service, Anchorage Field Office, March 13, 2003.

[127] Aleutias East Borough, *Aleutians East Borough announces boat harbor construction to begin along important Bering Sea/Pacific Ocean marine route*. Accessed at http://www.aleutianseast.org/index.asp?Type=B_PR&SEC=%7B4625D388-43A1-4E17-A354-F5F12E4E7205%7D&DE=%7B01BC3B24-DE56-4AFE-92F4-27B359BAA6F1%7D March 23, 2009..

[128] U.S. Fish and Wildlife Service, Marine Mammals Management. June 1994. *Conservation Plan for the Sea Otter in Alaska.* Pg 15.

[129] Public Comment on the Proposed Critical Habitat Rule from the State of Alaska, Department of Fish and Game, dated February 17, 2009; U.S. Environmental Protection Agency, *Fact Sheet for Log Transfer Facilities,* July 2007. Accessed at http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/General+NPDES+Permits/$FILE/LTF-FS-08.pdf on March 20, 2009.

[130] Alaska Department of Environmental Conservation, *Decision Document: Wastewater Disposal Individual Permit*. Accessed at http://www.dec.state.ak.us/water/wnpspc/forestry/pdfs/koncour_decision_document.pdf on March 20, 2009.

EXHIBIT 6-1. LAND-BASED SEAFOOD PROCESSING PLANTS WITHIN THE STUDY AREA

UNIT	PERMIT #	FACILITY NAME	LOCATION
1	673	Adak Fisheries LLC	Adak, AK
2	1326	Harbor Crown Seafoods, Inc.	Dutch Harbor, AK
	117	Unisea Inc. -Dutch Harbor Complex	Dutch Harbor, AK
	955	Westward Seafoods Inc	Dutch Harbor, AK
3	56-M	Peter Pan Seafoods - Port Moller Facility	Cold Bay, AK
5	66	North Pacific Seafoods Inc.	Kodiak, AK
	209	Alaska Fresh Seafoods, Inc.	Kodiak, AK
	1412	Alaska Seafood Systems	Kodiak, AK
	1242	Alaska Spirit LLC	Kodiak, AK
	412	Global Seafoods North American- Kodiak Facility	Kodiak, AK
	271-P	International Seafoods of Alaska - Plant 2	Kodiak, AK
	85	Island Seafoods	Kodiak, AK
	1271	Wildsource Inc	Kodiak, AK
Permits Under Review			
2	67	Trident – Akutan Facility	Akutan, AK
3	67-F	Trident Seafoods Corporation - Sand Point Facility	Sand Point, AK
5	1487	Kodiak Smoking	Kodiak, AK
	81	Western Alaska Fisheries	Kodiak, AK
	67-O	Trident Seafoods Corporation - Star of Kodiak	Kodiak, AK
Lapsed Permits			
1	307	Atka Pride Seafoods Inc.	Atka, AK
2	585	Alyeska Seafoods Inc	Unalaska, AK
	180	Prime Alaska Seafoods Inc.	Unalaska, AK
5	338	Kodiak Island Smokehouse	Kodiak, AK
	1191	O'Brien Seafoods	Kodiak, AK
	1077	Old Harbor's Finest	Old Harbor, AK

Source: Alaska Department of Environmental Conservation, *Land-Based Processors*. Accessed at http://alaska.state.gegov.com/alaska/seafood_listing.cfm?step=land-based on March 23, 2009.

6.2 EXISTING MANAGEMENT OF WATER QUALITY

181. A number of regulations exist that govern water quality standards in the proposed critical habitat area, including the Clean Water Act (CWA) and the State's water quality standards. While these regulations and standards do not currently describe explicit consideration of otter conservation, they offer baseline protection to the species in their general regulation of water quality in otter habitat areas.

182. The CWA establishes the basic structure for regulating discharges of pollutants into the waters of the United States. It gives the Environmental Protection Agency (EPA) the authority to implement pollution control programs, such as setting wastewater standards for industry. The CWA also mandates continued requirements to review and revise water quality standards for all contaminants in surface waters.

6.2.1 NPDES PERMITTING

183. Section 402 of the CWA established the National Pollutant Discharge Elimination System (NPDES) program to regulate point source discharges of pollutants into the waters of the United States. This program charges EPA and States with setting pollutant-specific limits on point source discharges for major industries, and issuing permits to individual point sources that apply to these limits.

184. Although established under Federal law, EPA may delegate NPDES permitting authority to individual States. In October 2008, EPA authorized Alaska's NPDES program. Until this time, EPA permitting of point source pollution constituted a Federal nexus potentially requiring section 7 consultation regarding listed species and their critical habitats.

185. Authority over the permitting, compliance, and enforcement programs is currently being transferred to AK DEC, and will be phased in over the next three years. Upon program authorization in 2008, AK DEC received authority for Phase I permits, including domestic discharge, log storage and transfer facilities, seafood processing facilities, and hatcheries.[131]

186. Although the State administers the NPDES permitting program in Alaska, EPA continues to have oversight and enforcement responsibilities under the CWA. The EPA therefore is able to review and, if appropriate, object to the issuance of NPDES permits. Therefore a section 7 consultation may be undertaken regarding potential effects on listed species.[132] Regardless, land use area plans within the State of Alaska describe that all Federal listed species are managed per Federal regulations, regardless of the presence of a Federal nexus. As such, the State would likely confer with the Service regarding the issuance of a permit in the case that otters or their habitat may be affected.[133]

187. EPA's regulations authorize the issuance of a general permit to categories of discharges when a number of point source discharges are similar in terms of operations, types of waste, geographic area, effluent limitations, and monitoring requirements.[134] Seafood processing facilities must be covered either by individual NPDES permits or one of three

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[131] Alaska Department of Environmental Conservation, *Schedule to Transfer Authority of Federal NPDES Permitting and Compliance/Enforcement Programs.* Accessed at http://www.dec.state.ak.us/water/npdes/APDESAuthorityTransferSchedule.htm on March 23, 2009.

[132] Letter from U.S. Fish and Wildlife Service to Nina Kocourek, EPA Office of Water and Watersheds. August 15, 2008.

[133] Personal communication with Sadie Wright, Alaska Department of Fish and Game, March 9, 2009.

[134] U.S. Environmental Protection Agency. *NPDES Permit No. AK-G52-0000: Fact Sheet*. Accessed at http://yosemite.epa.gov/r10/enforce.nsf/NPDES/Seafood+Compl on March 30, 2009.

seafood general permits. NPDES Permit No. AK-G52-0000 covers all of Alaska; Permit No. AK-G52-8000 covers shore-based facilities in Kodiak; and Permit No. AK-G52-7000 covers facilities in the City of St. Paul.

188. Of the three general permits, the only one that specifically mentions sea otter conservation is AK-G52-000, which covers facilities statewide. This permit mandates seasonal restrictions on discharge of uncooked fish processing waste residues for November through March in Orca Inlet where sea otters are attracted to the waste as a food source. Orca Inlet is not within or adjacent to the proposed critical habitat. The general permits enforce compliance with State water quality standards and best management practices (BMPs) designed to minimize the generation and release of pollutants into receiving waters.[135]

189. For most log transfer facilities, discharge of bark and woody debris is governed according to one of two NPDES general permits (Nos. AK-G70-0000 and AK-G70-1000). The permits were reissued as recently as October 27, 2008.[136] These permits describe limitations on effluents (petroleum hydrocarbons, oil, grease, and residues), compliance with State water quality standards, and requirements for monitoring and reporting, as well as recommending best management practices to ensure that water quality standards are met. The permit specifically notes that it will not apply to discharges within the waters surrounding Kodiak ort Afognak Islands if, after consultation with the Service, it is determined that the discharge adversely affects the otters.[137]

6.2.2 STATE WATER QUALITY STANDARDS

190. Under the water quality standards program, EPA issues national water quality criteria that establish limits on the ambient concentration of pollutants in surface waters, intended to protect the health of water bodies. Pursuant to Section 402 of the CWA, EPA collaborates with individual States to establish and regularly review and revise water quality criteria to govern ambient concentrations of pollutants in surface waters of the State. These State standards are at least as restrictive as the Federal water quality criteria. States may develop standards that are water body-specific. Once approved, these State standards apply to the NPDES discharge permits.

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[135] U.S. Environmental Protection Agency. *NPDES Permit No. AK-G52-0000: Authorization to Discharge Under the National Pollutant Discharge Elimination System for Seafood Processors in Alaska.* Accessed at http://yosemite.epa.gov/r10/enforce.nsf/NPDES/Seafood+Compl on March 30, 2009.

[136] U.S. Environmental Protection Agency. Reissuance of NPDES General Permits (GPs) for Log Transfer Facilities in Alaska that Received a Section 404 Permit Prior to October 22, 1985 (Permit Number AK-G70-0000); and Another GP for Other Log Transfer Facilities in Alaska that Meet Eligibility Requirements (Permit Number AK-G70-1000): Final Notice of Issuance of Two General NPDES Permits. 70 Federal Register 63707.

[137] U.S. Environmental Protection Agency, *Fact Sheet for Log Transfer Facilities,* July 2007. Accessed at http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/General+NPDES+Permits/$FILE/LTF-FS-08.pdf on March 20, 2009.

Existing State Water Quality Standards

191. The State of Alaska has established water quality standards (18 AAC 70) that specify the degree of water quality degradation that may not be exceeded as a result of human actions. In general, under these standards, "a person may not conduct an operation that cause or contributions to a violation of the water standards."[138]

192. The standards set out specific criteria by both type of pollutant and type of water use (e.g., drinking, culinary use, or food processing; agriculture, including irrigation; aquaculture; industrial use; recreation; and growth of aquatic life). The standards also outline certain waterbodies that are subject to site-specific criteria, including Cook Inlet, which is part of the proposed designation. While the current standards, amended as of March 2006, do not make specific mention of the otter, Exhibit 6-2 describes standards for seafood processing.

Review and Revision of State Water Quality Standards

193. State water quality standards are subject to review every three years (referred to as the triennial review). As part of EPA's triennial review for water quality standards in Alaska, the Service is in the process of consulting with EPA regarding the affects of standards on listed species and their habitats.

194. Specifically, formal section 7 consultation has been initiated for potential revisions to the State water quality standard for mixing zones. The standard for residues is also currently being revised, and the Service is in discussions with EPA about revising the standard for toxics, although no consultation is yet begun. At this time, it is unclear whether section 7 consultation will occur for the toxics standard. Each of these regulations may affect the management of marine waters, setting the standard for protection of water quality. The mixing zones regulation allows for a footprint where any water quality standard may be exceeded by a specified amount, but may not result in the destruction of aquatic life. The residues water quality standard specifies the amount of floating and suspended particles that may be discharged into a water body and is therefore relevant to both seafood processing and log transfer facilities. The toxics standard governs parameters on the discharge of pollutants such as heavy metals and dioxins.

195. Section 7 consultation on the review, revision, and authorization of these standards covers all potentially affected species and habitats within the State. Because consultation is ongoing for some standards and not yet begun for others, information is not currently available regarding whether consideration of the otter or its habitat may change the water quality standards within the proposed critical habitat area. This analysis is therefore not able to describe the potential economic impacts, if any, associated with otter conservation in establishing and complying with State water quality standards. The Service does not anticipate, however, that the presence of critical habitat designation will change

[138] 18 AAC 70.

recommendations made in the consultation process and therefore any impacts of sea otter conservation on these standards would be baseline.[139]

EXHIBIT 6-2. STATE WATER QUALITY STANDARDS GOVERNING SEAFOOD PROCESSING

POLLUTANT OR WATER USE	CRITERIA FOR SEAFOOD PROCESSING
Color*	May not exceed 15 color units or the natural condition, whichever is greater.
Fecal Coliform Bacteria	In a 30-day period, the geometric mean of samples may not exceed 20 Fecal Coliform/100 ml, and not more than 10 percent of the samples may exceed 40 FC/100 ml.
Dissolved Gas	Dissolved oxygen must be greater than or equal to 5.0 mg/l.
Petroleum Hydrocarbons, Oils, and Grease	May not cause a film, sheen, or discoloration on the surface or floor of the waterbody or adjoining shorelines. Surface waters must be virtually free from floating oils. May not exceed concentrations that individually or in combination impart odor or taste as determined by organoleptic tests.
pH	May not be less than 6.0 or greater than 8.5.
Radioactivity	May not exceed the concentrations specified in Table I of the *Alaska Water Quality Criteria Manual*, (see note 5) for radioactive contaminants and may not exceed limits specified in 10 C.F.R. 20 or National Bureau of Standards, *Handbook 69*.
Residues	May not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the Bottom, or upon adjoining shorelines.
Sediment	Below normally detectable amounts.
Temperature	May not exceed 15° C.
Toxic and Other Deleterious Organic or Inorganic Substances	The concentration of substances in water may not exceed the criteria shown in Table IV of the *Alaska Water Quality Criteria Manual*.
Turbidity	May not interfere with disinfection.

Source: Alaska Department of Environmental Conservation. *Water Quality Standards: As Amended through March 23, 2006.* 18 AAC 70.

Note:

* Color is as measured in color units on the platinum-cobalt scale according to *Standard Methods for the Examination of Water and Wastewater,* 18th edition, 1992.

[139] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. *Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat*.

6.3 ANALYTIC METHODOLOGY

6.3.1 SEAFOOD PROCESSING FACILITIES

196. Two consultations have occurred regarding the permitting and operations of seafood processing facilities. Review of these past consultations indicates that the primary otter conservation effort recommended for permitting seafood processing facilities involves avoiding disposal of processing waste in near-shore areas.[140] This may be accomplished through land-based disposal (at a landfill, composting station, or at a fish mill like the one in Kodiak).[141] If land-based disposal is not available, processors may barge their waste farther out to sea for disposal.[142]

197. Many of the larger, land-based plants are already associated with a fishmeal plant that takes most of the processing waste; the remaining waste is ground up and deposited in wastewater outfall pipes. While some plants may barge on a limited scale (e.g., Harbor Crown Seafoods), others may only barge when the dissolved oxygen levels in the bay fall below a certain level. Because of the costs involved in storing, preparing, and loading the processing waste for barging, processors believe that barging is typically more expensive than the other, mostly land-based disposal options they are currently employing.[143]

198. Floating processors and at-sea processors typically dispose of processing waste at sea, outside of the proposed designation. Because this is the primary project modification recommended for seafood processing, these types of processors are not forecast to be affected by sea otter conservation efforts. Accordingly, this analysis only forecasts impacts of administrative consultation costs and alternative waste disposal methods for on- or near-shore facilities.

199. Barging costs vary widely depending on the type of waste and the distance transported. Regional seafood processors estimate the costs of screening and barging seafood processing to be approximately $330 per day for a small facility, or $118,000 per facility per year based on the facility operating approximately ten months of the year.[144] The analysis assumes impacts related to compliance with existing regulations requiring facilities to apply best conventional pollutant control technology were incurred during facility construction, which generally occurred before the listing of the species in 2005.[145,146] Also in

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[140] Service, ESA Determination of the NPDES General Permit for Offshore Seafood Processors, AKG524000, Section 7 Consultation #2008-0165, December 15, 2008. Service, Nelson Lagoon Salmon Processing Facility, Section 7 Consultation #2007-F-0266, August 20, 2007.

[141] Personal communication with North Pacific Seafoods, Kodiak Plant, March 19, 2009.

[142] Service, Nelson Lagoon Salmon Processing Facility, Section 7 Consultation #2007-F-0266, August 20, 2007.

[143] Personal communication with Frank Kelty, Resource Analyst, City of Unalaska, on May 8, 2009.

[144] Association of Pacific Fisheries, New England Fish Company, Peter Pan Seafoods, Petersburg Fisheries, Inc., and Whitney-Fidalgo Seafoods, v. Environmental Protection Agency, 615 F.2d 794. Accessed at http://altlaw.org/v1/cases/453775 on March 22, 2009. Personal communication with Frank Kelty, Resource Analyst, City of Unalaska, on May 8, 2009.

[145] Based on the permit expiration dates as listed in Alaska Department of Environmental Conservation, APDES Phase I Facilities, accessed at: http://dec.alaska.gov/water/npdes/pdfs/APDES/Phase_Report1.pdf on March 30, 2009.

compliance with existing regulations, facilities are assumed to have posted signs reminding vessel owners to comply with existing State and Federal regulations regarding the discharge of waste or bilge water when the facility began operation, or before the listing of the species in 2005.[147]

200. Administrative costs of informal consultation are forecast associated with the reissuance of the three existing NPDES general permits for shore-based seafood processing facilities. These consultations are forecast to occur every five years from the last reissuance in 2006.[148] Two facilities adjacent to Unit 2, the Trident Plant at Akutan and the Alyeska Seafoods Plant at Unalaska, are governed under individual permits. Administrative costs associated with section 7 consultation for those permits are forecast to occur every five years, from the last expiration date of both individual permits in 2008.[149] These administrative costs of consultation are quantified in Chapter 7.

6.3.2 LOG TRANSFER FACILITIES

201. Review of the otter consultation history indicates that sea otter conservation efforts have not been requested of log transfer facility operations. The EPA states that they engaged in an informal section 7 consultation regarding the 2008 reissuance of the NPDES general permits for log transfer facilities. Both of the existing, permitted facilities within the proposed critical habitat are located in an area where the permit would not cover discharges in the case that they may adversely affect the otter. EPA therefore conducted a Biological Evaluation as part of the informal section 7 consultation and concluded that these log transfer facilities were not likely to adversely affect the otters within the vicinity of the discharge.[150]

202. This analysis assumes that the EPA will engage the Service in an informal section 7 consultation regarding the otter and its critical habitat in the context of future reissuance of the NPDES general permits covering the log transfer facilities. Administrative costs of consultation, including the costs of a Biological Evaluation, are therefore forecast to be incurred every five years from last reissuance (i.e., 2008). Administrative effort required

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[146] See 40 CFR 408, Canned and Preserved Seafood Processing Point Source Category. Association of Pacific Fisheries, New England Fish Company, Peter Pan Seafoods, Petersburg Fisheries, Inc., and Whitney-Fidalgo Seafoods, v. Environmental Protection Agency, 615 F.2d 794. Accessed at http://altlaw.org/v1/cases/453775 on March 22, 2009.

[147] The cost of sign installation can be $500 or more depending on the size of the sign. See, for example, City of Annapolis, *Permits and Fee Schedule*, accessed at: http://www.ci.annapolis.md.us/upload/images/government/depts/environ/forms/DNEPFees.pdf on March 30, 2009. However, given the signs relate to compliance with existing standards and facilities were permitted prior to the listing of the species, these costs are assumed to be incurred prior to 2005.

[148] EPA, Authorization to Discharge under the National Pollutant Discharge Elimination System for Seafood Processors in Alaska: NPDES Permit No. AK-G52-0000, accessed at: http://yosemite.epa.gov/R10/WATER.NSF/40db6e4de7be6d8888256c78007f8ff7/bc30f88057c7455088256c870082cd07/$FILE/AK-G52-0000%202001%20FP.pdf on March 30, 2009.

[149] Alaska Department of Environmental Conservation, APDES Phase I Facilities, accessed at: http://dec.alaska.gov/water/npdes/pdfs/APDES/Phase_Report1.pdf on March 30, 2009.

[150] U.S. Environmental Protection Agency, *Fact Sheet for Log Transfer Facilities,* July 2007. Accessed at http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/General+NPDES+Permits/$FILE/LTF-FS-08.pdf on March 23, 2009.

in these consultations may include, for example, expanding the permit language to include the definition of critical habitat for the sea otters. This is something that was done for these general permits when critical habitat was designated for the Steller sea lions.[151] Because previous consultation resulted in a "not likely to adversely affect" decision on the otter and the Service does not envision that the designation of critical habitat will change the outcome of a consultation, this analysis assumes that future consultations will likewise not result in requests for project modifications.[152]

6.4 ESTIMATED PRE-DESIGNATION IMPACTS OF OTTER CONSERVATION ON WATER QUALITY MANAGEMENT ACTIVITIES

203. Estimated pre-designation impacts consist of the costs of barging waste out to sea for each of the 24 facilities located directly adjacent to the designation, including those with lapsed permits. Assuming that all processing plants barge their waste may overestimate impacts because some processors are known to use land-based disposal methods (e.g., several plants in Dutch Harbor, AK), or only barge on a limited scale.[153]

204. As shown in Exhibit 6-3, total pre-designation impacts are estimated at $13.5 million ($4.0 million per year at a seven percent annual discount rate), with the highest impacts occurring in Unit 5. Chapter 7 quantifies the associated administrative costs of section 7 consultation for the NPDES permits associated with both the seafood processing and log transfer facilities.

6.5 ESTIMATED POST-DESIGNATION BASELINE IMPACTS OF OTTER CONSERVATION ON WATER QUALITY MANAGEMENT ACTIVITIES

205. Similar to pre-designation impacts, this analysis assumes an annual per facility cost of approximately $118,000 per year for all facilities currently located adjacent to the proposed designation. While this facility count may include some lapsed permits, the analysis assumes that either the facilities will renew their permits or that new facilities will replace them, holding the total number of facilities relatively constant.

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[151] U.S. Environmental Protection Agency, *Fact Sheet for Log Transfer Facilities,* July 2007. Accessed at http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/General+NPDES+Permits/$FILE/LTF-FS-08.pdf on March 23, 2009.

[152] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

[153] Personal communication with Frank Kelty, Resource Analyst, City of Unalaska, on May 8, 2009.

EXHIBIT 6-3. ESTIMATED PRE-DESIGNATION IMPACTS BY UNIT (2005-2008, DISCOUNTED AT SEVEN PERCENT)

UNIT	QUANTIFIED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1	▪ $118,000 in barging costs per facility per year for two seafood processing facilities	$1,130,000	$332,000
2	▪ $118,000 in barging costs per facility per year for six seafood processing facilities	$3,380,000	$997,000
3	▪ $118,000 in barging costs per facility per year for two seafood processing facilities	$1,130,000	$332,000
4a	None.	$0	$0
4b	None.	$0	$0
4c	None.	$0	$0
5	▪ $118,000 in barging costs per facility per year for 14 seafood processing facilities	$7,890,000	$2,330,000
	Total	**$13,500,000**	**$3,990,000**

Note: Estimates are rounded to three significant digits and may not sum due to rounding.

206. As shown in Exhibit 6-4, total post-designation impacts are estimated at $32.2 million (discounted at seven percent), or an annualized value of $2.8 million. Again, the majority of impacts are forecast to incur in Unit 5, which has the highest level of processing activity. Chapter 7 quantifies the associated forecast administrative costs of section 7 consultation for the NPDES permits associated with both the seafood processing and log transfer facilities.

6.6 ESTIMATED POST-DESIGNATION INCREMENTAL IMPACTS OF OTTER CONSERVATION ON WATER QUALITY MANAGEMENT ACTIVITIES

207. Given that the designation of critical habitat for the otter is not expected to result in future changes to Alaska's water quality standards, this analysis does not forecast any incremental impacts on NPDES-permitted activities. Both log transfer and seafood processing facilities are assumed to continue compliance with the existing standards.[154]

208. The analysis does forecast some incremental administrative costs associated with section 7 consultation on the reissuance of NPDES permits. Administrative effort required in these consultations may include, for example, expanding the permit language to include the definition of critical habitat for the sea otters. This is something that was done for

[154] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

these general permits when critical habitat was designated for the Steller sea lions.[155] Incremental administrative costs of consultation are estimated in Chapter 7 of this report.

EXHIBIT 6-4. ESTIMATED POST-DESIGNATION BASELINE IMPACTS BY UNIT (2009-2028, DISCOUNTED AT SEVEN PERCENT)

UNIT	QUANTIFIED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1	▪ $118,000 in barging costs per facility per year for two seafood processing facilities	$2,690,000	$237,000
2	▪ $118,000 in barging costs per facility per year for six seafood processing facilities	$8,060,000	$711,000
3	▪ $118,000 in barging costs per facility per year for two seafood processing facilities	$2,690,000	$237,000
4a	None.	$0	$0
4b	None.	$0	$0
4c	None.	$0	$0
5	▪ $118,000 in barging costs per facility per year for 14 seafood processing facilities	$18,800,000	$1,660,000
	Total	**$32,200,000**	**$2,840,000**

Note: Estimates are rounded to three significant digits and may not sum due to rounding.

6.7 SOURCES OF UNCERTAINTY

209. The three primary sources of uncertainty associated with the analysis in this Chapter are:

- **The outcome of ongoing and future consultation regarding the review and revision of State water quality standards is unknown**. Consultation is ongoing for some water quality standards and not yet begun for others. Consequently, uncertainty exists regarding whether consideration of the otter and its habitat is may affect the water quality standards within the proposed critical habitat area.
- **The potential exists for new NPDES permitted facilities to be constructed in the proposed critical habitat area**. Forecast impacts are based on conservation efforts at currently permitted seafood processing and log transfer facilities. Information is not available to suggest whether and how many additional facilities may be constructed within the proposed critical habitat area. In the case that new facilities are constructed, this analysis underestimates impacts associated with this activity.

[155] U.S. Environmental Protection Agency, *Fact Sheet for Log Transfer Facilities,* July 2007. Accessed at http://yosemite.epa.gov/r10/water.nsf/NPDES+Permits/General+NPDES+Permits/$FILE/LTF-FS-08.pdf on March 23, 2009.

- **The potential exists for additional sea otter conservation efforts to be recommended in the future.** Forecast otter conservation efforts are assumed to be consistent with past project modification requests at seafood processing (i.e., barging waste). Similarly, as past consultation regarding log transfer facilities did not result in project modifications for the otter, this analysis assumes no project modifications will be requested in the future at these facilities. This is based on the Service's statement that it does not anticipate critical habitat designation will change the types of conservation efforts requested of these projects.[156] In the case that future consultation results in requests for addition otter conservation efforts, this analysis underestimates impacts.
- **Estimated costs of barging seafood waste.** The estimate of $118,000 per year assumes the seafood processing facilities operate ten months of the year. It further assumes that the facilities opt to barge their waste to avoid affecting the sea otter rather than employing alternative land-based disposal methods. In the case that some of these facilities operate less or more than ten months per year, this analysis over or underestimates impacts of barging waste. In the case that land-based disposal is available and less expensive than barging waste, this analysis overestimates impacts of sea otter conservation on seafood processing facilities.

[156] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

CHAPTER 7 | ADMINISTRATIVE COSTS OF SECTION 7 CONSULTATION

210. This chapter describes past and future administrative costs of engaging in section 7 consultation considering the sea otter and its critical habitat habitat. Similar to the previous chapters of this report, administrative costs are broken into three categories: pre-designation costs, post-designation baseline costs, and post-designation incremental costs. The forecast consultations are described according to the various economic activities described in Chapters 3 through 6 that may jeopardize the continued existence of the otter or adversely modify its critical habitat.

KEY ISSUES AND CONCLUSIONS:
ADMINISTRATIVE COSTS

Administrative costs are based on the number of consultations and the estimated per consultation levels of effort. This analysis forecasts consultation numbers by reviewing both agency planning documents describing specific future projects (e.g., Federal Aviation Administration and Department of Transportation documents) and the historical consultation rate for various activities within the areas proposed for critical habitat designation.

Estimated levels of effort per consultation are based on data provided by the Alaska offices of the Fish and Wildlife Service regarding average time the Service spends per sea otter consultation, and review of Federal action agencies and third parties across the country regarding average levels of effort for section 7 consultation for various listed species.

Consultation efforts are split among the following activities: oil spill response, construction activities, water quality management, and "other" activities. The "other" activities include conservation projects (e.g., invasive species eradication) and recreation.

Pre-designation impacts

- Total present value pre-designation impacts of section 7 consultation (2005-present) are: **$1.15 million**. Units 2 and 5 have experienced the greatest administrative costs of consultation (Exhibit 7-1).

Post-designation baseline impacts

- Total present value post-designation baseline administrative costs of consultation (2009-2028) are: **1.97 million**. Consistent with the past, the greatest levels of economic activity, and therefore greatest administrative costs of consultation, are forecast to be associated with Units 2 and 5 (Exhibit 7-2).

Incremental impacts of critical habitat designation

- As highlighted in Chapters 3 though 6 of this report, critical habitat is not expected to result in additional conservation efforts for the sea otter above and beyond those afforded the species under the listing. Therefore, incremental impacts of critical habitat designation are limited to additional time spent in section 7 consultation to consider adverse modification for the forecast consultations. Total present value incremental impacts are forecast to be: **$615,000** (Exhibit 7-2).

Note: All cost figures presented in this Chapter describe present value impacts assuming a seven percent discount rate. Appendix B reports forecast cost impacts assuming a discount rate of three percent to highlight the sensitivity of the results to the discount rate.

EXHIBIT 7-1. SUMMARY OF PRE-DESIGNATION ADMINISTRATIVE COSTS BY UNIT (2005-PRESENT)

UNIT	PRESENT VALUE IMPACTS (7% DISCOUNT RATE)
1	$137,000
2	$317,000
3	$128,000
4a	$52,600
4b	$53,000
4c	$77,700
5	$390,000
Total	**$1,150,000**

EXHIBIT 7-2. SUMMARY OF POST-DESIGNATION BASELINE AND INCREMENTAL ADMINISTRATIVE COSTS BY UNIT (2009-2028)

UNIT	BASELINE IMPACTS (7% DISCOUNT RATE)		INCREMENTAL IMPACTS (7% DISCOUNT RATE)	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1	$209,000	$18,500	$66,300	$5,850
2	$586,000	$51,700	$180,000	$15,900
3	$195,000	$17,200	$61,800	$5,450
4a	$46,700	$4,120	$14,800	$1,300
4b	$46,700	$4,120	$14,800	$1,300
4c	$98,100	$8,660	$31,000	$2,740
5	$792,000	$69,900	$246,000	$21,700
Total	**$1,970,000**	**$174,000**	**$615,000**	**$54,200**

7.1 BACKGROUND

211. This section presents background information about the section 7 consultation process, and information on the development of estimates of administrative cost efforts.

7.1.1 THE CONSULTATION PROCESS

212. Section 7(a)(2) of the Act requires Federal agencies (Action agencies) to consult with the Service whenever activities that they undertake, authorize, permit, or fund may affect a listed species or designated critical habitat. In some cases, consultations will involve the Service and another Federal agency only, such as the U.S. Army Corps of Engineers. Often, they will also include a third party involved in projects that involve a permitted entity, such as the recipient of a Clean Water Act section 404 permit.

213. During a consultation, the Service, the Action agency, and the entity applying for Federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the proposed critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these interactions depends on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the proposed activity, the Federal agency, and whether there is a private applicant involved.

214. Section 7 consultations with the Service may be either informal or formal. *Informal consultation*s consist of discussions between the Service, the Action agency, and the applicant concerning an action that may affect a listed species or its designated critical habitat, and are designed to identify and resolve potential concerns at an early stage in the planning process. By contrast, a *formal consultation* is required if the Action agency determines that its proposed action may or will adversely affect the listed species or designated critical habitat in ways that cannot be resolved through informal consultation. The formal consultation process results in the Service's determination in its Biological Opinion of whether the action is likely to jeopardize a species or adversely modify critical habitat, and recommendations to minimize those impacts. Regardless of the type of consultation or proposed project, section 7 consultations can require substantial administrative effort on the part of all participants.

7.1.2 ADMINISTRATIVE SECTION 7 CONSULTATION COSTS

215. While consultations are required for activities that involve a Federal nexus and may adversely affect the species regardless of whether critical habitat is designated, the designation may increase the consultation effort where a project or activity may also adversely modify critical habitat. Administrative efforts for future sea otter consultation may therefore result in both baseline and incremental impacts.

216. 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.

217. The areas proposed for critical habitat are all considered occupied by the sea otter. [157] Further, the Service does not anticipate activities that are not a conservation threat to the species under the listing to be a conservation threat to the critical habitat. As a result, anticipated future consultations would already have been expected to occur under the baseline, but those consultations will also be expected to consider adverse modification following critical habitat designation. As such, only the first category of consultation type above is considered relevant to this analysis. The administrative cost estimates presented in this chapter take into consideration the level of effort of the Service, the Action agency, and the applicant (where relevant), as well as the varying complexity of the consultation.

218. Estimates of the level of Service effort for individual consultations were developed from a review of recent section 7 consultation efforts by the Alaska Marine Mammals Management Office for the northern sea otter. Estimates of the level of Action agency and third party effort for individual consultations were developed from a review and analysis of historical section 7 files from a number of Service field offices around the country conducted in 2002. These files addressed consultations conducted for both listings and critical habitat designations. Level of effort estimates were crosschecked with Action agencies and third parties in Alaska where possible.

219. 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. Exhibit 7-3 provides estimated consultation costs representing effort required for formal and informal consultations. The following sections describe the specific assumptions and administrative cost estimates for each activity type analyzed in this report.

[157] 73 FR 76454.

EXHIBIT 7-3. ADMINISTRATIVE COSTS PER CONSULTATION EFFORT BY ACTIVITY ($2008)[1]

COST DESCRIPTION	SCENARIO	CONSULT TYPE	SERVICE[2]	FEDERAL ACTION AGENCY[3]	THIRD PARTY[3]	BIOLOGICAL ASSESSMENT[4]	TOTAL COSTS
Oil Spill Response							
Cost of considering jeopardy	Baseline	Informal	$361	$2,250	$1,540	$4,150	$1,500
Cost of considering adverse modification	Incremental	Informal	$30	$750	$513	$1,290	$500
Cost of considering jeopardy & adverse modification	Baseline & Incremental	Informal	$391	$3,000	$2,050	$5,440	$2,000
Water Quality,[5] Construction, and Other activities							
Cost of considering jeopardy	Baseline	Informal	$387	$2,250	$1,540	$4,170	$1,500
		Formal	$10,600	$4,500	$2,630	$17,700	$3,600
Cost of considering adverse modification	Incremental	Informal	$30	$750	$513	$1,290	$500
		Formal	$663	$1,500	$875	$3,040	$1,200
Cost of considering jeopardy & adverse modification	Baseline & Incremental	Informal	$417	$3,000	$2,050	$5,470	$2,000
		Formal	$11,300	$6,000	$3,500	$20,800	$4,800

Notes:

1. Estimates are rounded to three significant digits and may not sum due to rounding. Estimates reflect average hourly time required by staff. Hourly rates based on Federal Government Schedule Rates, Office of Personnel Management, 2008.
2. The Service's Marine Mammals Management Office provided estimates of administrative efforts for sea otters for past consultations (baseline efforts), and estimates of administrative efforts likely to occur following critical habitat (incremental efforts). These estimates were provided separately for oil spills and other activities. Written communications with the Service, Marine Mammals Management Office, May 1, 2009.
3. Levels of Federal Action Agency and third party consultation efforts were developed as part of an IEc review of consultation records from several Service field offices across the country conducted in 2002. Third party effort levels were crosschecked in Alaska with an oil spill response organization in Alaska for relevance to sea otter. Personal communication with Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on May 5, 2009.
4. Biological Assessment costs are provided separately as some consultations may not require the development of a Biological Assessment, in which case these costs are not included.
5. Two past formal consultations on water quality involved a significantly higher level of effort by the Service. The first of these consultations occurred in 2008 and required 1,650 hours of effort by the Service (compared to an average consultation time of approximately 17 hours for water quality projects). The second consultation occurred in the beginning of 2009 and required roughly 550 hours of effort by the Service. The total baseline costs associated with these two consultations were $149,000 and $49,800, respectively. Based on written communications with the Service, Marine Mammals Management Office, May 1, 2009 and personal communication with the Service on May 11, 2009.

7.2 OIL SPILL PLANNING AND RESPONSE ADMINISTRATIVE COSTS

220. As discussed in Chapter 3, the USCG, ADEC, the responsible party, or primary action response contractors typically contact the Service or ADFG directly following a spill to identify environmentally-sensitive areas in the vicinity of the spill.[158] For typical small spills, the response primarily entails containment and cleanup of the oil at the site prior to causing any impacts on sensitive areas. For these spills, the Service typically has a brief conversation with the U.S. Coast Guard or other members of the Unified Command to make response organizations aware of otter presence in the general area.[159] A series of short coordinating phone calls among response organizations to be alert for potential wildlife issues may also ensue.[160] Of the 111 spills per year in the recent past, 103 spills per year have resulted in this low level of effort.[161] The administrative costs to the Service and response parties associated with initial contact following a spill are thought to be negligible and, thus, are not quantified in this analysis.

221. For spills where impacts to sensitive areas cannot be avoided, the Service may enter into emergency section 7 consultation on the spill for sea otters. For approximately eight oil spills per year (or a total of 39 efforts from 2005-present),[162] the Service spent between one and 40 hours of time on informal consultations following spills.[163] These efforts are summarized in Exhibit 7-4 by unit.

EXHIBIT 7-4. NUMBER OF PAST INFORMAL CONSULTATIONS ON OIL SPILLS (2005-PRESENT)

UNIT	TOTAL NUMBER OF INFORMAL CONSULTATIONS
1	9
2	11
3	5
4a	0
4b	0
4c	0
5	13
Total	**39**

[158] Personal communication with Contaminants Biologist, U.S. Fish and Wildlife Service on March 17, 2009.

[159] Personal communication with Contaminants Biologist, U.S. Fish and Wildlife Service on March 17, 2009.

[160] For example, Alaska Chadux has a contract with the IBRRC, who handles their wildlife concerns. In cases where wildlife concerns may arise, Chadux may contact IBRRC to alert them to the possibility that mobilization could be needed. Personal communication with Chris Burns, Preparedness Supervisor, Alaska Chadux Corporation on May 5, 2009.

[161] Written communication with Service, Alaska Marine Mammals Management Office, May 1, 2009.

[162] The available consultation history includes data for 2006 to 2009. This analysis uses this data to estimate the number of spills in 2005 that required informal consultation.

[163] Ibid.

222. Applying the baseline informal consultation costs for oil spills presented in Exhibit 7-3, the present value of costs associated with past informal consultations on oil spills is estimated to be $254,000 (Exhibit 7-5). Note that this analysis assumes that Action agencies have prepared biological assessments for oil spills for each informal consultation. To the extent that no biological assessment was prepared, estimates of administrative costs are likely to overstate actual costs.

EXHIBIT 7-5. PRE-DESIGNATION ADMINISTRATIVE COSTS OF OIL SPILL RESPONSE FOR OTTERS (2005-PRESENT)

UNIT	PRESENT VALUE IMPACTS (7% DISCOUNT RATE)
1	$62,700
2	$69,900
3	$32,700
4a	$2,650
4b	$2,650
4c	$2,650
5	$80,600
Total	**$254,000**

223. As discussed in Chapter 3 of this analysis, it is not possible to know with certainty where future oil spills will occur. Thus, this analysis assumes that the distribution of future oil spills requiring informal consultation across the proposed critical habitat units will be similar to the past distribution of spills requiring informal consultation. Applying this assumption, this analysis forecasts 152 oil spills requiring informal consultation within the proposed critical habitat area, resulting in present value baseline administrative costs of $467,000 over the next 20 years (Exhibit 7-6).

224. Because future consultations will consider both jeopardy and potential adverse modification of critical habitat, some incremental administrative impacts are expected. Applying the incremental oil spill costs presented in Exhibit 7-3, this analysis estimates that the total present value of incremental administrative costs for the 152 forecast consultations will be $148,000 (Exhibit 7-6).

EXHIBIT 7-6. POST-DESIGNATION ADMINISTRATIVE COSTS OF OIL SPILL RESPONSE FOR OTTERS (2009-2028)

UNIT	BASELINE IMPACTS (7% DISCOUNT RATE)		INCREMENTAL IMPACTS (7% DISCOUNT RATE)	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1	$113,000	$9,970	$35,900	$3,160
2	$128,000	$11,300	$40,600	$3,580
3	$60,300	$5,320	$19,100	$1,690
4a	$5,020	$443	$1,590	$141
4b	$5,020	$443	$1,590	$141
4c	$5,020	$443	$1,590	$141
5	$151,000	$13,300	$47,800	$4,220
Total	**$467,000**	**$41,200**	**$148,000**	**$13,100**

7.3 MARINE AND COASTAL CONSTRUCTION ADMINISTRATIVE COSTS

225. Since the listing of the species, approximately one formal and 49 informal consultations considering the sea otter have occurred in critical habitat areas regarding marine and coastal construction activities. Using the baseline formal and informal costs for marine and coastal construction presented in Exhibit 7-3, the present value administrative costs associated with past consultations on marine and coastal construction is estimated to be $333,000 (Exhibit 7-7).

EXHIBIT 7-7. PRE-DESIGNATION ADMINISTRATIVE COSTS FOR MARINE AND COASTAL CONSTRUCTION (2005-PRESENT)

UNIT	PRESENT VALUE COSTS (7% DISCOUNT RATE)
1	$3,420
2	$111,000
3	$42,000
4a	$7,870
4b	$8,290
4c	$33,000
5	$127,000
Total	**$333,000**

226. In the future, this analysis forecasts four formal consultations considering the otter for known coastal and marine construction projects. Specifically, formal consultations are anticipated for the following projects:

- Unit 2, Akutan Ferry Terminal in 2009;
- Unit 2, Dutch Harbor Airport in 2009;

- Unit 5, Pebble Mine between 2005 and 2016; and
- Unit 5, Kodiak Ferry Terminal in 2009.

227. In addition to these formal consultations, informal consultations are assumed to take place in the future at a similar rate and distribution as marine and coastal construction consultations. In total, this analysis anticipates 196 informal consultations on construction activities over the next 20 years, or approximately ten consultation actions annually. These consultations will be new consultations that will consider both jeopardy and potential impacts to adverse modification. Thus, they will contain both baseline and incremental components. Using the baseline formal and informal costs for marine and coastal construction presented in Exhibit 7-3, the present value baseline administrative costs associated with future consultations on marine and coastal construction are estimated to be $711,000 (Exhibit 7-8). The present value incremental costs are estimated to be $215,000 (Exhibit 7-8).

EXHIBIT 7-8. POST-DESIGNATION ADMINISTRATIVE COSTS FOR MARINE AND COASTAL CONSTRUCTION (2009-2028)

UNIT	BASELINE COSTS (7% DISCOUNT RATE)		INCREMENTAL COSTS (7% DISCOUNT RATE)	
	PRESENT VALUE COSTS	ANNUALIZED COSTS	PRESENT VALUE COSTS	ANNUALIZED COSTS
1	$6,890	$608	$2,180	$192
2	$217,000	$19,100	$63,500	$5,600
3	$84,100	$7,420	$26,600	$2,340
4a	$16,500	$1,460	$5,220	$461
4b	$16,500	$1,460	$5,220	$461
4c	$68,000	$6,000	$21,500	$1,890
5	$303,000	$26,700	$91,100	$8,030
Total	**$711,000**	**$62,800**	**$215,000**	**$19,000**

7.4 WATER QUALITY MANAGEMENT ADMINISTRATIVE COSTS

228. Since the listing of the species, approximately two formal and 23 informal consultations considering the sea otter have occurred that addressed water quality issues in critical habitat areas, in addition to consultations on oil spills. As discussed in Chapter 5 of the analysis, the first formal consultation is a statewide programmatic consultation on a number of species that was conducted with EPA on the Alaska Revised Mixing Zone strategy, and involved approximately 1,650 hours of Service time with an estimated baseline cost of $149,000.[164] The second formal consultation, also ongoing, is also a statewide programmatic regarding State water quality standards for residues, with an estimated baseline cost of $49,800. Importantly, each of these large-scale consultations considers multiple species and habitats in reviewing water quality standards, not only the sea otter.

[164] Written communications with the Service, Marine Mammals Management Office, May 1, 2009.

229. The remaining informal consultations addressed activities including storm water pollution prevention plans (SWPPPs) and the statewide seafood general permit, and NPDES permit reviews. Using the baseline formal and informal costs for water quality management presented in Exhibit 7-3 combined with the costs of the two formal consultations on water quality management, the present value of administrative costs associated with past consultations on water management projects is estimated to be $351,000 (Exhibit 7-9).

EXHIBIT 7-9. PRE-DESIGNATION ADMINISTRATIVE COSTS ASSOCIATED WITH WATER QUALITY MANAGEMENT (2005-PRESENT)

UNIT	PRESENT VALUE COSTS (7% DISCOUNT RATE)
1	$33,500
2	$72,500
3	$39,100
4a	$33,500
4b	$33,500
4c	$33,500
5	$106,000
Total	**$351,000**

230. This analysis assumes that future consultations will include an informal consultation every five years upon review of each of the general seafood processing permits (costs are distributed among affected facilities in the proposed critical habitat area). In addition, two facilities which hold individual permits are assumed to informally consult separately every five years. The analysis also assumes that an informal consultation on log transfer facilities will occur every five years. The specific forecast consultations, combined with the historic rates of consultation for water quality management activities result in a forecast of 108 future informal consultations on water quality issues over the next 20 years, or approximately five annually.

231. Applying the baseline informal consultation costs for water quality management presented in Exhibit 7-3, the present value of baseline administrative costs associated with future informal consultations on water management projects is estimated to be $345,000 (Exhibit 7-10). Using the incremental informal consultation costs for water quality management presented in Exhibit 7-3, the present value of incremental administrative costs associated with future informal consultations on water quality management is estimated to be $109,000 (Exhibit 7-10).

EXHIBIT 7-10. POST-DESIGNATION ADMINISTRATIVE COSTS ASSOCIATED WITH WATER QUALITY MANAGEMENT (2009-2028)

UNIT	BASELINE COSTS (7% DISCOUNT RATE)		INCREMENTAL COSTS (7% DISCOUNT RATE)	
	PRESENT VALUE COSTS	ANNUALIZED COSTS	PRESENT VALUE COSTS	ANNUALIZED COSTS
1	$8,510	$751	$2,690	$237
2	$112,000	$9,920	$35,500	$3,130
3	$21,400	$1,890	$6,750	$596
4a	$7,350	$648	$2,320	$205
4b	$7,350	$648	$2,320	$205
4c	$7,350	$648	$2,320	$205
5	$181,000	$16,000	$57,200	$5,050
Total	**$345,000**	**$30,500**	**$109,000**	**$9,630**

7.5 OTHER ACTIVITIES ADMINISTRATIVE COSTS

232. Since the listing of the species, approximately 35 informal consultations have occurred regarding the sea otter that addressed activities other than oil spills, marine construction, or water quality issues in the proposed critical habitat area. Such consultations have included conservation activities such as weed eradication, research activities, and forest management plans, among others. The Service indicated that these consultations resulted in only administrative costs for the sea otter.[165] Using the baseline informal consultation costs for other activities presented in Exhibit 7-3, the present value of administrative costs associated with past consultations on other activities is estimated to be $217,000 (Exhibit 7-11).

EXHIBIT 7-11. PRE-DESIGNATION ADMINISTRATIVE COSTS ASSOCIATED WITH OTHER ACTIVITIES (2005-PRESENT)

UNIT	PRESENT VALUE COSTS (7% DISCOUNT RATE)
1	$37,500
2	$62,900
3	$14,000
4a	$8,570
4b	$8,570
4c	$8,570
5	$76,400
Total	**$217,000**

[165] Personal communication with Service, Marine Mammals Management Office, Anchorage, Alaska, on May 1, 2009.

233. This analysis assumes that occurrences of these consultations will continue in the future at a similar rate and distribution as past consultations, resulting in a total of 140 future informal consultations over the 20 year period for this analysis, or approximately seven annually. These consultations will be new consultations that will consider both jeopardy and potential adverse modification to critical habitat. Thus, they will contain both baseline and incremental components. Using the baseline informal consultation costs for other activities presented in Exhibit 7-3, administrative costs associated with future informal consultations on other activities are estimated to be $450,000 (Exhibit 7-12). Using the incremental informal consultation costs for other activities presented in Exhibit 7-3, the present value incremental administrative costs associated with future informal consultations on other activities is estimated to be $142,000 (Exhibit 7-12).

EXHIBIT 7-12. POST-DESIGNATION ADMINISTRATIVE COSTS ASSOCIATED WITH OTHER ACTIVITIES (2009-2028)

UNIT	BASELINE COSTS (7% DISCOUNT RATE)		INCREMENTAL COSTS (7% DISCOUNT RATE)	
	PRESENT VALUE COSTS	ANNUALIZED COSTS	PRESENT VALUE COSTS	ANNUALIZED COSTS
1	$81,000	$7,150	$25,600	$2,260
2	$128,000	$11,300	$40,500	$3,570
3	$29,600	$2,610	$9,340	$824
4a	$17,800	$1,570	$5,610	$495
4b	$17,800	$1,570	$5,610	$495
4c	$17,800	$1,570	$5,610	$495
5	$158,000	$14,000	$50,000	$4,410
Total	**$450,000**	**$39,700**	**$142,000**	**$12,500**

7.6 CAVEATS

234. **Number of Affected Actions.** The number of consultations and technical assistance efforts to be undertaken in the future for activities within a given critical habitat unit is highly uncertain. The frequency of such efforts will be related to the level of economic activity, whether the activities may affect the otter or its critical habitat.

235. While a number of specific construction projects are separately identified and analyzed in this report, the majority of the forecast activities (oil spill response, construction, and water quality permitting) are expected to occur at regular intervals for the foreseeable future. For such activities, this analysis uses a 20-year time horizon based on professional judgment regarding how far out the occurrence of these activities can be considered "reasonably foreseeable." For example, NPDES permit reviews forecast in this analysis are expected to occur every five years. This analysis estimates the present value of these regular reviews over the next 20 years assuming the following three conditions do not change within that time frame: 1) critical habitat continues to exist for the duration of the time period; 2) the NPDES review process continues every five years; and 3) new facilities are brought online at the same rate that older facilities are taken offline, i.e., the number of affected facilities remains constant. To the extent that the

number of consultations, permit reviews, or affected facilities decreases over the next 20 years, this analysis could overestimate the administrative impacts of otter conservation. Because it includes costs only to a 20-year time horizon, this analysis could underestimate present value impacts in the case that critical habitat effects continue beyond 20 years.

236. **Costs of Consultation.** The average costs per consultation described in Exhibit 7-3 assume an average level of effort for the various types of consultation (informal and formal, by activity). To the extent that future consultation are not reflective of this average level of effort, this analysis may under or overestimate administrative impacts of section 7 consultation.

CHAPTER 8 | ECONOMIC BENEFITS

237. This chapter provides a characterization of the potential economic benefits of critical habitat designation for the sea otter, to provide context to the cost analyses presented in the preceding chapters. It first describes the categories of economic benefit that may derive from the conservation of species and their habitats, and discusses the research methods that economists employ to quantify these benefits. It then describes the available literature that addresses the economic value of sea otter populations. Next, this chapter summarizes the otter conservation efforts described in Chapters 3 through 6, linking these efforts with potential economic benefits that may derive from their implementation. Given data limitations, this chapter does not attempt to quantify the potential baseline and incremental benefits described.

8.1 CATEGORIES OF BENEFIT RELATING TO SPECIES AND HABITAT CONSERVATION

238. The primary goal of listing a species is to preserve the species from extinction. Various economic benefits, measured in terms of social welfare or regional economic performance, may also result from species and habitat conservation. The benefits of species and habitat conservation can be placed into two broad categories: (1) those associated with the primary goal of species conservation, and (2) those that derive from the habitat conservation efforts to achieve this primary goal.

239. Because a purpose of the Act is to provide for the conservation of endangered and threatened species, the benefits of actions taken under the Act are often measured in terms of the value placed by the public on species preservation (e.g., avoidance of extinction, and/or increase in a species' population). Such social welfare values for a species may reflect both use and non-use values for the species. Use values derive from a direct use for a species, such as commercial harvesting or recreational wildlife-viewing opportunities. Non-use values are not derived from direct use of the species, but instead reflect the utility the public derives from knowledge that a species continues to exist (e.g., existence or bequest values).

240. As a result of actions taken to preserve endangered and threatened species, such as habitat management, various other benefits may accrue to the public. Conservation efforts for species and habitat may result in improved environmental quality, which in turn may have collateral human health or recreational use benefits. In addition, conservation efforts undertaken for the benefit of a threatened or endangered species may enhance shared habitat for other wildlife. Such benefits may be a direct result of modifications to projects, or may be collateral to such actions. For example, a section 7 consultation may result in barging waste from seafood processing facilities outside of sea otter habitat. A reduction in seafood waste concentrated in nearshore, marine areas may

directly benefit water quality in these areas and also provide the collateral benefits of preserving habitat for other species occupying these areas.

241. Economists apply a variety of methodological approaches in estimating both use and non-use values for species and for habitat improvements, including stated preference and revealed preference methods. Stated preference techniques include the contingent valuation method and conjoint analysis or contingent ranking methods. In simplest terms, these methods employ public opinion survey techniques, asking respondents to state what they would be willing to pay for a resource or for programs designed to protect that resource. A substantial literature has developed that describes the application of this technique to the valuation of natural resource assets.

242. More specific to use values for species or habitats, revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" their value by their behavior). For example, travel cost models are frequently applied to value access to recreational opportunities, as well as to value changes in the quality and characteristics of these opportunities. Basic travel cost models are rooted in the idea that the value of a recreation resource can be estimated by analyzing the travel and time costs incurred by individuals visiting the site. Another revealed preference technique is hedonic analysis, which is often employed to determine the effect of specific site characteristics on property values.

8.2 AVAILABLE LITERATURE VALUING SEA OTTER POPULATIONS

243. An ideal study for use in valuing the use and non-use values that may derive from critical habitat designation for the otter would be specific to the species (Southwest Alaska distinct population segment of Northern sea otter), the policy question at hand (economic benefits of critical habitat designation), and the affected population (e.g., citizens of Alaska or of the U.S.).

244. Absent primary research specific to the policy question, resource management decisions can often be informed by applying the results of existing valuation research to a new policy question – a process known to economists as benefit transfer. Benefit transfer involves the application of unit value estimates, functions, data, and/or models from existing studies to estimate the benefits associated with the resource under consideration. The Office of Management and Budget (OMB) has written guidelines for conducting credible benefit transfers.[166] The important steps in the OMB guidance are: (1) specify the value to be estimated for the rulemaking; and (2) identify appropriate studies to conduct benefits transfer based on the following criteria:

- The selected studies should be based on adequate data, sound and defensible empirical methods and techniques.

[166] 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.

- The selected studies should document parameter estimates of the valuation function.
- The study and policy contexts should have similar populations (e.g., demographic characteristics). The market size (e.g., target population) between the study site and the policy site should be similar.
- The good, and the magnitude of change in that good, should be similar in the study and policy contexts.
- The relevant characteristics of the study and policy contexts should be similar.
- The distribution of property rights should be similar so that the analysis uses the same welfare measure (i.e., If the property rights in the study context support the use of willingness-to-accept measures while the rights in the rulemaking context support the use of willingness-to-pay measures, benefits transfer is not appropriate).
- The availability of substitutes across study and policy contexts should be similar.

245. There are four types of benefit transfer studies: point estimate, benefit function, meta-analysis, and Bayesian techniques. The point estimate approach involves taking the mean value (or range of values) from the study case and applying it directly to the policy case. As it is rare that a policy case and study case will be identical, this approach is not generally preferable. If it is possible to choose between transferring a function or a point estimate, the entire demand function should be transferred rather than adopting a single point estimate.

246. A 2005 study by Loomis, *Economic Benefits of Expanding California's Southern Sea Otter Population*, considers the use and non-use benefits associated with expanding the southern sea otter population along the southern California coast.[167] Specifically, the analysis estimates the benefits associated with an addition 196 sea otters (117 along the coast and 79 at San Nicolas Island). The analysis employs benefit transfer techniques to estimate the value of sea otter tourism benefits in Southern California, non-market benefits to households in California and ecosystem service benefits of kelp forest conservation. The results are summarized below:

- **Sea Otter Tourism.** The Loomis analysis estimates direct income and employment benefits per sea otter of $13,220 to $69,700 and 0.53 to 2.8, respectively. Thus an expansion of 117 in the population of sea otters along the coast would result in $1.5 million to $8.2 million in direct income in Santa Barbara County. For the high end estimate of $69,700 per sea otter, Loomis transfers a point estimate from a 2001 Aldrich et. al. study (a University of California, Santa Barbara thesis) which statistically estimated the amount of

[167] Loomis, John. December 2005. "Economic Benefits of Expanding California's Southern Sea Otter Population." Prepared for Defenders of Wildlife.

tourism spending related to sea otters.[168] Because the Aldrich et. al. study contained an omitted variable bias in not controlling for viewing opportunities for other wildlife in the region, Loomis develops a the low end estimate ($13,220 per sea otter) by taking 19 percent of the high end estimate. The 19 percent adjustment is based on a 1985 study by Hageman estimating that 19 percent of total wildlife-viewing trip related expenditures to sea otter habitat in California were related to sea otters.[169] These per otter estimates were only applied to the 117 additional otters expected along the coast as the 79 additional otters at San Nicolas Island were determined to be too difficult to view to be relevant to these estimates. Loomis notes that these tourism benefits reflect only the direct increase in income and employment expected and does not take into account multiplier effects, which could double these estimates.

- **Non-Market Economic Values for Sea Otters.** Loomis estimates a low end non-market value of 196 additional sea otters to be $3.4 million, including wildlife viewing, existence value, and option value. This estimate is a transfer of the benefit value derived in the 1985 Hageman study, which used a mail survey to elicit California households' willingness to pay for three population levels of sea otters. Because the Hageman survey had a relatively low response rate (21 percent), the Loomis study applies the estimated willingness to pay per household to only 21 percent of California households (rather than all California households) to inform the low end estimate of non-market value. The Loomis study compares this result to the results of an alternative benefit transfer in the form of a meta-analysis of relevant studies. Loomis and White (1996) reviewed 25 different contingent valuation studies on the total economic value of endangered and threatened species to inform a multiple regression equation.[170] The dependent variable being the willingness to pay per household to protect the species, and the independent variables being the species' population size, form of payment (e.g., one time or annual), visitors (i.e., whether they were visitors to the region), marine mammals, and birds. This functional transfer is carried out two ways: 1) assuming the willingness to pay is linearly related to otter populations (at the high end); and 2) assuming a double natural log willingness to pay function to reflect decreasing marginal benefits of additional otters. This resulted in a range in non-market values of $2.32 to $5.81 per household, or statewide benefits of $26.7 million to $66.8 million.

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[168] Aldrich, K., J. Curtis, and S. Drucker. 2001. A Cost-Benefit Analysis of Public Law 99-625: Sea Otter Shellfishery Conflicts in Santa Barbara and Ventura Counties. Group Thesis, Donald Bren School of Environmental Science and Management, University of California-Santa Barbara.

[169] Hageman, R. 1985. Valuing Marine Mammal Populations: Benefit Valuations in a Multi-species Ecosystem. Administrative Report LJ-85-22. National Marine Fisheries Service, La Jolla, California.

[170] Loomis, J. and D. White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-Analysis. Ecological Economics 18: 197-206.

- **Ecosystem Service Benefits.** The Loomis study recognizes the importance of kelp forest ecosystems in terms of providing food and habitat for filter feeders, supporting commercial and recreational fishing, dampening wave surges, reducing coastal erosion, and carbon storage or sequestration. Absent information on how these ecosystem services change in response to different levels of sea otter populations, the Loomis study simply provides a per acre value from a 1997 Costanza et. al. study for coastal seagrass/algal bed ecosystems of $7,600 per acre.[171]

247. Assessing studies for applicability involves determining whether available studies are comparable to the policy case. Specifically, the analyst should assure that (1) the basic commodities are essentially equivalent; (2) the baseline and extent of the change are similar; and (3) the affected populations are similar. Accordingly, while the Loomis study highlights that real social welfare benefits are associated with expansions in sea otter populations, it does not provide an adequate basis to evaluate the economic benefits of critical habitat designation for the northern sea otter.

248. While the basic commodities (sea otters) may be similar, the affected populations are quite dissimilar. Sea otter habitat in Southern California allows for relatively accessible viewing opportunities whereas the more remote nature of sea otter habitat in Southwest Alaska does not. As such, the tourism benefits associated with the two sea otter populations are not comparable. In fact, the Loomis study does not apply the per otter tourism benefits to those otters that are not accessible for viewing.

249. With regard to the existence and option values, the Loomis study does not align with the policy question at hand. The Loomis study considers the benefits of increasing southern sea otter populations. Unfortunately, it is not known how critical habitat designation for the northern sea otter will impact this species population levels. In fact, there are limited projected changes in resource use that would be expected to reduce impacts on the otter in this region.

250. Even if the economics literature provided a more robust foundation of studies, implementation of a benefit transfer for purposes of this report would likely prove problematic. Contingent valuation studies to value species conservation are typically designed to elicit the general benefits (in terms of a population's willingness to pay) of species protection or restoration, as opposed to the specific contribution of critical habitat designation to species restoration. In addition, critical habitat decisions under section 4(b)(2) of the Act entail consideration of impacts on a unit by unit basis, based on a determination that the benefits of excluding a particular unit outweigh the benefits of including it in the designation. Absent information on how each individual unit contributes to the conservation and recovery of the species, it would be difficult to assign aggregate use and non-use values to individual units on the basis of a simple formula, such as the percentage of the study area that the unit represents. Appropriate allocation of benefits to individual would require modeling changes in otter populations over time

[171] Costanza, R. et. al. 1997. The Value of the World's Ecosystem Services and Natural Capital. Nature 387: 253-260.

in response to the designation of different combinations of units. As this level of detail regarding otter population dynamics is not available, aggregate benefits figures cannot be readily disaggregated and integrated into an analysis of the costs and benefits of designating particular units as critical habitat.

8.3 POTENTIAL BENEFITS OF NORTHERN SEA OTTER CONSERVATION EFFORTS QUANTIFIED IN THIS ANALYSIS

251. This section describes the categories of benefits resulting from otter conservation efforts within the proposed critical habitat area. Exhibit 8-1 summarizes potential benefits associated with the specific otter conservation efforts described in Chapters 3 through 6 of this report. The first column summarizes otter conservation efforts by activity. The second column identifies potential categories of benefits that may derive from implementation of these conservation efforts. A description of these categories of benefit is provided below. The final columns of the exhibit identify the units in which baseline or incremental benefits may occur. Whether the benefits deriving from the conservation efforts are baseline or incremental depends on the reason for implementing the effort. The baseline or incremental status of the conservation effort summarized in the exhibit is as described for each activity and unit in Chapters 3 through 6 of this report.

252. The categories of economic benefit that may derive from the otter conservation efforts described in this report include:

- **Improved water quality:** Limiting or redistributing development, as well as managing economic activities that occur adjacent to riparian and aquatic habitats (e.g., agriculture, construction, and timber harvests) may improve water quality. Water quality improvements may in turn have human health and human use (e.g., recreation) benefits.
- **Aesthetic benefits:** Social welfare gains may be associated with enhanced aesthetic quality of habitat. Preferences for aesthetic improvements may be measured through increased willingness-to-pay to visit a habitat region for recreation or increased visitation.
- **Regional economic benefits:** To the extent that increased open space, aesthetic benefits, or improved water quality lead to an increase in visitation to the region (e.g., for recreation such as hiking or wildlife-viewing), the economy and employment may benefit from increased regional spending.

253. In addition to these categories of potential benefit, all of the conservation efforts described in Exhibit 8-1 are related to the broader conservation and recovery of the species. For example, monitoring and surveying for the species as part of an environmental impact study for a project is undertaken to better understand the effects of projects on species, and therefore inform the avoidance or minimization of those effects. All conservation efforts therefore relate to the maintenance or enhancement of the use (e.g., wildlife-viewing) and non-use value (e.g., existence value) that the public may hold specifically for the otter. Further, many of the conservation efforts undertaken for the otter may also result in

improvements to ecosystem health that are shared by other, coexisting species. The maintenance or enhancement of use and non-use values for these other species, or for biodiversity in general, may also result from these otter conservation efforts.

EXHIBIT 8-1 OTTER CONSERVATION EFFORTS AND POTENTIAL ASSOCIATED BENEFITS

CONSERVATION EFFORT	POTENTIAL ASSOCIATED BENEFITS	UNITS APPLIED	
		BASELINE BENEFIT	INCREMENTAL BENEFIT
MARINE AND COASTAL CONSTRUCTION			
Conducting environmental studies to determine impacts of project on sea otters.	• Maintenance and enhancement of use and non-use values. • Regional economic benefits associated with any use values (e.g., wildlife viewing).	2, 5	Incremental impacts limited to administrative costs.
WATER QUALITY MANAGEMENT			
Barging waste from seafood processing facilities outside of nearshore, marine areas inhabited by the sea otter.	• Maintenance and enhancement of use and non-use values. • Improved water quality • Aesthetic benefits • Regional economic benefits	1, 2, 3, 5	Incremental impacts limited to administrative costs.

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APPENDIX A | SMALL BUSINESS ANALYSIS AND ENERGY IMPACTS 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 in 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 otter and other Federal, State, and local regulations and policies, as quantified in Chapters 3 through 6 of this report, are expected to occur regardless of the outcome of this rulemaking. The only incremental impacts forecast in this analysis are administrative costs of consultation. These are quantified in Chapter 7.

A.1 SBREFA ANALYSIS

3. When a Federal agency proposes regulations, the RFA requires the agency to prepare and make available for public comment an analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions as defined by the RFA).[1] No initial regulatory flexibility analysis (IRFA) is required if the head of an agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have significant economic impact on a substantial number of small entities. To assist in this process, this appendix provides a screening level analysis of the potential for otter critical habitat to affect small entities.

4. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination in the proposed rule regarding whether the proposed critical habitat designation could be certified as not

[1] 5 U.S.C. § 601 et seq.

having a significant economic impact on a substantial number of small entities. This small business analysis will therefore inform the Service's threshold determination.

A.1.1 SUMMARY OF IMPACTS TO SMALL ENTITIES

5. This screening analysis is based on the estimated incremental impacts associated with the proposed rulemaking. The designation of critical habitat is not forecast to result in changes in the project design, operation, or management of the activities considered in this analysis as discussed in Chapters 3 through 6. The only incremental costs associated with critical habitat designation are additional administrative costs of section 7 consultation, which are described in Chapter 7. Chapter 7 describes incremental costs related to oil spill response, construction activities, and activities that may affect water quality.

6. Small entities may participate in section 7 consultation as a third party (the primary consulting parties being the Service and the Federal action agency). It is therefore possible that the small entities may spend additional time considering critical habitat during section 7 consultation for otter. These incremental administrative impacts to third parties are the focus of this analysis of impacts to small entities (development of the administrative costs are discussed in Chapter 7 of this analysis). Additional incremental costs of consultation that would be borne by the Federal action agency and the Service are not relevant to this screening analysis as these entities (Federal agencies) are not small.

7. Third party costs ($54,200 annualized) are anticipated to be borne by entities involved in a mixture of construction activities (35 percent), oil spill response activities (24 percent), water quality activities (18 percent), and other activities (23 percent).

8. Of potentially affected entities in critical habitat areas, 40 percent are small entities. If all of the entities involved in consultation efforts are small, and each of the 12 small entities in affected industries located within the study area were to share the annual costs, they would bear approximately $4,500 per entity.

9. Exhibit A-1 describes potentially affected small businesses by NAICS code, highlighting the relevant small business thresholds.[2] The threshold marks the high end annual revenues expected for any potentially affected small businesses. The Exhibit highlights that expected annual impacts to the construction industry ($19,000) and industries affecting water quality ($9,600) are significantly less than the annual revenues that could be garnered by a single small operator (e.g., $0.75 million for shellfish farming), in those industries. As such, impacts appear low relative to potential revenues.

[2] This exhibit does not include fishing vessels, as this fishing industry is not well captured by Dun and Bradstreet data due to the fact that most of the operations occur offshore.

EXHIBIT A-1. SUMMARY OF POTENTIAL IMPACTS ON INDIVIDUAL SMALL BUSINESSES

ACTIVITY	INDUSTRIES AND NAICS CODES	SMALL BUSINESS SIZE STANDARD	NUMBER OF ENTITIES IN STUDY AREA	NUMBER OF SMALL ENTITIES IN STUDY AREA	PERCENT OF TOTAL ENTITIES THAT ARE "SMALL"	ANNUALIZED INCREMENTAL ECONOMIC IMPACTS TO SMALL BUSINESSES (7%)
Oil Spill Response	Deep Sea Freight Transportation (NAICS code 483111)	500 employees	7	3	43%	$13,100
Construction	Power and Communication Line and Related Structures Construction (NAICS code 237130)	$33.5 million	0	0	n/a	$19,000
	Shellfish farming (NAICS code 112512)	$0.75 million	0	0	n/a	
	Natural gas pipeline construction (NAICS code 237120)	$33.5 million	0	0	n/a	
	General construction activities (NAICS code 237990)	$33.5 million	2	2	100%	
	Governmental Jurisdictions	50,000 people	3	3	100%	
Water Quality	Fresh and frozen seafood processing (NAICS code 311712)	500 employees	18	4	22%	$9,627
	Logging (NAICS code 113310)	500 employees	0	0	n/a	
Other	Various	Unknown	-	-	-	$12,546
		Total	**30**	**12**	**40%**	**$54,232**

Note that this exhibit does not include fishing vessels, as this fishing industry is not well captured by Dun and Bradstreet data due to the fact that most of the operations occur offshore and are based outside of habitat areas. Similarly, the data does not include any satellite facilities in the study area for which the main office is located outside of the study area.

10. In addition to the above impacts, potential impacts on oil and gas development activities could occur within the study area. However, the specific location of future oil and gas development activities is unknown at this time. Thus, quantification of impacts associated with these activities is not possible in critical habitat areas. Nonetheless, the nature and potential scale of impacts of otter conservation on oil and gas development activities is discussed in Chapters 4.

A.1.2 DETAILED ANALYSIS OF IMPACTS TO SMALL BUSINESSES

11. This analysis is intended to improve the Service's understanding of the potential effects of the proposed rule on small entities and to identify opportunities to minimize these impacts in the final rulemaking. The Act requires the Service to designate critical habitat for threatened and endangered species to the maximum extent prudent and determinable. 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 impact, of specifying any particular areas as critical habitat." The Secretary's discretion is limited as (s)he may not exclude areas if so doing "will result in the extinction of the species."

12. 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.

13. 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.[3]

14. 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.[4] 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.

15. 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.[5] "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."[6]

16. 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 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.

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[3] 773 F. 2d 327 (D.C. Cir. 1985).

[4] 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

[5] Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act, pg. 20.

[6] *Ibid.*, pg. 21.

17. This screening analysis focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapters 3 through 6 of this economic analysis. Although businesses affected indirectly are considered, this analysis considers only those entities for which impact would not be measurably diluted.

Potential Administrative Costs of Section 7 Consultation that May be Borne by Small Entities

18. As described above and detailed in Chapters 3 through 7 of this report, the only incremental impacts associated with this rulemaking are administrative in nature: the costs associated with section 7 consultations. Chapter 3 discusses oil spill planning and response; as described in that chapter, the only incremental impacts identified that may be borne by small businesses are those associated with the administrative costs of section 7 consultation (as quantified in Chapter 7). In Chapters 5 and 6, this analysis forecasts costs associated with known future construction projects and the reissuance of NPDES permits. Therefore, third parties (some of which may be small entities) may bear a total annual impact of up to $54,200 in incremental impacts related to these consultations (discounted at seven percent). These potential impacts are described in greater detail below.

- **Oil Spill Response.** Based on past history, approximately eight oil spills per year are anticipated to result in informal consultations on sea otters. Potential impacts to third parties could occur if oil spill response organizations or responsible parties for oil spills participate in discussions about potential impacts to otter critical habitat (administrative costs borne by the Service and Federal agencies are not impacts to small entities). As presented in Exhibit 7-3, these efforts are anticipated to result in costs of approximately $1,500 per spill. In the case that all forecast consultations involve small entities, present value impacts to the small entities involved in oil spill response activities could be $9,600 annually (discounted at seven percent). Note that while additional otter conservation efforts are likely for large spills in habitat areas, it is not possible to reliably forecast those spill events.
- **Construction Activities.** Based on the number of known future projects, this analysis forecasts that approximately four formal consultations and 196 informal consultations on marine and coastal construction projects will occur over the next 20 years. In the case that all forecast consultations involve small entities (e.g., small construction and dredging companies, small governmental jurisdictions), annual impacts to construction activities are forecast to be $19,000 in total (discounted at seven percent). These are administrative costs to small entities of participating with the Service and Federal action agencies in section 7 consultation considering critical habitat.
- **Water Quality Activities.** Based on a review of the facilities' NPDES permits, this analysis assumes that small entities may bear administrative costs related to informal consultation for the reissuance of two NPDES general permits and two individual permits every five years. Potential impacts to small entities holding NPDES permits are forecast to be $9,600 annually in total (discounted at seven percent). These are

administrative costs of participating with the Service and Federal action agencies in section 7 consultation considering critical habitat.

Other Potential Impacts to Small Businesses

19. As described above, in addition to the incremental administrative costs of consultation, this analysis qualitatively describes potential additional impacts of otter conservation on oil and gas development and tidal energy developments. While the majority of potential impacts would not be expected to borne by small entities in these industry categories, some level of impact could fall on small entities. As with other activities, the Service does not anticipate the designation of critical habitat to result in any additional project modification recommendations above and beyond those that would be requested because of the listing of the species as threatened.[7]

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

20. 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."[8]

21. The Office of Management and Budget provides guidance for implementing this Executive Order, outlining nine outcomes that may constitute "a significant adverse effect" when compared with 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

[7] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

[8] 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.

- Other similarly adverse outcomes.[9]

22. Oil and gas exploration and development and tidal energy developments have not occurred within the proposed critical habitat to date. As described in this analysis, however, the potential exists for these activities to occur in areas within or affecting critical habitat in the future. While this analysis considers that these activities are reasonably foreseeable, specific information on the future scope and scale of these activities is unknown. In the case that these activities do occur within or affecting critical habitat, the Service does not anticipate the designation of critical habitat to result in any additional project modification recommendations above and beyond those that would be requested because of the listing of the species as threatened.[10] Incremental impacts to the energy industry associated with these activities would therefore most likely be limited to additional administrative costs of consultation.

A.2.1 OIL AND GAS DEVELOPMENT

23. The State of Alaska owns the mineral rights to the vast majority of critical habitat areas (one small portion of critical habitat at the northernmost point of Unit 5 is Federally owned.). Given the recent oil and gas lease sale history, it appears that critical habitat areas have been relatively low priority for oil development to date (see Chapter 4 of this analysis). Leases in the Federal offshore areas in the North Aleutian Basin are currently scheduled for sale in 2011 and could result oil and gas development and a need for supporting infrastructure on the Alaska Peninsula in critical habitat areas. However, the specific outcomes of the sale, including any development plans, are unknown at this time. The State of Alaska has identified Unit 4c as a promising location for the offshore-onshore gas pipeline outlet in Bristol Bay-North Aleutian Basin. However, the specific location of the pipeline project, should it be built, is unknown at this time. While a current report projects the potential development in the North Aleutian Basin beginning in 2021, the authors state that the specific prediction of where, when, and how oil and gas development will occur within the region is unknown at this time.

24. No past consultations on otter have addressed oil and gas development activities. The Service has, however, been unable to foresee a scenario in which requests for otter conservation would change incrementally due to critical habitat designation, i.e., requests for modifications to projects in critical habitat would be different that what would be requested absent critical habitat.

[9] Ibid.

[10] U.S. Fish and Wildlife Service Memorandum to Industrial Economics, Inc. January 23, 2009. Adverse Modification versus Jeopardy Analyses in Southwest Alaska Distinct Population Segment of Northern Sea Otter Proposed Critical Habitat.

A.2.2 TIDAL ENERGY PROJECTS

25. To date, no tidal energy projects have been developed in critical habitat areas. Four preliminary permits for tidal energy projects have been issued in Cook Inlet, as described in Chapter 5. The specific location of these potential facilities within Cook Inlet is not known, and may or may not occur in the proposed critical habitat areas, which comprise a very small portion of Cook Inlet. Because the future likelihood of development of tidal energy projects within critical habitat is unknown, this analysis is unable to forecast impacts of otter conservation on potential future projects. Again, however, the Service does not anticipate modifications to tidal energy projects to result specifically from the designation of critical habitat for the sea otter.

APPENDIX B | SENSITIVITY OF RESULTS TO DISCOUNT RATE

1. This appendix summarizes on the costs off otter conservation quantified in Chapters 3 through 7 of this report. It first presents impacts assuming an alternative real discount rate of three percent (the main text of the report assumes a real discount rate of seven percent). This appendix then provides the undiscounted baseline and incremental impacts by year and subunit for each economic activity in Exhibits B-5 through B-12.

B.1 PRESENT VALUE IMPACTS ASSUMING A THREE PERCENT DISCOUNT RATE

2. 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 use of an alternative discount rate, this appendix provides estimates of the present value of economic impacts assuming a three percent real discount rate. Consistent with the main analysis, the appendix focuses on quantified estimates of economic impacts to oil spill planning and response, marine and coastal construction projects, and water quality management activities within the proposed critical habitat area.

3. Exhibits B-1 and B-2 summarize the distribution of estimated baseline and incremental economic impacts by subunit, respectively. The exhibits provide estimates of the present value impacts described in Chapters 3 through 7 of this report employing both a three percent and a seven percent real discount rate. As the exhibit indicates, the present value of estimated impacts is higher when a three percent rate is employed. This is to be expected, all else being equal, because the use of a lower discount rate will assign a higher present value to future costs.

4. Exhibits B-1 indicates that the relative ranking of units by baseline economic impact is not sensitive to the discount rate assumption. For example, assuming a three percent annual rate, baseline impacts are greatest in Unit 5 followed by Unit 2. The same is true assuming a seven percent discount rate. Similarly, Exhibit B-2 describes that the forecast incremental impacts are greatest in Unit 5 followed by Unit 2, regardless of the discount rate assumption.

EXHIBIT B-1. SUMMARY OF ESTIMATED 20-YEAR POST-DESIGNATION BASELINE IMPACTS (2009-2028)

PROPOSED SUBUNIT	3% DISCOUNT RATE		7% DISCOUNT RATE	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1. Western Aleutian	$3,920,000	$256,000	$2,890,000	$255,000
2. Eastern Aleutian	$13,700,000	$892,000	$10,600,000	$939,000
3. South Alaska Peninsula	$3,900,000	$254,000	$2,880,000	$254,000
4a. Amak Island	$63,300	$4,130	$46,700	$4,120
4b. Izembek Lagoon	$63,300	$4,130	$46,700	$4,120
4c. Port Moller/Herendeen Bay	$133,000	$8,670	$98,100	$8,660
5. Kodiak, Kamishak, Alaska Peninsula	$28,100,000	$1,830,000	$21,100,000	$1,860,000
Total Impacts	**$49,800,000**	**$3,250,000**	**$37,700,000**	**$3,330,000**

1. Impact estimates reflect a 20-year time horizon.
2. Estimates are rounded to three significant digits and may not sum to totals reported due to rounding.

EXHIBIT B-2. SUMMARY OF ESTIMATED 20-YEAR POST-DESIGNATION INCREMENTAL IMPACTS (2009-2028)

PROPOSED SUBUNIT	3% DISCOUNT RATE		7% DISCOUNT RATE	
	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS	PRESENT VALUE IMPACTS	ANNUALIZED IMPACTS
1. Western Aleutian	$91,500	$5,970	$66,800	$5,890
2. Eastern Aleutian	$268,000	$17,500	$202,000	$17,800
3. South Alaska Peninsula	$84,800	$5,540	$62,300	$5,490
4a. Amak Island	$20,000	$1,300	$14,800	$1,300
4b. Izembek Lagoon	$20,000	$1,300	$14,800	$1,300
4c. Port Moller/Herendeen Bay	$42,000	$2,740	$31,000	$2,740
5. Kodiak, Kamishak, Alaska Peninsula	$358,000	$23,400	$268,000	$23,700
Total Impacts	**$885,000**	**$57,700**	**$660,000**	**$58,200**

1. Impact estimates reflect a 20-year time horizon.
2. Estimates are rounded to three significant digits and may not sum to totals reported due to rounding.

5. Exhibit B-3 describes the distribution of quantified baseline impacts by land use activity assuming a three percent discount rate. Approximately 88 percent of the total high-end impacts are attributable to impacts on water quality management activities. Another nine percent is associated with impacts on marine and coastal construction activities. Impacts spill planning and response and other activities account for the remaining three percent of the total.

6. Incremental impacts of critical habitat designation are distributed by activity in Exhibit B-4. Approximately 35 percent of the total impacts are attributable to impacts on water quality management activities and 23 percent is associated with impacts on marine and coastal construction activities. Another 22 percent is associated with consultation on other activities; the remaining 20 percent are incremental administrative impacts of consultation on oil spill response activities.

EXHIBIT B-3. DISTRIBUTION OF TOTAL BASELINE IMPACTS BY ACTIVITY ASSUMING A 3% DISCOUNT RATE

ACTIVITY	3% DISCOUNT RATE		7% DISCOUNT RATE	
	ESTIMATED PRESENT VALUE IMPACTS	PERCENT OF TOTAL	ESTIMATED PRESENT VALUE IMPACTS	PERCENT OF TOTAL
Water Quality Activities	$44,031,356	88.37%	$32,569,554	86.32%
Construction Activities	$4,537,928	9.11%	$4,243,830	11.25%
Oil Spill Response	$647,318	1.30%	$467,084	1.24%
Other Activities	$608,649	1.22%	$450,241	1.19%
Oil and Gas Development	N/A	0.00%	N/A	0.00%
Total	**$49,825,251**		**$37,730,710**	

EXHIBIT B-4. DISTRIBUTION OF TOTAL INCREMENTAL IMPACTS BY ACTIVITY ASSUMING A 3% DISCOUNT RATE

ACTIVITY	3% DISCOUNT RATE		7% DISCOUNT RATE	
	ESTIMATED PRESENT VALUE IMPACTS	PERCENT OF TOTAL	ESTIMATED PRESENT VALUE IMPACTS	PERCENT OF TOTAL
Water Quality Activities	$176,712	19.98%	$129,932	19.70%
Construction Activities	$310,227	35.07%	$239,203	36.27%
Oil Spill Response	$205,386	23.22%	$148,200	22.47%
Other Activities	$192,259	21.73%	$142,221	21.56%
Oil and Gas Development	N/A	0.00%	N/A	0.00%
Total	**$884,584**		**$659,556**	

B.2 UNDISCOUNTED IMPACTS BY ECONOMIC ACTIVITY

7. Exhibits B-5 through B-12 summarize the undiscounted costs associated with otter conservation organized by economic activity. Exhibits B-5 and B-6 describe potential undiscounted baseline and incremental costs, respectively, associated will oil spill planning and response (as contextualized in Chapter 3). Similarly, Exhibit B-7 and B-8 describe undiscounted baseline and incremental costs associated with construction activities (Chapter 5). Exhibits B-9 and B-10 present undiscounted baseline and incremental costs associated with other water quality management activities (Chapter 6). Finally, Exhibit B-11 and B-12 present undiscounted baseline and incremental administrative costs associated with other activities (Chapter 7).

EXHIBIT B-5. UNDISCOUNTED POST-DESIGNATION BASELINE COSTS ASSOCIATED WITH OIL SPILL RESPONSE

SUBUNIT	IMPACT	YEAR(S)	DESCRIPTION
1	$10,900	2010-2028	Administrative costs associated with oil spill response for sea otters
2	$12,400		
3	$5,830		
4a	$486		
4b	$486		
4c	$486		
5	$14,600		

EXHIBIT B-6. UNDISCOUNTED POST-DESIGNATION INCREMENTAL COSTS ASSOCIATED WITH OIL SPILL RESPONSE

SUBUNIT	IMPACT	YEAR(S)	DESCRIPTION
1	$3,470	2010-2028	Administrative costs associated with oil spill response for sea otters
2	$3,930		
3	$1,850		
4a	$154		
4b	$154		
4c	$154		
5	$4,630		

EXHIBIT B-7. UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO CONSTRUCTION ACTIVITIES

SUBUNIT	ANNUAL IMPACT	YEAR(S)	DESCRIPTION
1	$608	2009-2028	Administrative cost of section 7 consultation
2	2,000,000	2009	Environmental survey costs
	58,000		Administrative cost of section 7 consultation
	15,400	2010-2028	
3	7,420	2009-2028	Administrative cost of section 7 consultation
4a	1,460	2009-2028	Administrative cost of section 7 consultation
4b	1,460	2009-2028	Administrative cost of section 7 consultation
4c	6,000	2009-2028	Administrative cost of section 7 consultation
5	1,080,000	2009	Environmental survey costs
	83,300	2010-2016	
	47,309	2009	Administrative cost of section 7 consultation
	26,000	2010-2016	
	23,300	2017-2028	

EXHIBIT B-8. UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO CONSTRUCTION ACTIVITIES

SUBUNIT	ANNUAL IMPACT	YEAR(S)	DESCRIPTION
1	$192	2009-2028	Administrative cost of section 7 consultation
2	$13,300	2009	
	$4,850	2010-2028	
3	$2,340	2009-2028	
4a	$461	2009-2028	
4b	$461	2009-2028	
4c	$1,900	2009-2028	
5	$12,100	2009	
	$7,890	2010-2016	
	$7,360	2017-2028	

EXHIBIT B-9. UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO WATER QUALITY ACTIVITIES

SUBUNIT	ANNUAL IMPACT	YEAR(S)	DESCRIPTION
1	$240,000	2009-2028	Screening and barging costs
	$648	2009-2010, 2012-2015, 2017-2020, 2022-2025, 2027-2028	Administrative cost of section 7 consultation
	$1,160	2011, 2016, 2021, 2026	
2	$711,000	2009-2028	Screening and barging costs
	$7,460	2009-2010, 2012-2015, 2017-2020, 2022-2025, 2027-2028	Administrative cost of section 7 consultation
	$19,800	2011, 2016, 2021, 2026	
3	$240,000	2009-2028	Screening and barging costs
	$1,780	2009-2010, 2012-2015, 2017-2020, 2022-2025, 2027-2028	Administrative cost of section 7 consultation
	$2,300	2011, 2016, 2021, 2026	
4a	$648	2009-2028	Administrative cost of section 7 consultation
4b	$648		
4c	$648		
5	$1,660,000	2009-2028	Screening and barging costs
	$14,300	2009-2010, 2012, 2014-2015, 2017, 2019-2020, 2022, 2024-2025, 2027	Administrative cost of section 7 consultation
	$19,900	2013, 2018, 2023, 2028	
	$17,900	2011, 2016, 2021, 2026	

EXHIBIT B-10. UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO WATER QUALITY ACTIVITIES

SUBUNIT	ANNUAL IMPACT	YEAR(S)	DESCRIPTION
1	$205	2009-2010, 2012-2015, 2017-2020, 2022-2025, 2027-2028	Administrative cost of section 7 consultation
	$368	2011, 2016, 2021, 2026	
2	$2,360	2009-2010, 2012-2015, 2017-2020, 2022-2025, 2027-2028	Administrative cost of section 7 consultation
	$6,270	2011, 2016, 2021, 2026	
3	$563	2009-2010, 2012-2015, 2017-2020, 2022-2025, 2027-2028	Administrative cost of section 7 consultation
	$726	2011, 2016, 2021, 2026	
4a	$205	2009-2028	Administrative cost of section 7 consultation
4b	$205		
4c	$205		
5	$4,510	2009-2010, 2012, 2014-2015, 2017, 2019-2020, 2022, 2024-2025, 2027	Administrative cost of section 7 consultation
	$6,300	2013, 2018, 2023, 2028	
	$5,650	2011, 2016, 2021, 2026	

EXHIBIT B-11. UNDISCOUNTED POST-DESIGNATION BASELINE IMPACTS TO OTHER ACTIVITIES

SUBUNIT	IMPACT	YEAR(S)	DESCRIPTION
1	$7,150	2009-2028	Administrative costs associated with oil spill response for sea otters
2	$11,300		
3	$2,610		
4a	$1,570		
4b	$1,570		
4c	$1,570		
5	$14,000		

EXHIBIT B-12. UNDISCOUNTED POST-DESIGNATION INCREMENTAL IMPACTS TO OTHER ACTIVITIES

SUBUNIT	IMPACT	YEAR(S)	DESCRIPTION
1	$2,260	2009-2028	Administrative costs associated with oil spill response for sea otters
2	$3,570		
3	$824		
4a	$495		
4b	$495		
4c	$495		
5	$4,410		