



ECONOMIC ANALYSIS OF CRITICAL
HABITAT DESIGNATION FOR THE
WINTERING POPULATION OF PIPING
PLOVER IN TEXAS

Draft Economic Analysis | November 25, 2008

A decorative horizontal bar spanning the width of the page. The left portion is a solid dark blue, and the right portion is a textured image of green and yellow vegetation.

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EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the currently proposed critical habitat designation for the wintering population of the piping plover in Texas (*Charadrius melodus*), (hereafter, "piping plover"). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).
2. 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 piping plover; 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 piping plover. The analysis looks retrospectively at baseline impacts incurred since the species was listed (pre-designation time period), and forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized (post-designation time period).

OVERVIEW OF THE PROPOSED RULE

3. A Final Rule to list the piping plover as endangered in the Great Lakes watershed and threatened elsewhere within its range was published on December 11, 1985.¹ Subsequently, the Service designated critical habitat for the wintering population of piping plovers along the southern Atlantic and Gulf coasts of eight States, including Texas, on July 10, 2001.² On March 20, 2006, the Texas General Land Office (GLO) filed a lawsuit challenging the designation of 19 critical habitat units along the Texas Coast (Units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33). A court order was issued on July 26, 2006 that vacated and remanded the 19 units for reconsideration, while leaving the other critical habitat units in Texas in place.³ Most recently, the Service published a rule on May 20, 2008 to revise the existing critical habitat designation for the wintering population of piping plover in Texas.⁴

¹ 50 FR 50726.

² 66 FR 36038.

³ Texas General Land Office v. U.S., Department of the Interior, et. al., No. 06-cv-00032 (S.D. Tex.).

⁴ U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (*Charadrius melodus*) in Texas; Proposed Rule, 73 FR 98, May 20, 2008.

4. The 18 proposed critical habitat units (divided into 24 subunits) in the current May 20, 2008 Proposed Rule cover approximately 138,881 acres located in Texas' Gulf Coast region, and include portions of Aransas, Brazoria, Calhoun, Cameron, Nueces, Willacy, Kenedy, and Kleberg Counties. These proposed critical habitat units (the study area) are comprised of State lands (55 percent), private lands (24 percent), Federal lands (20 percent), and county lands (less than one percent). The proposed federally-owned lands, which fall on National Wildlife Refuges (NWRs), are being considered for possible exclusion from final critical habitat designation in units TX-3, TX-4, TX-16, TX-18, TX-19, and TX-31. An overview map of the proposed habitat is presented in Exhibit ES-1. Chapter 1 of the report provides more detailed maps of the proposed critical habitat units as well as a summary of land ownership by unit.
5. In general, the piping plover habitat in Texas includes coastal areas between the low and high water mark that are often inundated with seawater, including tidal mudflats, sand flats, and algal flats as well as sandy beaches and wash-over passes. The Proposed Rule identifies vehicular and human impacts as threats to piping plover critical habitat in 21 of the 24 proposed units and subunits. The Proposed Rule also lists domestic animal disturbance, predation, uncontrolled recreational use, pedestrian recreational use, and beach cleaning, stabilization, and renourishment activities as threats to particular subunits. This report describes and quantifies the potential economic impacts associated with addressing these threats in and around the study area.
6. A summary of this analysis is presented below. Pre-designation, post-designation baseline, and incremental impacts are presented by unit in Exhibits ES-2, ES-3, and ES-4 respectively. Exhibit ES-5 ranks the post-designation baseline impacts by unit and similarly, Exhibit ES-6 ranks the incremental impacts by unit. Exhibit ES-7 shows the distribution of post-designation baseline impacts by activity type and Exhibit ES-8 shows this distribution for incremental impacts.

KEY FINDINGS

Future Baseline Impacts: Baseline impacts associated with conservation efforts for the piping plover are estimated to be \$2.47 million to \$17.2 million (\$166,000 to \$1.16 million annualized), assuming a three percent discount rate, or \$1.91 million to \$13.8 million (\$180,000 to \$1.30 million annualized), assuming a seven percent discount rate, over the next 20 years. These impacts are not expected to be affected by the designation of critical habitat.

Detailed Baseline Impacts: Oil and gas industry impacts represent 40 percent of the total high-end, post-designation baseline impacts. Impacts to development represent 54 percent of the high-end baseline impacts. Beach management for recreation, marine construction, and other activities make up the remaining impacts.

- **Oil and Gas Industry:** Anticipated costs of conservation efforts related to avoiding impacts to plover habitat for seismic survey and drilling activities are estimated to range from \$1.33 million to \$5.51 million depending on effort and cost levels required to carry out recommended conservation efforts. Expected baseline costs are incurred in units without road access where beach driving is necessary. Conservation efforts related to beach driving include providing beach monitors, convoying vehicles, and shortening work day. Unit TX-23 has the highest baseline costs to oil and gas activities of all proposed units.
- **Development:** The baseline costs of limiting the effects of residential and commercial development activities on the piping plover over the next 20 years are estimated to range from \$26,600 to \$7.43 million. The cost range results from the assumption that, in the high-end scenario, all future development projects will undertake conservation efforts for the plover, while at the low-end no future development projects are undertaken. Conservation effort costs are primarily associated with litter control, monitoring, and exclusion fencing for new construction. Unit TX-8 has the highest baseline costs to development of all proposed units.
- **Recreation :** Primary impacts of plover conservation on recreation are anticipated to be associated with regular beach cleaning activities conducted by local municipalities. The baseline costs of limiting the effects of these activities on the piping plover are estimated to range from \$309,000 to \$422,000 over 20 years. These costs are primarily associated with staff training to identify the piping plover and annual plover monitoring reports. Unit TX-8 has the highest baseline costs to beach management for recreation of all proposed units.
- **Marine Construction and Other Activities:** Two large marine construction projects are anticipated over the next 20 years, as well as a number of smaller marine construction projects. In addition, a few informal consultations are anticipated associated with miscellaneous projects which may arise. Conservation efforts for the large marine construction projects are anticipated to consist primarily of survey, monitoring, and reporting efforts. Total costs associated with marine construction and other activities are anticipated to range from \$249,000 to \$395,000 over 20 years. Unit TX-32 has the highest baseline costs to marine construction and other activities of all proposed units.

Incremental Impacts: Incremental impacts are anticipated as a result of additional conservation efforts associated specifically with critical habitat for oil and gas activities and recreation-related activities. In addition, incremental administrative costs of section 7 compliance are anticipated for all affected activities. Incremental impacts are estimated to range from \$8.52 million to \$72.5 million (\$573,000 to \$4.87 million annualized), assuming a three percent discount rate, or \$6.30 million to \$57.3 million (\$595,000 to \$5.07 million annualized), assuming a seven percent discount rate.

- **Oil and Gas:** The incremental costs of limiting the effects of oil and gas activities on the piping plover are estimated to range from \$6.03 million to \$53.0 million. Incremental costs associated with oil and gas activities are anticipated to include costs associated with avoiding freshwater discharge in tidal flats and directional drilling in habitat areas. Unit TX-3C has the highest incremental costs to oil and gas activities of all proposed units.
- **Recreation:** The incremental costs of limiting the effects of beach management for recreation on the piping plover are estimated to range from \$231,000 to \$344,000. These costs are primarily associated with staff training to identify the piping plover habitat and annual plover monitoring reports. Unit TX-8 has the highest incremental costs to beach management for recreation of all proposed units.
- **Other:** Incremental costs associated with all other activities are limited to administrative section 7 consultation costs, and are estimated to be \$37,100 to \$324,000 over 20 years..

Critical Habitat Unit with Highest Impacts: TX-8, Mustang Island Beach, has the highest anticipated post-designation baseline impacts, representing 25 percent of the total. TX-3C, North Padre Island Interior, the largest unit in area (50,855 acres), has the highest anticipated post-designation incremental impacts, representing 32 percent of the total incremental impacts.

Note: All impacts discussed in the Key Findings section are post-designation impacts discounted at seven percent, unless otherwise noted. Unit rankings are presented for the high-end scenario.

SUMMARY OF BASELINE IMPACTS

7. Baseline impacts associated with conservation efforts for the piping plover are estimated to be \$2.47 million to \$17.2 million (\$166,000 to \$1.16 million annualized), assuming a three percent discount rate, or \$1.91 million to \$13.8 million (\$180,000 to \$1.30 million annualized), assuming a seven percent discount rate, over the next 20 years. Oil and gas industry impacts represent 69 of the low-end baseline impacts, and 40 percent of the total high-end baseline impacts. Impacts to development represent one percent of the low-end scenario costs and 54 percent of the high-end scenario costs. Beach management for recreation, marine construction, and other activities make up the remaining impacts.

Oil and Gas Activities

8. Two factors drive the estimation of costs to the oil and gas industry of protecting the piping plover: (1) the amount and location of future exploration and development activity; and (2) the restrictions likely to be imposed by the U.S. Army Corps of Engineers (USACE) on these activities as part of section 7 consultations with the Service. This analysis relies on historical rates of surveying and well development to predict the number of future seismic survey efforts and drilling sites in the study area. Because future drilling rates are dependent on a number of factors in addition to past rates, a high degree of uncertainty is associated with these estimates.
9. The Service provided greater certainty regarding likely project modifications that may result from section 7 consultation in a memorandum outlining its likely recommendations for minimizing adverse impacts to the piping plover and its habitat. In the memorandum, the Service does not contemplate preclusion of future surveying efforts and drilling efforts in critical habitat areas; rather, the Service includes modifications likely to be recommended regardless of whether critical habitat is designated including minimizing beach driving, hiring a site monitor, and smoothing vehicle ruts. These recommendations appear consistent with efforts currently ongoing on the South Padre Island National Seashore, an area outside the study area where oil and gas development activities are currently allowed and conducted under an Oil and Gas Management Plan despite presence of piping plovers and several listed sea turtle species.
10. In total, anticipated costs of conservation efforts related to avoiding impacts to piping plover habitat for seismic survey and drilling activities are estimated to range from \$1.33 million to \$5.51 million in present value terms assuming a seven percent discount rate (\$125,000 to \$520,000 annualized) regardless of whether critical habitat is designated (baseline costs). The majority of these expected costs are related to providing beach monitors and project delays while vehicles are convoyed or because the work day is shortened due to piping plover concerns. TX-23 has the highest costs of all proposed units due to the relative popularity of this unit for well drilling compared to the other units that lack road access.

Residential and Commercial Development

11. Residential and commercial development activity is not anticipated within proposed critical habitat. However, development adjacent to habitat may increase the use of beaches by humans (on foot or in vehicles), domestic animals such as dogs, and

predators. Conservation efforts identified by the Service to address these threats generally involve controlling pets, limiting trash that might attract predators, and surveying and monitoring the bird and its habitat. Residential and commercial development of adjacent areas is not anticipated to be precluded.

12. Since 1985, the Service has consulted on development projects adjacent to piping plover habitat; however, none of the projects have gone forward for reasons other than piping plover protection. Given significant uncertainty regarding the likelihood of future development in these areas, the analysis forecasts impacts of two scenarios. In the low-end scenario, no new development is anticipated that would require a permit from the USACE in or adjacent to the habitat in the next 20 years. In the high-end scenario, private lands adjacent to critical habitat and in close proximity to Corpus Christi, Port Aransas, and the Town of South Padre Island are assumed to be entirely built out over the next four years. The high-end estimate likely overstates future development; actual development activity is likely to fall between the two scenarios. The relative probability of either scenario occurring, however, is unknown.
13. The baseline costs of limiting the effects of residential and commercial development activities on the piping plover over the next 20 years are estimated to range from \$26,600 to \$7.43 million (discounted at seven percent). The cost range results from the assumption that, in the high-end scenario, all future development projects will undertake conservation efforts for the plover, while at the low-end no future development projects are undertaken. These costs are primarily associated with litter control, monitoring, and exclusion fencing for new construction adjacent to the study area. Unit TX-8 has the highest baseline costs of all proposed units. This is likely due to the relatively large expanse of beach area covered by this unit, as well as its large volume of adjacent private lands.

Recreation

14. The Service is unlikely to recommend plover conservation efforts with respect to on going and forecast recreation activities. The Texas Open Beaches Act places land between mean low tide and the vegetation line or 200 feet landward (whichever is less) within the public trust, thereby guaranteeing the public's right of free and unrestricted access to beaches along the Texas coast. The protection of recreation afforded by this law makes it unlikely that the Service or other entities will restrict recreational use in the foreseeable future. History further supports the assumption that recreational use of the beaches will continue unimpeded. Specifically, critical habitat for the piping plover has been in place in Texas in some areas since 2001, and during that time, recreational use of the habitat has not been affected.
15. Recreational use and enjoyment of beaches are often supported by beach stabilization efforts (e.g., beach nourishment, beach maintenance, sediment dredging and disposal, inlet channelization, and construction of jetties and other hard structures), which may also threaten the piping plover. The USACE has recently begun requiring a permit for stabilization activities on Texas beaches and consequently entities undertaking these activities are now expected to carry out piping plover conservation efforts. The baseline

costs of limiting the effects of recreation activities on the piping plover over the next 20 years are estimated to range from \$309,000 to \$422,000 (seven percent discount rate). These costs are primarily associated with staff training to identify the piping plover and annual plover monitoring reports. Unit TX-8 has the highest baseline costs of beach management for recreation of all proposed units due to its location near Port Aransas and City of Corpus Christi, both of which have ongoing beach cleaning programs.

Marine Construction and Other Activities

16. Future impacts of piping plover conservation in critical habitat areas on marine construction and other activities are anticipated to primarily include administrative costs of consultations initiated for marine construction activities within the study area. Future impacts also include costs associated with monitoring and surveying of project site and reporting efforts for two large marine construction projects expected to occur within the study area in the foreseeable future. The majority of forecast impacts would be expected to occur absent critical habitat designation, and hence are included in the baseline for this analysis. Total future baseline costs related to marine construction and other activities are estimated to be between \$249,000 to \$395,000 (seven percent discount rate).

SUMMARY OF INCREMENTAL IMPACTS

17. Incremental impacts are estimated to range from \$8.52 million to \$72.5 million (\$573,000 to \$4.87 million annualized), assuming a three percent discount rate, or \$6.30 million to \$53.7 million (\$595,000 to \$5.07 million annualized), assuming a seven percent discount rate.

Oil and Gas Activities

18. The majority of incremental impacts associated with the current Proposed Rule (98 percent) are anticipated to be associated with oil and gas development activities. As stated above, the Service provided a memorandum outlining likely project modifications that may result from section 7 consultation for minimizing adverse impacts to the piping plover and its habitat. The Service stated that conservation efforts unrelated to vehicle use would not have been required absent critical habitat for the piping plover, and are therefore considered incremental impacts of critical habitat designation. The project modifications with the largest economic impacts are expected to be recommendations to utilize directional drilling and to avoid freshwater discharge across tidal flats. Total incremental effects are estimated to be \$6.03 to \$53.0 million (\$570,000 to \$5.01 million annualized), present value using a seven percent discount rate.

Residential and Commercial Development

19. The incremental costs of limiting the effects of residential and commercial activities on the piping plover over the next 20 years are estimated to range from \$8,880 to \$296,000 (seven percent discount rate). These costs are associated with section 7 consultation administrative costs. There are no additional conservation efforts associated with critical habitat designation.

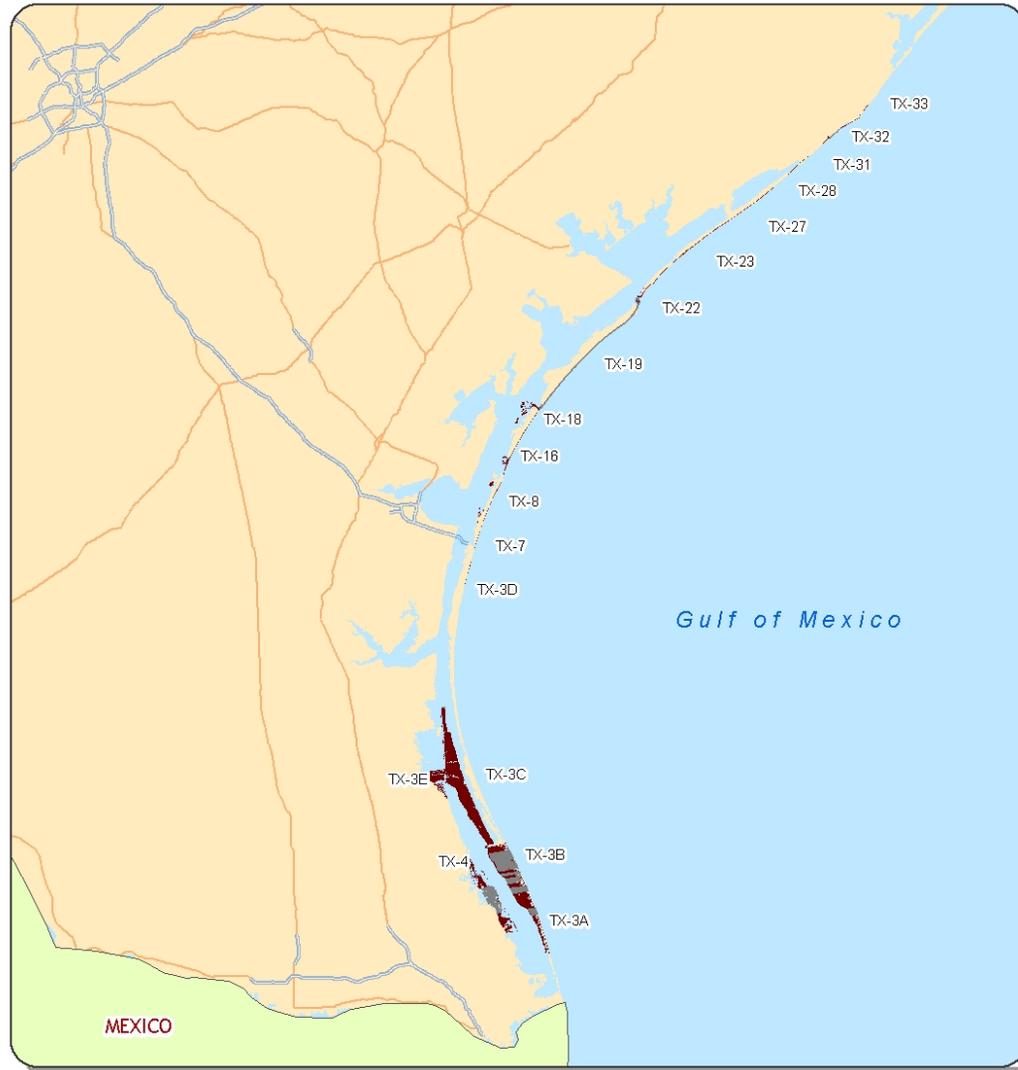
Recreation

20. The incremental costs of limiting the effects of recreation activities on the piping plover over the next 20 years are estimated to range from \$231,000 to \$344,000 (discounted at seven percent). These costs are primarily associated with staff training to identify the piping plover habitat and annual plover monitoring reports associated with beach cleaning efforts as well as section 7 consultation administrative costs.

Marine Construction and Other Activities

21. Future incremental costs associated with marine construction activities are anticipated to be entirely administrative in nature, are estimated to be \$28,200 over 20 years (seven percent discount rate). There are no additional conservation efforts associated with critical habitat designation

EXHIBIT ES-1 PROPOSED CRITICAL HABITAT FOR WINTERING PIPING PLOVER: OVERVIEW MAP



Proposed Critical Habitat for Wintering Piping Plover: Overview Map

1:2,369,467

Legend

Critical Habitat Units

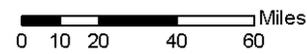
- Proposed for Designation
- Considered for Exclusion

Minor Highways

- Limited Access
- Highway



Source:
1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT ES-2 PRE-DESIGNATION IMPACTS BY UNIT (1985-2007)

UNIT	PRESENT VALUE (3 %)		PRESENT VALUE (7 %)	
	LOW	HIGH	LOW	HIGH
TX-3A	\$18,500	\$34,400	\$25,600	\$48,800
TX-3B	\$18,500	\$34,400	\$25,600	\$48,800
TX-3C	\$18,500	\$34,400	\$25,600	\$48,800
TX-3D	\$18,500	\$34,400	\$25,600	\$48,800
TX-3E	\$18,500	\$34,400	\$25,600	\$48,800
TX-4	\$451	\$451	\$566	\$566
TX-7	\$161,000	\$245,000	\$220,000	\$323,000
TX-8	\$23,500	\$39,800	\$32,300	\$57,200
TX-9	\$13,100	\$29,500	\$19,700	\$44,700
TX-10A	\$13,100	\$29,500	\$19,700	\$44,700
TX-10B	\$13,100	\$29,500	\$19,700	\$44,700
TX-10C	\$13,100	\$29,500	\$19,700	\$44,700
TX-14	\$9,740	\$9,740	\$12,100	\$12,100
TX-15	\$0	\$0	\$0	\$0
TX-16	\$28,600	\$59,100	\$33,800	\$65,400
TX-18	\$48,400	\$78,900	\$64,100	\$95,700
TX-19	\$7,340	\$7,340	\$7,630	\$7,630
TX-22	\$22,500	\$50,600	\$34,900	\$79,300
TX-23	\$21,800	\$50,000	\$34,200	\$78,600
TX-27	\$21,800	\$50,000	\$34,200	\$78,600
TX-28	\$7,790	\$7,790	\$8,730	\$8,730
TX-31	\$2,890	\$2,890	\$3,120	\$3,120
TX-32	\$2,890	\$2,890	\$3,120	\$3,120
TX-33	\$10,500	\$10,500	\$11,300	\$11,300
Unknown	\$1,220,000	\$2,640,000	\$1,920,000	\$4,180,000
Subtotal	\$1,730,000	\$3,550,000	\$2,630,000	\$5,430,000
Areas Considered for Possible Exclusion				
Subtotal	\$0	\$0	\$0	\$0
Total	\$1,730,000	\$3,550,000	\$2,630,000	\$5,430,000

EXHIBIT ES-3 POST-DESIGNATION BASELINE IMPACTS BY UNIT (2008-2027)

UNIT	TOTAL PRESENT VALUE COSTS (3 %)		TOTAL PRESENT VALUE (7 %)	
	LOW	HIGH	LOW	HIGH
TX-3A	\$344,000	\$3,220,000	\$254,000	\$2,590,000
TX-3B	\$4,900	\$105,000	\$3,950	\$88,400
TX-3C	\$4,900	\$4,610	\$3,950	\$3,410
TX-3D	\$42,000	\$743,000	\$32,300	\$625,000
TX-3E	\$4,900	\$4,610	\$3,950	\$3,410
TX-4	\$251	\$251	\$186	\$186
TX-7	\$312,000	\$2,070,000	\$231,000	\$1,620,000
TX-8	\$278,000	\$4,190,000	\$207,000	\$3,500,000
TX-9	\$1,730	\$1,330	\$1,730	\$981
TX-10A	\$74,100	\$194,000	\$55,200	\$143,000
TX-10B	\$1,730	\$1,330	\$1,730	\$981
TX-10C	\$1,730	\$1,150,000	\$1,730	\$978,000
TX-14	\$5,500	\$464,000	\$4,070	\$393,000
TX-15	\$36,200	\$96,200	\$26,800	\$71,200
TX-16	\$211,000	\$1,170,000	\$157,000	\$862,000
TX-18	\$92,200	\$188,000	\$79,700	\$159,000
TX-19	\$82,000	\$178,000	\$71,400	\$152,000
TX-22	\$75,100	\$195,000	\$56,100	\$144,000
TX-23	\$377,000	\$2,230,000	\$280,000	\$1,650,000
TX-27	\$2,440	\$1,960	\$2,340	\$1,450
TX-28	\$4,750	\$4,750	\$3,510	\$3,510
TX-31	\$1,820	\$1,820	\$1,340	\$1,340
TX-32	\$156,000	\$349,000	\$137,000	\$299,000
TX-33	\$6,570	\$6,570	\$4,860	\$4,860
Unknown	\$173,000	\$147,000	\$156,000	\$109,000
Subtotal	\$2,290,000	\$16,700,000	\$1,780,000	\$13,400,000
Areas Considered for Exclusion				
TX-3 - NWR lands	\$0	\$0	\$0	\$0
TX-4 - NWR lands	\$0	\$0	\$0	\$0
TX-16 - NWR lands	\$72,300	\$192,000	\$53,500	\$142,000
TX-18 - NWR lands	\$72,300	\$192,000	\$53,500	\$142,000
TX-19 - NWR lands	\$36,200	\$96,200	\$26,800	\$71,200
TX-31 - NWR lands	\$0	\$0	\$0	\$0
Subtotal	\$181,000	\$481,000	\$134,000	\$356,000
Total	\$2,470,000	\$17,200,000	\$1,910,000	\$13,800,000
Annualized	\$166,000	\$1,160,000	\$180,000	\$1,300,000

EXHIBIT ES-4 INCREMENTAL IMPACTS BY UNIT (2008-2027)

UNIT	PRESENT VALUE (3 %)		PRESENT VALUE (7 %)	
	LOW	HIGH	LOW	HIGH
TX-3A	\$256,000	\$1,570,000	\$188,000	\$1,170,000
TX-3B	\$1,690,000	\$14,900,000	\$1,250,000	\$11,000,000
TX-3C	\$2,610,000	\$23,000,000	\$1,930,000	\$17,000,000
TX-3D	\$27,800	\$63,800	\$20,900	\$52,800
TX-3E	\$614,000	\$5,410,000	\$455,000	\$4,000,000
TX-4	\$460,000	\$4,060,000	\$340,000	\$3,000,000
TX-7	\$192,000	\$1,430,000	\$142,000	\$1,060,000
TX-8	\$158,000	\$364,000	\$116,000	\$296,000
TX-9	\$442	\$442	\$327	\$327
TX-10A	\$442	\$442	\$327	\$327
TX-10B	\$442	\$442	\$327	\$327
TX-10C	\$460,000	\$4,100,000	\$340,000	\$3,040,000
TX-14	\$1,840	\$17,600	\$1,360	\$16,500
TX-15	\$0	\$0	\$0	\$0
TX-16	\$155,000	\$1,350,000	\$115,000	\$1,000,000
TX-18	\$4,760	\$4,760	\$3,520	\$3,520
TX-19	\$1,590	\$1,590	\$1,170	\$1,170
TX-22	\$778	\$778	\$576	\$576
TX-23	\$307,000	\$2,710,000	\$227,000	\$2,000,000
TX-27	\$460,000	\$4,060,000	\$341,000	\$3,000,000
TX-28	\$155,000	\$1,350,000	\$115,000	\$1,000,000
TX-31	\$606	\$606	\$448	\$448
TX-32	\$606	\$606	\$448	\$448
TX-33	\$2,190	\$2,190	\$1,620	\$1,620
Unknown	\$49,000	\$49,000	\$36,200	\$36,200
Subtotal	\$7,600,000	\$64,400,000	\$5,620,000	\$47,700,000
Areas Considered for Exclusion				
TX-3 - NWR lands	\$766,000	\$6,760,000	\$567,000	\$5,000,000
TX-4 - NWR lands	\$0	\$0	\$0	\$0
TX-16 - NWR lands	\$0	\$0	\$0	\$0
TX-18 - NWR lands	\$0	\$0	\$0	\$0
TX-19 - NWR lands	\$0	\$0	\$0	\$0
TX-31 - NWR lands	\$153,000	\$1,350,000	\$113,000	\$1,000,000
Subtotal	\$919,000	\$8,110,000	\$680,000	\$6,000,000
Total	\$8,520,000	\$72,500,000	\$6,300,000	\$53,700,000
Annualized	\$573,000	\$4,870,000	\$595,000	\$5,070,000

EXHIBIT ES-5 RANK OF PROPOSED CRITICAL HABITAT UNITS ACCORDING TO THE MAGNITUDE OF POST-DESIGNATION BASELINE IMPACTS (HIGH-END COSTS)

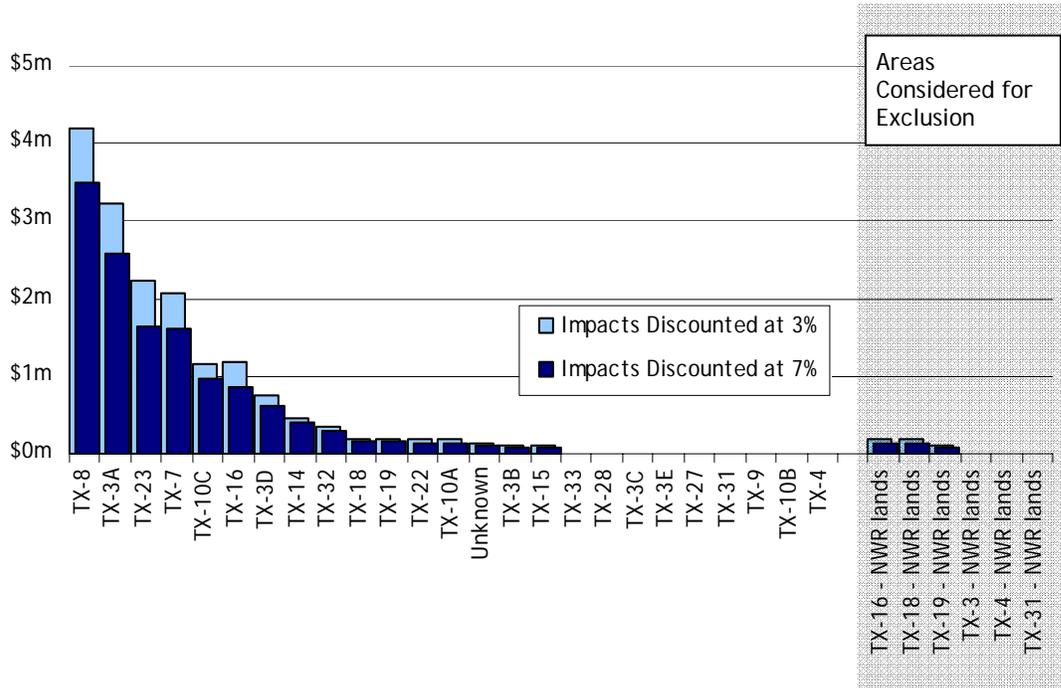


EXHIBIT ES-6 RANK OF PROPOSED CRITICAL HABITAT UNITS ACCORDING TO THE MAGNITUDE OF INCREMENTAL IMPACTS (HIGH-END COSTS)

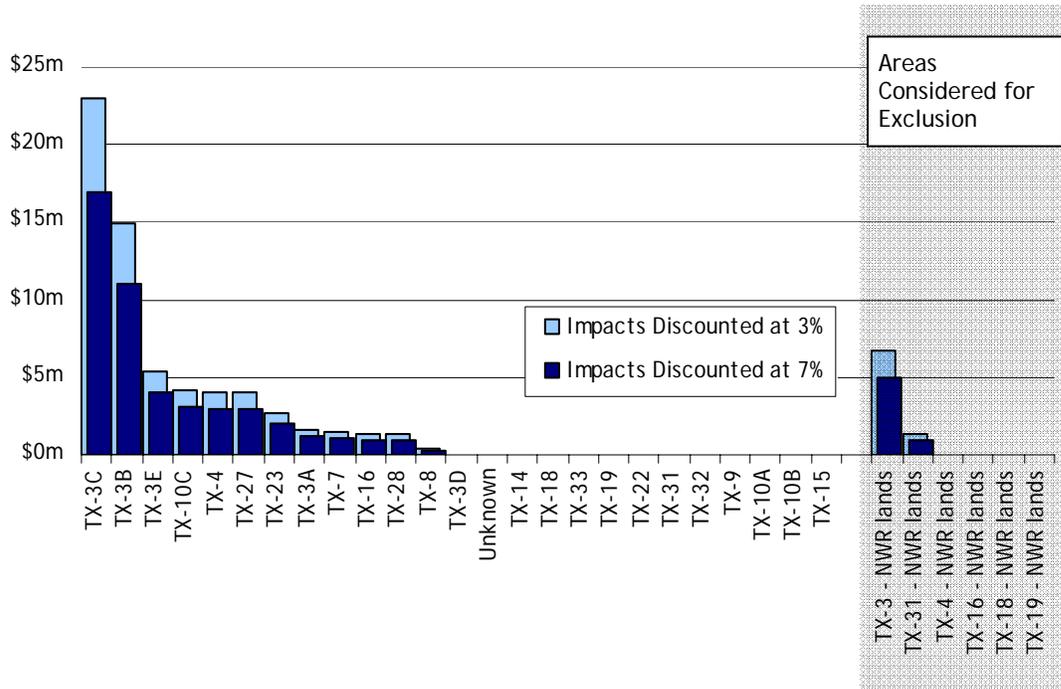


EXHIBIT ES-7 DISTRIBUTION OF POST-DESIGNATION BASELINE IMPACTS BY ACTIVITY TYPE⁵

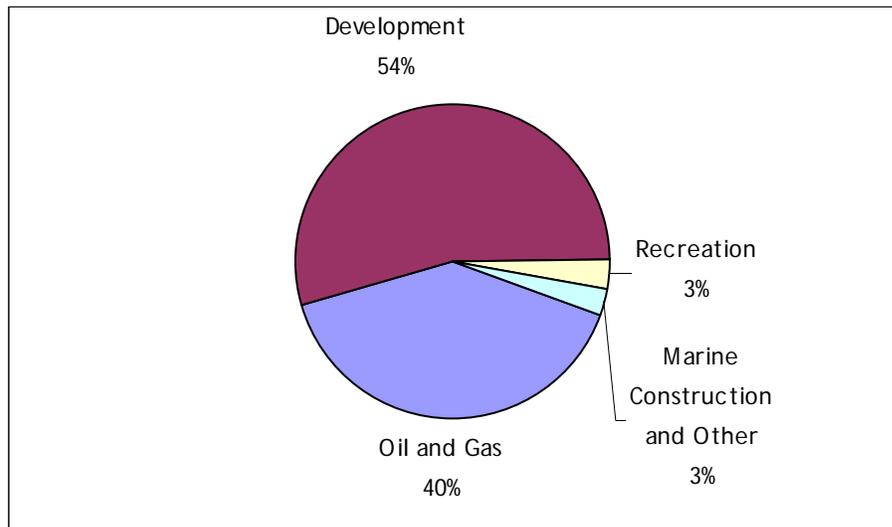
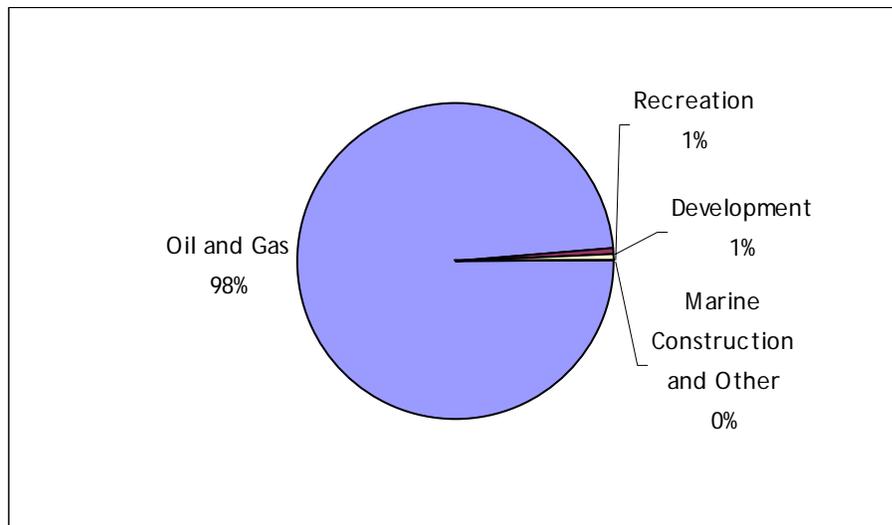


EXHIBIT ES-8 DISTRIBUTION OF INCREMENTAL IMPACTS BY ACTIVITY TYPE⁶



⁵ The distribution of impacts by activity type is presented for impacts discounted at seven percent.

⁶ Ibid.

CHAPTER 1 | BACKGROUND

1.1 INTRODUCTION

1. This section provides a brief introduction to the May 2008 proposed critical habitat for piping plover in Texas. It includes a summary of past publications and legal actions that have lead to the current proposal, a summary of land ownership within the current proposal, maps of proposed units, and a summary of threats to proposed critical habitat. This information is intended to provide background information to the reader. All official definitions and boundaries provided are defined in the Proposed Rule.⁷

1.2 PREVIOUS FEDERAL ACTIONS

2. A Final Rule to list the piping plover as endangered in the Great Lakes watershed and threatened elsewhere within its range was published on December 11, 1985.⁸ Subsequently, the Service designated critical habitat for the wintering population of piping plovers along the southern Atlantic and Gulf coasts of eight States, including Texas, on July 10, 2001.⁹ On March 20, 2006, the Texas General Land Office (GLO) filed a lawsuit challenging the designation of 19 critical habitat units along the Texas Coast (Units 3, 4, 7, 8, 9, 10, 14, 15, 16, 17, 18, 19, 22, 23, 27, 28, 31, 32, and 33). A court order was issued on July 26, 2006 that vacated and remanded the 19 units for reconsideration, while leaving the other critical habitat units in Texas in place.¹⁰ Most recently, the Service published a rule on May 20, 2008 to revise the existing critical habitat designation for the wintering population of piping plover in Texas (hereafter, “piping plover”). This economic analysis addresses the May 20, 2008 Proposed Rule to revise the critical habitat designation for the wintering population of piping plover in Texas.

1.3 PROPOSED CRITICAL HABITAT DESIGNATION

3. The 2001 critical habitat for the plover included 37 units and 378,156 acres in Texas. The 2006 court decision vacated and remanded critical habitat in 19 units in Texas, totaling 231,280 acres, leaving the other units in place. The current proposed revised critical habitat designation, which will be added to the designated areas unaffected by the

⁷ 73 FR 29294.

⁸ 50 FR 50726.

⁹ 66 FR 36038

¹⁰ Texas General Land Office v. U.S., Department of the Interior, et. al., No. 06-cv-00032 (S.D. Tex.).

court decision, is composed of 18 units, which differ in size and configuration from the 2001 designation, primarily due to use of a more precise mapping technique.¹¹ Unit TX-17 has not been repropoed. In total, the Service has repropoed 138,881 acres, a reduction of 40 percent from the remanded acreage. The Service is considering the possible exclusion of federally-owned NWR lands in units TX-3, TX-4, TX-16, TX-18, TX-19, and TX-31 from the final critical habitat designation based on benefits provided to the plover habitat under Comprehensive Conservation Plans that are currently being drafted. Exhibit 1-1 provides information concerning land ownership and size of proposed revised critical habitat for the piping plover. Exhibits 1-2 through 1-6 present an overview of the locations of proposed critical habitat units.

4. The repropoed habitat is along the southern coast of Texas in nine counties: Cameron, Willacy, Kenedy, Kleberg, Nueces, Aransas, Calhoun, Matagorda, and Brazoria. In general, the plover habitat in Texas includes areas that are often inundated with seawater, including tidal mudflats, sand flats, and algal flats as well as sandy beaches and wash-over passes. The repropoed unit boundaries were drawn to exclude manmade structures wherever possible.

1.4 THREATS TO CRITICAL HABITAT AREAS

5. The Proposed Rule identifies vehicular and human impacts as threats to piping plover critical habitat in 21 of the 24 proposed units and subunits. The Proposed Rule also lists domestic animal disturbance; predation; uncontrolled recreational use; pedestrian recreational use; and beach cleaning, stabilization, and renourishment activities as threats to particular subunits. This report describes and quantifies the potential economic impacts associated with proposed critical habitat designation for the piping plover in relation to the threats identified by the Service. Several threats identified by the Service address broad impacts that could require project modifications within a number of industry types; therefore, threats were reclassified by potentially affected land use activity or industry according to consultation history records and written descriptions by the Service of potential effects of critical habitat. The four sections of this report are organized by land use activity and capture the threats as described in the rule. These are: potential economic impacts to the oil and gas industry, residential and commercial development activities, recreation activities, and marine construction and other related activities.

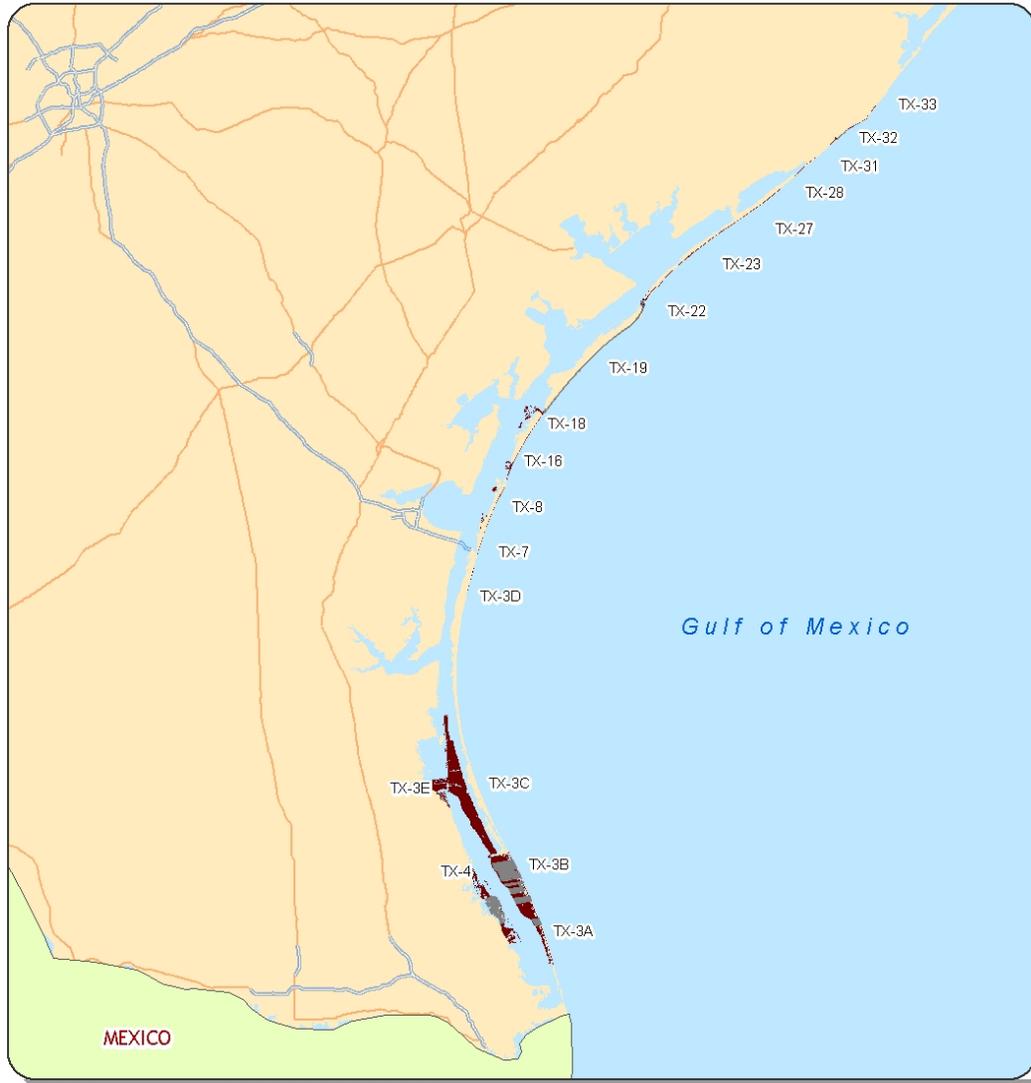
¹¹ 66 FR 36038.

EXHIBIT 1-1 SUMMARY OF LAND OWNERSHIP IN PROPOSED REVISED CRITICAL HABITAT FOR PIPING PLOVER

UNIT	LANDOWNERSHIP (ACRES)				
	FEDERAL	STATE	COUNTY	PRIVATE	TOTAL
Subunit TX-3A: South Padre Island - Gulf of Mexico Shoreline	728	287	28	1,845	2,888
Subunit TX-3B: South Padre Island -Interior	18,778	16,583		8,722	44,083
Subunit TX-3C: North Padre Island - Interior		46,027		4,828	50,855
Subunit TX-3D: North Padre Island - Gulf of Mexico		212		57	269
Subunit TX-3E: Mesquite Rincon		398		9,180	9,578
TX-4. Lower Laguna Madre Mainland	6,300	8,576		2,342	17,218
TX-7. Newport Pass/Corpus Christi Beach		143		152	295
TX-8. Mustang Island Beach		367	5	248	620
TX-9. Fish Pass Lagoons		169		2	171
Subunit TX-10A: Shamrock Island		8		4	12
Subunit TX-10B: Mustang Island - Unnamed sand flat		3			3
Subunit TX-10C: Mustang Island - Lagoon Complex		237		92	329
TX-14. East Flats		12		578	590
TX-15. North Pass		154		651	805
TX-16. San Jose Beach	15	691		670	1,376
TX-18. Cedar Bayou/ Vinson Slough	115	2		2,350	2,467
TX-19. Matagorda Island Beach	2,135	284			2,419
TX-22. Decros Point		325		220	545
TX-23. West Matagorda Peninsula Beach		877		931	1,808
TX-27. East Matagorda Bay/ Matagorda Peninsula Beach West		481		425	906
TX-28. East Matagorda Bay/ Matagorda Peninsula Beach East		146		332	478
TX-31. San Bernard NWR Beach	119	193		87	399
TX-32. Gulf Beach Between Brazos and San Bernard Rivers		555			555
TX-33. Bryan Beach and Adjacent Beach		212			212
Total:	28,190	76,942	33	33,716	138,881

Source: 2008 Proposed Rule, 73 FR 29294.

EXHIBIT 1-2 PROPOSED CRITICAL HABITAT FOR WINTERING PIPING PLOVER: OVERVIEW MAP



Proposed Critical Habitat for Wintering Piping Plover: Overview Map
1:2,359,467



Source:
 1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

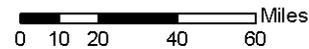
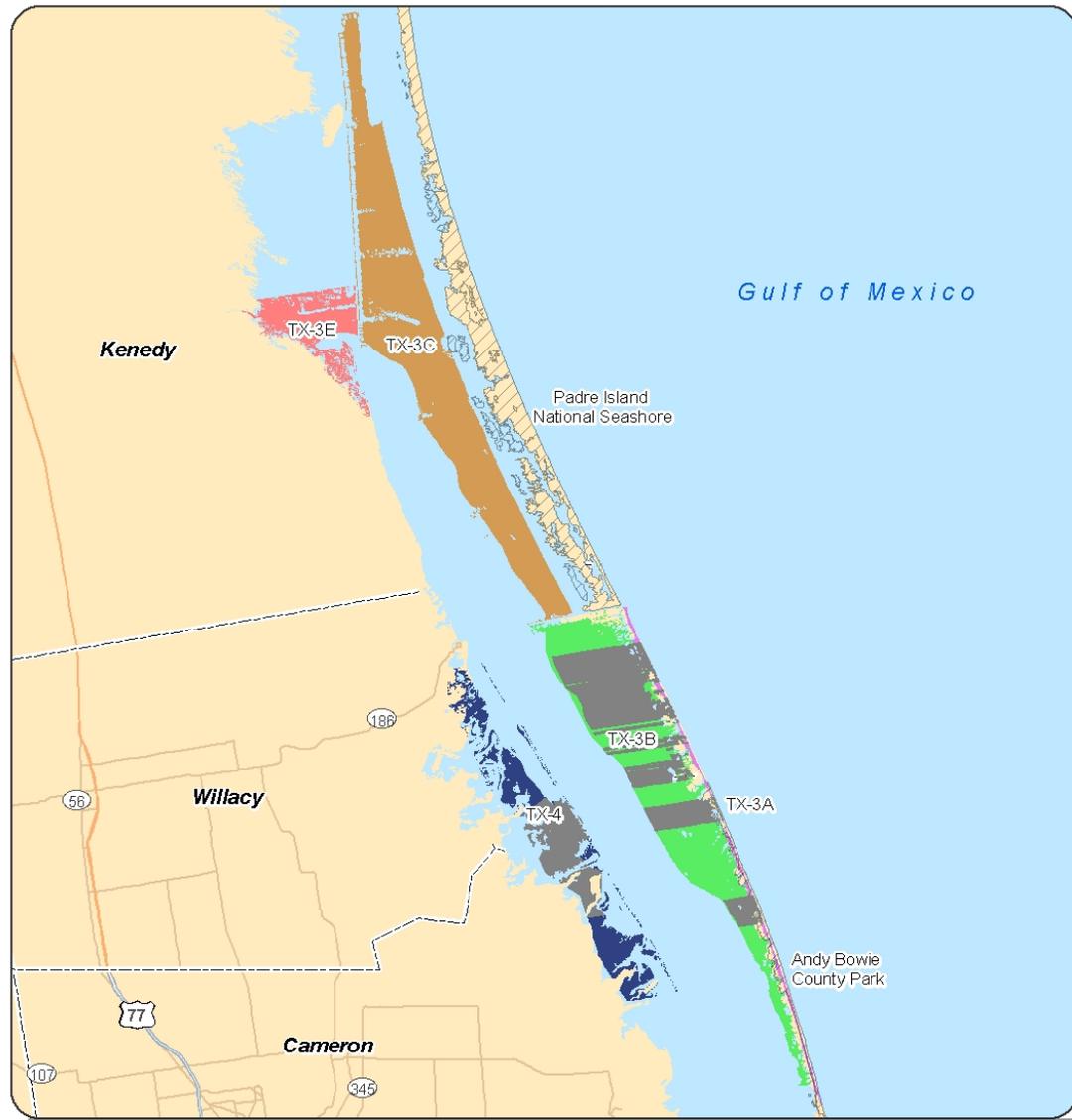


EXHIBIT 1-3 PROPOSED CRITICAL HABITAT FOR WINTERING PIPING PLOVER: MAP 1



Proposed Critical Habitat for Wintering Piping Plover: Map 1
1:565,538

Legend

Proposed Critical Habitat

- TX-3A
- TX-3B
- TX-3C
- TX-3E
- TX-4
- Considered for Exclusion
- Designated Parks

Minor Highways

- Limited Access
- Highway
- Major Road



Source:
 1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



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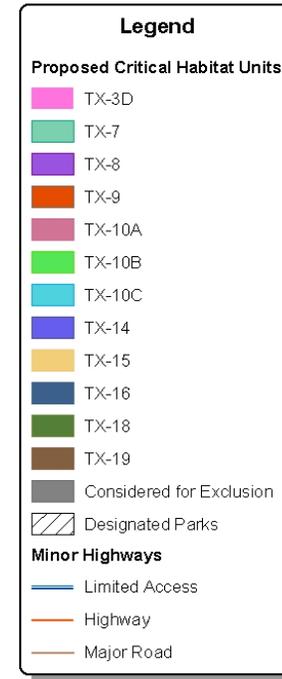
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-4 PROPOSED CRITICAL HABITAT FOR WINTERING PIPING PLOVER: MAP 2



Source:
 1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

Proposed Critical Habitat for Wintering Piping Plover: Map 2
 1:446,239

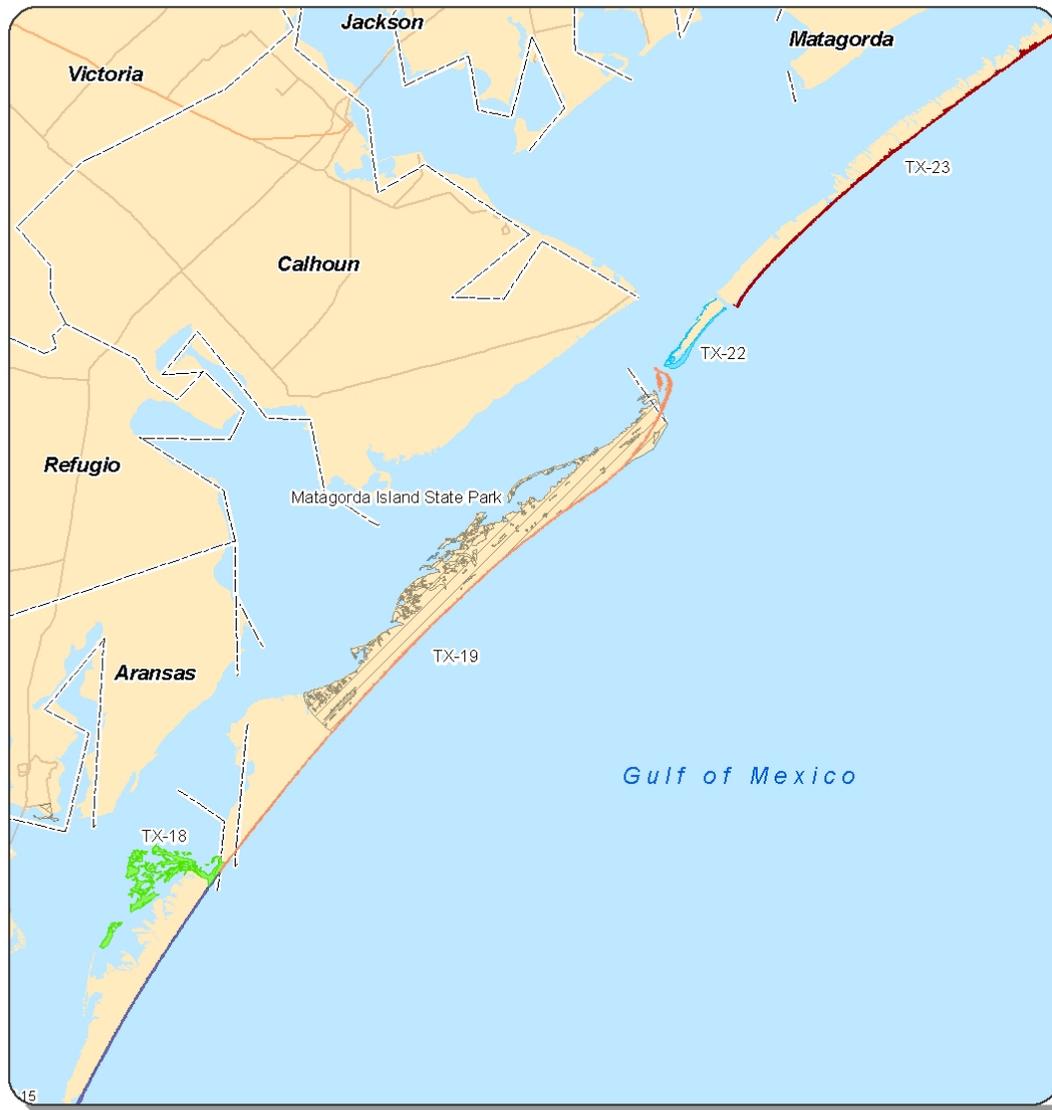


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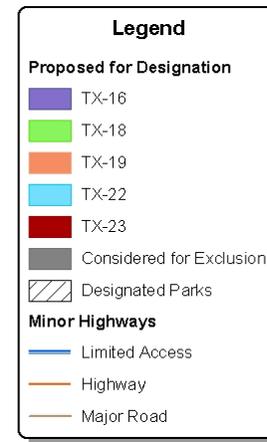
INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-5 PROPOSED CRITICAL HABITAT FOR WINTERING PIPING PLOVER: MAP 3



Proposed Critical Habitat for Wintering Piping Plover: Map 3

1:529,616



Source:
 1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



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INDUSTRIAL ECONOMICS, INCORPORATED

EXHIBIT 1-6 PROPOSED CRITICAL HABITAT FOR WINTERING PIPING PLOVER: MAP 4



Proposed Critical Habitat for Wintering Piping Plover: Map 4

1:363,417



Source:

1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



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CHAPTER 2 | FRAMEWORK FOR THE ANALYSIS

6. The purpose of this report is to estimate the economic impact of actions taken to protect the federally listed wintering population of the piping plover in Texas (*Charadrius melodus*), hereafter, "piping plover") 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 areas considered for critical habitat designation. 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 piping plover; 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 piping plover. The analysis looks retrospectively at baseline impacts incurred since the species was listed, and forecasts both baseline and incremental impacts likely to occur after the proposed critical habitat is finalized.
7. 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.¹² 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).¹³
8. This Chapter describes the framework for the 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, including the link between existing and critical habitat-related protection efforts and potential impacts, and the consideration of benefits. It concludes with a presentation of the information sources relied upon in the analysis and the structure of the report.

¹² 16 U.S.C. §1533(b)(2).

¹³ 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

9. The U.S. Office of Management and Budget's (OMB) guidelines for conducting an 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."¹⁴ 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.
10. 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.¹⁵ 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] 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.”¹⁶
11. 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.¹⁷ For example, in the March 2006 court order ruling that the August 2004 critical habitat rule

¹⁴ 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>.

¹⁵ *New Mexico Cattle Growers Assn v. United States Fish and Wildlife Service*, 248 F.3d 1277 (10th Cir. 2001).

¹⁶ *Ibid.*

¹⁷ *Cape Hatteras Access Preservation Alliance v. Department of Interior*, 344 F. Supp. 2d 108 (D.D.C.); *CBD v. BLM*, 422 F. Supp. 2d 1115 (N.D. Cal. 2006).

for the Peirson's milk-vetch was arbitrary and capricious, the United States District Court for the Northern District of California stated,

“The Court is not persuaded by the reasoning of *New Mexico Cattle Growers*, and instead agrees with the reasoning and holding of *Cape Hatteras Access Preservation Alliance v. U.S. Dep't of the Interior*, 344 F. Supp 2d 108 (D.D.C. 2004). That case also involved a challenge to the 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.’”¹⁸

12. 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 piping plover 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.

Summed, these two types of impacts comprise the fully co-extensive impacts of piping plover conservation in areas considered for critical habitat designation.

13. 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.¹⁹ 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.²⁰ Under the statutory provisions of the 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

¹⁸ *Center for Biological Diversity et al, Plaintiffs, v. 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.

¹⁹ 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.

²⁰ *Gifford Pinchot Task Force v. United States Fish and Wildlife Service*, No. 03-35279 (9th Circuit 2004).

of the methodology used to define baseline and incremental impacts is provided later in this section.

2.2 CATEGORIES OF POTENTIAL ECONOMIC EFFECTS OF SPECIES CONSERVATION

14. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect the piping plover and its habitat (hereinafter referred to collectively as “piping plover 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 piping plover conservation efforts.
15. 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 relatively 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

16. 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 piping plover 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.²¹
17. 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, such as the U.S. Forest Service, 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

²¹ 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>.

manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When compliance activity is not expected to significantly affect markets -- that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price -- the measurement of compliance costs can provide a reasonable estimate of the change in economic efficiency.

18. Where habitat protection efforts are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, protection efforts 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.
19. This analysis begins by measuring impacts associated with efforts undertaken to protect piping plover and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation efforts is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets. In the case of the piping plover, conservation efforts are not anticipated to significantly affect markets; therefore this report focuses on compliance costs.

2.2.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

20. 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.²² 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

21. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.²³ In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis

²² 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>.

²³ 5 U.S.C. § 601 et seq.

considers the future impacts of conservation efforts on the energy industry and its customers.²⁴

Regional Economic Effects

22. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation efforts. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreators) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreators). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
23. 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 affected 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.
24. 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.
25. As described later in this report, impacts associated with piping plover conservation efforts primarily result in additional costs to oil and gas exploration companies to survey for and monitor the presence of the bird and to avoid its habitat as necessary via methods such as directional drilling. Similarly, residential development projects are likely to incur costs associated with removing trash that attracts predators, and municipalities will incur costs associated with beach cleaning. Measurable impacts of the type typically assessed with input-output models are not anticipated.

²⁴ Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, May 18, 2001.

2.3 ANALYTIC FRAMEWORK AND SCOPE OF THE ANALYSIS

26. This analysis identifies those economic activities most likely to threaten the listed species and its habitat and, where possible, quantifies the economic impact to avoid or minimize such threats within the boundaries of the study area (the boundaries of the study area are discussed later in this chapter).
27. 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 piping plover. 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

28. The baseline for this analysis is the existing state of regulation, prior to the designation of critical habitat, that provides protection to the species under the Act, as well as under other Federal, State and local laws and guidelines. The "without critical habitat designation" scenario, which represents the baseline for this analysis, 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.
29. Baseline impacts include sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections to the extent that they are expected to occur absent the designation of critical habitat for the species.
- Section 7 of the Act, absent critical habitat designation, requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations under the jeopardy standard, along with the impacts of project modifications resulting from consideration of this standard, are considered baseline impacts. Baseline administrative costs of section 7 consultation are summarized later in Exhibit 2-2.
 - Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the "take" of endangered wildlife, where "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."²⁵ 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

²⁵ 16 U.S.C. 1532.

species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.²⁶ 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.

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

2.3.2 IDENTIFYING INCREMENTAL IMPACTS

31. 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.
32. 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.
33. Exhibit 2-1 depicts the decision analysis regarding whether an impact should be considered incremental. The following sections describe this decision tree in detail.
34. Incremental impacts may be the direct compliance costs associated with additional effort for forecast consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional project modifications that would

²⁶ U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning," August 6, 2002, accessed at <http://endangered.fws.gov/hcp/>.

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., developing habitat conservation plans (HCPs) 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 perceptual effects on markets.

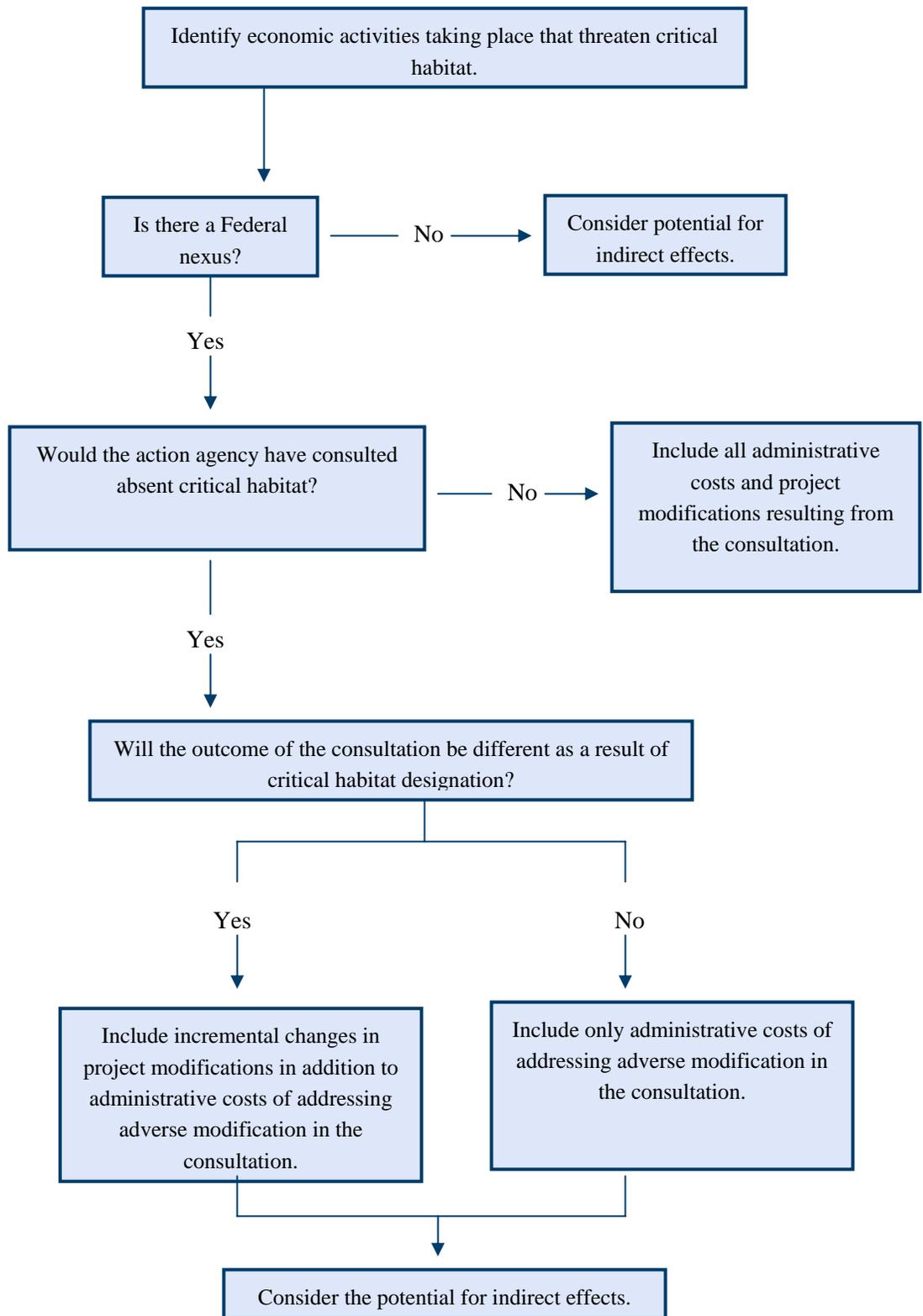
Direct Impacts

35. 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

36. 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 affect 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.

EXHIBIT 2-1 IDENTIFYING INCREMENTAL IMPACTS OF CRITICAL HABITAT DESIGNATION



37. 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.
38. The administrative costs of these consultations vary depending on the specifics of the project. One way to address this variability is to show a range of possible costs of consultation as it may not be possible to predict the outcome of each future consultation in terms of level of effort. Review of consultation records and discussions with Service field offices resulted in the estimated range of administrative costs of consultation employed in this analysis. For simplicity, the average of the range of costs in each category is applied in this analysis.
39. Exhibit 2-2 provides estimated consultation costs representing effort required for all types of consultation, including those that considered both adverse modification and jeopardy. To estimate the fractions of the total administrative consultation costs that are baseline and incremental, the following assumptions were applied.
- The greatest effort will be associated with consultations that consider both jeopardy and adverse modification. Depending on whether the consultation is precipitated by the listing or the critical habitat designation, part of all of the costs, respectively, will be attributed to the Proposed Rule.

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

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

BASELINE ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION CONSIDERING JEOPARDY (DOES NOT INCLUDE CONSIDERATION OF ADVERSE MODIFICATION)					
Technical Assistance	\$405	n/a	\$788	n/a	\$1,130
Informal	\$1,760	\$2,250	\$1,540	\$1,500	\$7,130
Formal	\$3,980	\$4,500	\$2,630	\$3,600	\$15,000
Programmatic	\$12,000	\$9,940	n/a	\$4,200	\$26,100
INCREMENTAL ADMINISTRATIVE COSTS OF CONSULTATION					
CONSULTATION TYPE	SERVICE	FEDERAL AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT	TOTAL COSTS
NEW CONSULTATION RESULTING ENTIRELY FROM CRITICAL HABITAT DESIGNATION (TOTAL COST OF A CONSULTATION CONSIDERING BOTH JEOPARDY AND ADVERSE MODIFICATION)					
Technical Assistance	\$540	n/a	\$1,050	n/a	\$1,500
Informal	\$2,350	\$3,000	\$2,050	\$2,000	\$9,500
Formal	\$5,300	\$6,000	\$3,500	\$4,800	\$20,000
Programmatic	\$16,000	\$13,300	n/a	\$5,600	\$34,800
NEW CONSULTATION CONSIDERING ONLY ADVERSE MODIFICATION					
Technical Assistance	\$405	n/a	\$788	n/a	\$1,130
Informal	\$1,760	\$2,250	\$1,540	\$1,500	\$7,130
Formal	\$3,980	\$4,500	\$2,630	\$3,600	\$15,000
Programmatic	\$12,000	\$9,940	n/a	\$4,200	\$26,100
RE-INITIATION OF CONSULTATION TO ADDRESS ADVERSE MODIFICATION					
Technical Assistance	\$270	n/a	\$525	n/a	\$750
Informal	\$1,180	\$1,500	\$1,030	\$1,000	\$4,750
Formal	\$2,650	\$3,000	\$1,750	\$2,400	\$10,000
Programmatic	\$7,980	\$6,630	n/a	\$2,800	\$17,400
ADDITIONAL EFFORT TO ADDRESS ADVERSE MODIFICATION IN A NEW CONSULTATION (ADDITIVE WITH BASELINE COSTS ABOVE OF CONSIDERING JEOPARDY)					
Technical Assistance	\$135	n/a	\$263	n/a	\$375
Informal	\$588	\$750	\$513	\$500	\$2,380
Formal	\$1,330	\$1,500	\$875	\$1,200	\$5,000
Programmatic	\$3,990	\$3,310	n/a	\$1,400	\$8,700
Source: IEC analysis of full administrative costs is based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2008, and a review of consultation records from several Service field offices across the country conducted in 2002.					
Notes:					
1. Totals may not sum due to rounding.					
2. Estimates reflect average hourly time required by staff.					

Section 7 Project Modification Impacts

40. 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

41. 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 to 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

42. 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.
43. 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 actions 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

44. 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.
45. The California Environmental Quality Act (CEQA), for example, requires that lead agencies, public agencies responsible for project approval, consider the environmental effects of proposed projects that are considered discretionary in nature and not categorically or statutorily exempt. In some instances, critical habitat designation may trigger CEQA-related requirements. This is most likely to occur in areas where the critical habitat designation provides clearer information on the importance of particular areas as habitat for a listed species. In addition, applicants who were “categorically exempt” from preparing an Environmental Impact Report under CEQA may no longer be exempt once critical habitat is designated. In cases where the designation triggers the CEQA significance test or results in a reduction of categorically exempt activities, associated impacts are considered to be an indirect, incremental effect of the designation. Evidence of additional impacts triggered by State and local laws is not available for this designation.²⁷

Additional Indirect Impacts

46. 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. The impact of time delays is estimated in Chapter 3 of this report.
 - **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

²⁷ CEQA is provided as an example of State law that may be triggered by critical habitat, it should be noted that no such regulations exist in Texas.

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. This analysis attempts to capture regulatory uncertainty by presenting a range of possible outcomes for future consultations.

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

2.3.3 BENEFITS

47. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.²⁸ 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.²⁹
48. 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

²⁸ Executive Order 12866, Regulatory Planning and Review, September 30, 1993.

²⁹ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

conduct new research.³⁰ *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.*

49. 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.
50. It is often difficult to evaluate the ancillary benefits of critical habitat designation. To the extent that the ancillary benefits of the rulemaking may be captured by the market through an identifiable shift in resource allocation, they are factored into the overall economic impact assessment in this report. For example, if habitat preserves are created to protect a species, the value of existing residential property adjacent to those preserves may increase, resulting in a measurable positive impact. Where data are available, this analysis attempts to capture the *net* economic impact (i.e., the increased regulatory burden less any discernable offsetting market gains), of species conservation efforts imposed on regulated entities and the regional economy.

2.3.4 GEOGRAPHIC SCOPE OF THE ANALYSIS

51. The geographic scope of the analysis includes all areas currently identified as proposed critical habitat in the May 2008 Proposed Rule, including the areas considered for possible exclusion from the final designation. Collectively, these areas are referred to as the "study area" for the purposes of this analysis. Thus, this analysis does not address past or future impacts related to piping plover conservation in the 18 critical habitat units that were unaffected by the 2006 court decision and which have remained in place since 2001.
52. Although the entire study area is analyzed, emphasis is placed on understanding impacts in areas proposed for final designation. Note that economic activities affecting critical habitat may be sited outside of the boundaries of the study area (e.g., upstream activities); these activities are considered relevant to this analysis.

2.3.5 ANALYTIC TIME FRAME

53. The analysis estimates impacts based on activities that are "reasonably foreseeable," including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. The analysis estimates economic impacts to activities from 1985 (year of the species' final listing) to 2027 (20

³⁰ Ibid.

years from critical habitat designation). Estimated impacts are divided into pre-designation (1985-2007) and post-designation (2008-2027) impacts.³¹

2.4 INFORMATION SOURCES

54. The primary sources of information for this report are communications with, and data provided by, personnel from the Service, Federal, State, and local governments and other stakeholders. In addition, this analysis relies upon the Service's section 7 consultation records, and existing habitat management and conservation plans that consider the piping plover. 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.

2.5 STRUCTURE OF THE REPORT

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

- Chapter 3: Potential economic impacts to the oil and gas industry;
- Chapter 4: Potential economic impacts to residential development;
- Chapter 5: Potential economic impacts to recreation-related activities;
- Chapter 6: Potential economic impacts to marine construction and other activities;
- Appendix A: Small Business Analysis and Energy Impacts Analysis;
- Appendix B: Sensitivity Analysis Presenting Estimates Discounted at Three Percent;
- Appendix C: Undiscounted Impacts by Year.

³¹ As described in the Proposed Rule, the Service first designated critical habitat for this species in 2001 (U.S. Fish and Wildlife Service, Endangered and Threatened Wildlife and Plants; Final Determination of Critical Habitat for Piping plover; Final Rule, 66 FR 17, February 1, 2001).

CHAPTER 3 | POTENTIAL ECONOMIC IMPACTS TO OIL AND GAS ACTIVITIES

3.1 INTRODUCTION

56. The Proposed Rule identifies vehicular and human impacts as threats to piping plover critical habitat in 21 of the 24 proposed units and subunits. While the rule does not specifically identify oil and gas exploration or development activities as a threat, it does state that impacts to “seismic studies for oil and gas drilling” may occur.
57. Because critical habitat areas include beaches, mud flats, sand flats, algal flats, spits, and washover areas, oil and gas exploration and drilling activities, including seismic surveys, typically require a permit from the USACE for authorization to conduct actions within the waters of the United States under section 10 of the Rivers and Harbors Act of 1899 and section 404 of the Clean Water Act. Under this Federal nexus, approximately 21 informal consultations on oil and gas activities, most of them seismic surveys, have been conducted within the study area since the listing of the species. Including technical assistance efforts, oil and gas-related actions comprise nearly 40 percent of the total Service actions conducted on piping plovers in the study area during this time period.
58. This chapter describes past and potential economic impacts to oil and gas exploration and development activities resulting from piping plover conservation efforts in the study area. This analysis is divided into three parts:
- Background information on industry terms, oil and gas exploration and development on Texas beaches, and threats posed by the oil and gas industry to piping plover habitat;
 - Estimates of past impacts of piping plover conservation efforts on the oil and gas industry in proposed critical habitat areas; and
 - Estimates of potential future impacts on the oil and gas industry (particularly seismic surveying and development activities) associated with piping plover conservation. This portion of the analysis also assigns future costs of conservation efforts either to the baseline or to the critical habitat designation itself (incremental impacts of the rule).

3.2 SUMMARY OF IMPACTS TO OIL AND GAS ACTIVITIES IN PROPOSED CRITICAL HABITAT

59. Past impacts of piping plover conservation on oil and gas activities in critical habitat areas include administrative costs of 21 informal consultations and eight technical assistance efforts within the study area since the listing of the species, and costs associated with modifying seismic survey methods to avoid impacts to piping plovers. Costs of these efforts are estimated to be between \$2.05 million and \$4.75 million between 1985 and 2007 (discounted at seven percent). While drilling efforts have been modified for the benefit of the plover in the past, none of these efforts have occurred within the study area for this analysis; no drilling efforts have been modified to accommodate piping plover to date within the study area.³² Directional drilling has been recommended in the past as a conservation effort related to listed turtles and the Service has indicated that it may be recommended in the future in piping plover critical habitat.
60. Significant uncertainty surrounds the potential future impacts to the oil and gas industry in this analysis. The primary source of uncertainty is the potential number and location of future seismic survey efforts and drilling sites. Contributing factors to this uncertainty include: a) the response of the market to recent hurricane damage; b) the recent national economic crisis; c) the inherent unpredictability of oil and gas exploration and production; and d) the possibility of changes in future energy policy.
61. Absent specific information on the number and location of future seismic surveys and drilling sites, this analysis employs information on past instances of these activities to forecast future rates and locations of activity. That is, the analysis assumes that the geographic distribution of seismic survey and drilling efforts in the past is indicative of the future. The basis for this assumption is that the recent oil and gas exploration is focused in areas that have been determined to be most likely to be profitable. Although ongoing and future surveys may narrow down the areas attractive for oil and gas exploration, this analysis is not able to predict the outcome of future surveys to inform a forecast of how the geographic distribution of these activities may change over time.
62. To project future locations of seismic surveys, this analysis uses information on the locations of past survey activity, and assumes that critical habitat areas not surveyed in the past ten years will be surveyed twice within the 20-year time period of this analysis. Areas surveyed in the past ten years are assumed to be surveyed once within the timeframe for this analysis. In total, this analysis estimates that 43 seismic surveys will be conducted within the study area over the next 20 years (nine within areas considered for possible exclusion from critical habitat).
63. Potential locations of future drilling sites within critical habitat are forecast using the rate of past well drilling activity within the proposed critical habitat. Using these data, the

³² The analysis discusses ongoing impacts associated with modifying drilling activities within Padre Island National Seashore for piping plover as well as sea turtles, but these costs are not included in past costs because the area is not within the areas currently proposed as critical habitat for piping plover (the study area).

analysis estimates that 53 wells may be drilled within the study area over the next 20 years (six within areas considered for possible exclusion from critical habitat).

64. The Service has stated that it will most likely recommend allowing proposed seismic survey and drilling projects within the study area with prescribed modifications, as opposed to recommending avoidance of the area for such activities. This analysis estimates that additional costs will be incurred associated with each future well drilled to accommodate piping plover concerns. Impacts associated with minimizing the effects of beach driving are considered likely to be incurred regardless of critical habitat designation (baseline), while costs associated with avoiding discharge of freshwater over tidal flats and directional drilling are assumed to result solely from the designation. Total costs associated with potential drilling and survey efforts in the study area are estimated to range from \$1.33 million to \$5.51 million (\$125,000 to \$520,000 annualized) according to the baseline “without critical habitat” scenario. Incremental impacts of critical habitat designation are forecast to range from \$6.03 million to \$53.0 million (\$570,000 to \$5.01 million annualized). These impacts, summarized in Exhibit 3-1, are present values assuming a seven percent discount rate).

EXHIBIT 3-1 FUTURE COSTS TO OIL AND GAS ACTIVITIES RELATED TO PIPING PLOVER CONSERVATION EFFORTS IN STUDY AREA (2008-2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
Areas Considered for Final Designation	\$1,190,000	\$5,160,000	\$5,350,000	\$47,000,000
Areas Considered For Exclusion	\$134,000	\$356,000	\$680,000	\$6,000,000
Total Proposed Area	\$1,330,000	\$5,510,000	\$6,030,000	\$53,000,000
Total Annualized	\$125,000	\$520,000	\$570,000	\$5,010,000
Note: For detailed costs by critical habitat unit, see Exhibits 3-11 and 3-12 at the end of this chapter.				

3.3 BACKGROUND

65. According to Service documents, threats posed by oil and gas development and exploration activities to piping plover critical habitat may include:

- Disturbance of sand, mud, and algal flats that are used by the piping plover;
- Destruction of vegetation by vehicles and foot traffic;
- Temporary displacement of piping plovers, which affect individual energy expenditures;
- Rutting, compaction, and other physical alteration of the habitat due to vehicle use.

66. As stated above, oil and gas-related actions comprise nearly 40 percent of the total Service actions conducted on piping plovers since the listing of the species. Most of these actions have been related to informal consultations with the USACE on proposed seismic surveying activities, which are conducted as part of oil and gas exploration activities, and are described more fully below.

3.3.1 DEFINITIONS

67. This section defines the key oil and gas industry terms used in this analysis: exploration, seismic surveying, and development.

Exploration

68. The U.S. Energy Information Administration (EIA) defines oil and gas “exploration” as involving:

- (1) Identifying areas that may warrant examination; and
- (2) Examining specific areas that are considered to have prospects of containing oil and gas reserves, including drilling exploratory wells and exploratory-type stratigraphic test wells.

The EIA states that costs of exploration include, among other costs, “costs of topographical, geological, and geophysical studies....”³³ These studies include seismic surveys, as discussed below. This analysis assumes that the primary oil and gas exploration method that may be affected by piping plover habitat considerations are seismic survey efforts and exploratory well drilling.

Seismic Surveys

69. Areas thought to contain oil and gas are initially subjected to seismic reflection surveys to estimate the properties of the subsurface geology. Seismic reflection methods measure the time it takes for reflected sound waves to travel through rock to determine the likelihood of it containing oil and gas reserves. A reflection experiment is carried out by initiating a seismic source and recording the reflected waves using seismometers.³⁴ Surveys typically entail three components:

1. Predetermined locations of shot holes are marked on the ground with wooden stakes or poles. A typical seismic survey may evaluate between 15 and 50 square miles, with an average of 60 shot holes created per square mile.³⁵ Each shot hole is about four to six inches in diameter, 20 to 80 feet deep and loaded with two to seven pounds explosives, depending on the soil of the area.

³³ Energy Information Administration, Financial Reporting System Glossary, Accessed at <http://www.eia.doe.gov/emeu/perfpro/glossary.html> on September 8, 2008.

³⁴ U.S. Department of Energy, Office of Fossil Energy. Accessed at <http://www.fossil.energy.gov/programs/oilgas/fundamental/index.html> on August 29, 2008.

³⁵ However, seismic projects can also be much larger than 15 to 50 square miles. For example, BNP Petroleum has undertaken a several-year 615-square mile 3D seismic shoot in the Padre Island area. BNP Petroleum Corp, Padre Island Project History Summary Sheet, accessed at <http://www.bnppetroleum.com/opportunities.html> on July 30, 2008.

2. Next, receiver lines are connected to the geophones and the receiver station.
 3. Finally, a geophone sensor is deployed or a hole will be drilled and loaded with a small charge. The sound waves resulting from this charge will be measured by the geophones and recorded by the receiver station.³⁶
70. A survey effort may cover several square miles at any one time, and typically is not done all at once. Survey efforts typically range from one to five months of effort, using crews of about 30 people, but can also take several years.³⁷ Example costs of seismic surveys are \$15,000 per square mile plus \$150 per acre leasehold costs.³⁸

Development

71. Oil and gas drilling has been effected by piping plover conservation in the past (e.g., within Padre Island National Seashore); however, this activity has not been modified for piping plover conservation within the study area for this analysis. This analysis assumes that future oil and gas development activities may be affected by piping plover habitat considerations. The EIA defines mineral “development” as:
- The preparation of a specific mineral deposit for commercial production. This preparation includes construction of access to the deposit and of facilities to extract the minerals. Costs of development include:
1. Gaining access to and preparing well locations for drilling, including surveying well locations for the purpose of determining specific development drilling sites, clearing ground, draining, road building, and relocating public roads, gas lines, and power lines, to the extent necessary in developing the proved reserves;
 2. Drilling and equipping development wells, development-type stratigraphic test wells, and service wells including the costs of platforms and of well equipment such as casing, tubing, pumping equipment, and the wellhead assembly;
 3. Acquiring, constructing, and installing production facilities such as lease flow lines, separators, treaters, heaters, manifolds, measuring devices, and production storage tanks, natural gas cycling and processing plants, and utility waste disposal systems; and
 4. Providing improved recovery systems.
72. As with seismic exploration activity, oil and gas activity may take place on all types of surface habitats, including marine habitat, beach habitat, as well as forested or other

³⁶ Section 7 Consultation # 21410-2007-I-0102, March 2, 2007, Service, Corpus Christi Ecological Field Services Office; Personal communication with C. Hagan, Dawson Geophysical, on September 9, 2008.

³⁷ Personal communication with L. Sherrod, Horizon Environmental Services, September 3, 2008; Personal communication with C. Hagan, Dawson Geophysical, on September 9, 2008; BNP Petroleum Corp, Padre Island Project History Summary Sheet, accessed at <http://www.bnppetroleum.com/opportunities.html> on July 30, 2008.

³⁸ BNP Petroleum Corp, Fact sheets for Dunn Deep Prospect, El Mar Prospect, La Playa Prospect, accessed at <http://www.bnppetroleum.com/opportunities.html> on July 30, 2008.

habitats. Drilling activities may result in more repetitive vehicle actions in beach areas, which could lead to more vehicle rutting than seismic exploration activities.³⁹

3.3.2 OIL AND GAS EXPLORATION AND DEVELOPMENT IN TEXAS

73. Texas is the leading State for crude oil and natural gas production in the U.S. even after excluding the Federal offshore areas, which themselves produce more oil and gas than any single State. More than one-fourth of the total U.S. natural gas production occurs in Texas.⁴⁰ The largest concentration of oil reserves in Texas are found in West Texas, while the largest deposits of natural gas are found in the northeastern part of the State. Neither of these concentrations lies near proposed critical habitat for the piping plovers. Nonetheless, the Gulf Coast Region produces a significant amount of oil and gas, with 15,484 active oil and 20,218 active gas wells operating in the nine counties that contain critical habitat. These wells comprise 22 percent and 10 percent of Texas wells, respectively.⁴¹

3.3.3 PAST OIL AND GAS DRILLING ACTIVITY IN PROPOSED CRITICAL HABITAT AREAS

74. As shown in Exhibit 3-2, proposed critical habitat areas have experienced some drilling activity over the past 18 years (1989-2007), but overall, well-drilling activity in the study area comprises a small portion (approximately one percent) of the total well drilling activity in the counties containing proposed critical habitat. As shown in Exhibit 3-3, critical habitat areas fall primarily on barrier islands, which have not been the source of the majority of drilling activity in affected counties. These areas also comprise a small portion of the overall land area in these counties.

³⁹ Personal communication with J. Copley, Kindee Oil and Gas, September 3, 2008.

⁴⁰ Energy Information Administration, Texas Quick Facts, accessed at http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=TX on August 21, 2008.

⁴¹ TXRRC, surface wells dataset of Aransas, Brazoria, Cameron, Calhoun, Matagorda, Nueces, Kenedy, Kleberg and Willacy counties, 2008.

EXHIBIT 3-2 NUMBER OF PAST OIL AND GAS WELLS DRILLED IN STUDY AREA (1989-2007)

COUNTY	CHD UNIT	NUMBER OF WELLS DRILLED IN CHD	NUMBER OF WELLS DRILLED IN COUNTY	PERCENT OF COUNTY WELLS DRILLED WITHIN STUDY AREA
Aransas	TX-16	1		
County Total		1	242	0.41%
Cameron	TX-3A	1		
	TX-3B	9		
	TX-4	3		
County Total		13	943	1.48%
Kenedy	TX-3C	16		
	TX-3E	4		
County Total		20	1,416	1.38%
Matagorda	TX-23	2		
	TX-27	3		
	TX-28	1		
County Total		6	115	5.22%
Nueces	TX-7	1		
	TX-10C	3		
County Total		4	841	0.48%
Willacy	TX-3B	1		
County Total		1	600	0.17%
Total		45	4,157	1.08%

SOURCE: Texas RRC, GIS Data, Oil and Gas Well Records, Oil and Gas Survey Records, and API data for Aransas, Brazoria, Cameron, Calhoun, Matagorda, Nueces, Kenedy, Kleberg and Willacy counties, provided to IEc on August 28, 2008. Note that this data indicates approximate locations of drilled wells, but does not provide information on whether wells were dry or if they are productive.

EXHIBIT 3-3 OIL AND GAS WELLS DRILLED IN 1989-2007 IN 9 COASTAL COUNTIES CONTAINING PIPING PLOVER CRITICAL HABITAT



Oil and Gas Wells Drilled in 1989-2007 in 9 Coastal Counties containing Piping Plover Critical Habitat

1:1,733,085

Legend

- Oil and Gas wells in Critical Habitat
- Oil and Gas wells in Coastal Counties
- Proposed Critical Habitat Units
- County boundary

Study Area



Map Projection: Transverse Mercator, Zone 11
 Geodetic Reference System: NAD 83
 Source:
 1. United States Fish and Wildlife Service
 2. Environmental Systems Research Institute, Inc. (ESRI)

IEc

INDUSTRIAL ECONOMICS, INCORPORATED

Source: Texas Railroad Commission, GIS Data, Oil and Gas Well Records, Oil and Gas Survey Records, and API data for Aransas, Brazoria, Cameron, Calhoun, Matagorda, Nueces, Kenedy, Kleberg and Willacy counties, provided to IEC on August 28, 2008.

3.3.4 INDUSTRY CONCERN

75. The oil and gas industry has expressed concern that critical habitat designation for the piping plover could lead to reduced oil and gas production. A letter from the Texas General Land Office (GLO) to the Service on this rule states that piping plover critical habitat designation will negatively impact the ability of oil and gas interests to develop oil and gas resources. With regard to seismic surveys, it states that restrictions may “increase the risk that Texas’ mineral rights will not be developed or will be developed less efficiently and effectively, resulting in diminished revenues to the State.” The GLO estimates that potential lost revenues to the Permanent School Fund could exceed \$1 billion, with additional lost revenues to the State from associated severance taxes.⁴² The GLO is particularly concerned with a 2006 letter it received from the Service, in which, for a specific proposed seismic survey, the Service stated that the GLO should “eliminate areas within [piping plover critical habitat] from the project and restrict any activity within 1000 feet of these areas.”⁴³
76. In response, the Service states that, in the future, it is more likely to recommend a series of project modifications for work within critical habitat than it is to recommend avoidance of the habitat areas altogether.⁴⁴ For example, in an area outside of proposed critical habitat but where piping plovers are present, the South Padre Island National Seashore (PAIS), oil and gas development activities are currently allowed and conducted under an Oil and Gas Management Plan despite presence of piping plovers and several listed sea turtle species. As described later in this chapter, many of the established conservation efforts in PAIS mirror those that the Service states it will request in critical habitat areas.

3.4 ANALYTIC METHODOLOGY FOR ESTIMATING IMPACTS TO THE OIL AND GAS INDUSTRY

77. To assess the past and potential future impacts to the oil and gas industry, this analysis employs the following method:
1. First, the analysis assesses the extent to which past administrative efforts and project modifications have been undertaken for the piping plover within the study area since the listing of the species for oil and gas activities. Costs associated with those efforts are assigned.
 2. Next, the analysis considers how future regulation of piping plover habitat may deviate from past efforts given recent court decisions and changing on-the-

⁴² Renaud, Louis. “Comments on USFWS Re-Designation of Critical Habitat for the Piping Plover,” Public comments of the Texas General Land Office, July 21, 2008.

⁴³ Section 7 Consultation #2-11-06-I-0345, June 26, 2006, Service, Corpus Christi Ecological Field Services Office.

⁴⁴ Service, “Guidance on Consultations for Piping Plover and Piping Plover Critical Habitat,” Corpus Christi Ecological Services Field Office, August 27, 2008.

ground conditions, and estimates costs of compliance on a per survey and per well basis.

3. Next, the analysis estimates the level of future seismic survey activity and oil and gas development (i.e., well drilling) activity that is expected to occur in each unit and subunit within the study area over the next 20 years.
4. Finally, the analysis estimates total costs of compliance with anticipated future conservation efforts for each unit and subunit in the study area.

3.5 PRE-DESIGNATION ECONOMIC IMPACTS TO OIL AND GAS ACTIVITIES

78. Since 1991, the Service has conducted 47 consultation actions with USACE, NPS, FERC and itself regarding the effects of oil and gas-related activities on the piping plover. Of these actions, 29 have occurred within the study area for this analysis. None of these actions resulted in a formal consultation: 21 actions were informal consultations and 8 were technical assistance efforts. Most of these actions addressed proposed seismic surveys in beach areas; none addressed drilling activities.

79. Past consultations regarding seismic surveys have resulted in administrative effort and project modifications. Exhibit 3-4 summarizes a number of recent Service recommendations included in informal consultations related to seismic survey activities and piping plovers.

80. Both the GLO and the USACE pointed out that the Service has requested that some past permits for seismic exploration avoid piping plover habitat areas, as shown in the first row of Exhibit 3-4.⁴⁵ The consultation record indicates, however, that these requests were not consistently proffered by the Service. At least one firm involved in a past consultation reported that no additional costs to conduct their survey were incurred as a result of piping plover considerations.⁴⁶ Absent specific information on project modifications that occurred following each past consultation, this analysis assumes that past consultations regarding seismic surveys within the study area did alter operations to accommodate piping plovers, but that total avoidance of the area, if it occurred, did not result in significant costs.

⁴⁵ Personal communication with R. Hatter, General Land Office, July 15, 2008; Personal communication with T. Calnan, General Land Office, Austin, July 16, 2008; Personal communication with R. Richter, USACE, Permitting Branch, Corpus Christi Office, on August 26, 2008.

⁴⁶ Personal communication with D. Howell, of Meridian Resources Group, September 3, 2008

**EXHIBIT 3-4 EXAMPLE CONSERVATION RECOMMENDATIONS FROM RECENT CONSULTATIONS
RELATED TO SEISMIC SURVEYS**

CONSERVATION RECOMMENDATION	SPECIFIC LANGUAGE FROM CONSULTATION	SOURCE
Eliminate work in critical habitat area	<p>“Areas with constituent elements for the piping plover within critical habitat areas should be eliminated from the project area and seismic activity should not occur within 1000 feet of that area.”</p> <p>“Drilling of shot holes within TX-13 and 1000 foot buffer is prohibited.”</p>	<p>Section 7 Consultation #2-11-06-I-0345, June 26, 2006, Service, Corpus Christi Ecological Field Services Office.</p> <p>Consultation #2-11-05-I-0009R1, February 4, 2005, Service, Corpus Christi Ecological Field Services Office.</p>
Avoid wintering season	<p>“All project-related activity should occur outside of the wintering season for the piping plovers when most plovers have left the area.”</p>	<p>Section 7 Consultation #2410-2007-I-0105, February 5, 2007 and March 22, 2007, Service, Corpus Christi Ecological Field Services Office.</p>
Minimize vehicle disturbance	<p>“Work should be planned to minimize the number of trips on unvegetated flats to reduce disturbances;</p> <p>Minimize airboats proximity to shoreline by only approaching shore to the depth that would allow personnel to wade to shore; all other vessels or vehicles prohibited.”</p> <p>“Laying and retrieving of receiver lines will occur by wading or walking; no other activity, specifically motorized, is authorized.”</p>	<p>Consultation #2-11-05-I-0009R1, February 4, 2005, Service, Corpus Christi Ecological Field Services Office;</p> <p>Section 7 Consultation # 21410-2007-I-0102, March 2, 2007, Service, Corpus Christi Ecological Field Services Office.</p>
Have a biological monitor present	<p>“Qualified biological monitors to be present during all project activities;”</p> <p>“A biological monitor should be present to ensure that project activities do not adversely affect listed species.”</p> <p>“A biological monitor will accompany airboats and walk ahead of personnel laying receiver lines to survey for the presence of piping plover and make recommendations. Biological monitor will also submit daily reports to service outlining the day’s activity, number of piping plover observed and any items of significance.”</p> <p>“Photo-documentation of the area prior to survey activity, during survey period, and after the survey period.”</p>	<p>Intra-service Section 7 Consultation #2410-2007-I-0074, November 15, 2006, Service, Corpus Christi Ecological Field Services Office.</p> <p>Consultation #2-11-05-I-0009R1, February 4, 2005, Service, Corpus Christi Ecological Field Services Office</p> <p>Section 7 Consultation #2410-2007-I-0105, February 5, 2007 and March 22, 2007, Service, Corpus Christi Ecological Field Services Office.</p>
Minimize and restore vehicle ruts	<p>“Specific equipment will be selected to minimize rutting compaction or other disturbances. Any ruts or disturbances will be restored to their original contours with rakes and other tools.”</p> <p>“Specific equipment be selected based on the existing conditions at the time of the activity to minimize impacts to the habitat.”</p>	<p>Section 7 Consultation # 21410-2007-I-0102, March 2, 2007, Service, Corpus Christi Ecological Field Services Office.</p> <p>Intra-service Section 7 Consultation #2410-2007-I-0074, November 15, 2006, Service, Corpus Christi Ecological Field Services Office.</p>

81. One conservation recommendation described in Exhibit 3-4 is that activities may be shifted to a time of the year when the piping plover is not present. The piping plovers are present in the study area from approximately August to March. In the case that the Service recommends projects be shifted to occur within the remaining four months of the year, this analysis may not accurately capture associated impacts. First, it is unknown whether the full schedule of annual activities could be completed within the four months the plovers are not present. Second, on the gulf side of the study area (i.e., not the bay side habitat), restrictions on activities are in place for turtles for the four months of the year the plovers are not present. Because of this, shifting activity timing for the plovers in these areas would effectively place year round restrictions on the activities. This analysis therefore assumes projects proceed on schedule throughout the year but incorporate conservation recommendations to avoid adverse affects on the piping plover and its habitat.
82. The following costs are included for past efforts:
- Administrative Costs: For informal consultations, administrative costs of approximately \$7,100 per consultation, including efforts by all parties. For technical assistance efforts, administrative costs of approximately \$1,100 per effort, including efforts by all parties.⁴⁷
 - Project Modification Costs: \$37,600 to \$96,800 per consultation effort. These costs include costs to minimize vehicle disturbance, hire a biological monitor, and smooth vehicle ruts. The analysis assumes that all informal consultations were burdened with the same project modification efforts, although it is likely that many of these efforts were not required for all actions. These costs are detailed in Exhibit 3-5.

Total pre-designation costs are summarized in Exhibit 3-6. Because some past consultation actions may not, in fact, have lead to any conservation efforts for piping plover, these estimates may overstate actual impacts.

⁴⁷ Refer to Chapter 2 of this analysis for additional detail regarding these costs.

EXHIBIT 3-5 ESTIMATED COSTS PER PAST INFORMAL CONSULTATION EFFORT

CONSERVATION EFFORT	DESCRIPTION OF IMPACT	ESTIMATED COSTS PER EFFORT
Minimize vehicle disturbance	As described under the Drilling Section below, minimizing vehicle disturbance has been interpreted to a requirement that vehicles must travel in convoys in PAIS. Convoying has resulted in delays to vehicle progress due to logistical issues. ^{1,2,3}	-Costs for survey team delay. Assumed to be comparable to holding costs for convoy of trucks in drilling party: \$9,600 per day ² Costs: \$9,600 to \$29,000 for 1 to 3 day delay per consultation
Have a biological monitor present	Discussions with professional species monitors suggest that past conservation efforts related to seismic surveys have commonly resulted in the use of monitors during these projects in recent years. ¹	-Monitors cost \$300-\$500/day, projects often last 4-5 months -Costs of reporting vary, approx. \$3,000-10,000 per project ¹ Costs: \$27,000 to \$60,000 per consultation
Smooth over vehicle ruts	Smoothing of vehicle ruts is most likely needed in tidal flat areas, and would be required less often in beach habitat areas. One operator in PAIS performs daily smoothing and wetting activities in a dune area. ² Required project modifications under the existing biological opinion for PAIS include stationing a backhoe on-site to smooth out ruts as needed. ⁴	-Because survey activity does not repetitively use beach areas, less need for smoothing ruts is expected. However, activities would still be needed in tidal flat areas. Actions require 30 minutes to one hour per day ² of running backhoe at \$50 to \$100/hour for 20 to 80 days. Costs: \$1,000 to \$8,000 per consultation
TOTAL PER SURVEY		\$37,000 to \$97,000
Notes: ¹ Personal communication with L. Sherrod, Horizon Environmental Consulting, September 3, 2008. ² Personal communication with V. Lopez, BNP Petroleum, September 2, 2008. ³ Personal communication with J. Copley, Kindee Oil and Gas, September 2, 2008. ⁴ Cons.#2-11-04-F-0050. Consultation on proposed BNP Dunn-Peach #1 and Dunn-Manzano #1 natural gas wells located on Padre Island National Seashore. Service, Corpus Christi Ecological Services.		

EXHIBIT 3-6 SUMMARY OF PRE-DESIGNATION IMPACTS TO OIL AND GAS ACTIVITIES (1985-2007, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE IMPACTS	
	LOW	HIGH
TX-3A*	\$17,600	\$40,900
TX-3B*	\$17,600	\$40,900
TX-3C*	\$17,600	\$40,900
TX-3D*	\$17,600	\$40,900
TX-3E*	\$17,600	\$40,900
TX-8	\$20,200	\$45,100
TX-9	\$19,700	\$44,700
TX-10A	\$19,700	\$44,700
TX-10B	\$19,700	\$44,700
TX-10C	\$19,700	\$44,700
TX-16*	\$23,900	\$55,600
TX-18*	\$23,900	\$55,600
TX-22	\$33,600	\$78,000
TX-23	\$33,600	\$78,000
TX-27	\$33,600	\$78,000
UNKNOWN	\$1,720,000	\$3,980,000
Subtotal	\$2,050,000	\$4,750,000
Areas Considered for Possible Exclusion		
Subtotal	\$0	\$0
Total	\$2,050,000	\$4,750,000

3.6 POST-DESIGNATION IMPACTS

83. This section presents estimates of potential future impacts to the oil and gas industry within the study area related to piping plover conservation, including those expected to occur under the baseline (i.e., regardless of critical habitat designation), and those that are incremental impacts of critical habitat designation over the next 20 years. First, this section discusses future conservation efforts likely to be undertaken by the oil and gas industry within the study area, and estimates which of those efforts are incremental impacts of critical habitat designation. It then presents costs of these efforts on a per-survey and per-well basis. Next, the analysis estimates the number of expected surveys and wells forecast across the study area over the next 20 years. Finally, it calculates the projected future baseline and incremental costs within each proposed critical habitat unit.

3.6.1 LIKELY PIPING PLOVER PROJECT MODIFICATIONS RELATED TO OIL AND GAS EXPLORATION AND DEVELOPMENT ACTIVITIES

84. In response to recent concerns expressed by the GLO and others that critical habitat designation may result in complete avoidance of the critical habitat designation for oil and gas exploration, the Service developed a memo describing likely conservation

recommendations for oil and gas activities.⁴⁸ Exhibit 3-7 summarizes those potential recommendations. Many of these modifications appeared in past consultations regarding oil and gas activities. Other modifications, such as recommendations to conduct directional drilling activities, have not appeared in piping plover-related conservation recommendations, but have been applied during conservation efforts for listed turtles on the Padre Island National Seashore and the Service anticipates they may be requested for the piping plover in the future.

EXHIBIT 3-7 LIKELY PIPING PLOVER PROJECT MODIFICATIONS RELATED TO OIL AND GAS EXPLORATION AND DEVELOPMENT ACTIVITIES

CONSERVATION EFFORT	APPLICABLE TO			
	OIL AND GAS DEVELOPMENT	SURVEYING	BASELINE	CRITICAL HABITAT
During the August to March piping plover wintering season, minimize beach driving/minimize driving on tidal flat habitat in bayside areas	X	X	X	
If driving is needed, avoid going close to the swash zone when shorebirds are feeding	X	X	X	
Try to avoid driving on the high beach, above mean high tide line, in the afternoon or on windy days when plovers are likely to be roosting	X	X	X	
Have a site monitor to see if birds are in the area	X	X	X	
Where possible minimize or avoid ATV or airboats in areas where large numbers of shorebirds are present.	X	X	X	
Use wide track vehicles or board roads to access tidal flats to prevent ruts	X	X	X	
Smooth over vehicle ruts	X		X	
Avoid stockpiling materials on sand flats or disposing of dredged material on them	X			X
Avoid oil and chemical spills on beaches.	X		X	
Avoid discharging fresh water across unvegetated tidal flats	X			X
Directionally drill from adjacent upland and/or previously disturbed areas	X			X
Sources: "Guidance on Consultations for Piping Plover and Piping Plover Critical Habitat," Corpus Christi Ecological Services Field Office, August 27, 2008; Written communication with Service biologist, Corpus Christi Ecological Field Services Office, September 3, 2008.				

85. This analysis assumes that driving-related project modifications, including the use of beach monitors during vehicle use, are baseline activities that would be requested even absent critical habitat designation, as these conservation recommendations have been made in the past and are expected to be made regardless of critical habitat designation in the future. The Service describes that conservation efforts not related to beach driving

⁴⁸ "Guidance on Consultations for Piping Plover and Piping Plover Critical Habitat," Corpus Christi Ecological Services Field Office, August 27, 2008.

would not be recommended absent critical habitat.⁴⁹ As a result, these conservation efforts result in incremental impacts of critical habitat designation. These include: avoid stockpiling materials on sand flats or disposing of dredged material on them; avoid discharging fresh water across unvegetated tidal flats; and directional drilling from adjacent upland or previously disturbed areas.

86. Several conservation recommendations in Exhibit 3-7 pertain to modifying beach driving activities (minimize beach driving, smooth over vehicle ruts, etc.). These conservation recommendations are only relevant to those units for which beach driving would be required to access sites. The Service determines that beach access would only be required for Units 3(a), 7, 8, 10(a), 15, 16, 18, 19, 22, 23, and 32.⁵⁰ These units are therefore assigned the impacts of minimizing vehicle disturbance. For the 13 remaining units, existing roads could be used to access survey and well sites and so the costs of minimizing beach vehicle driving are not included in the total project modification costs for forecast surveys and wells in these units.
87. To estimate potential costs associated with the piping plover conservation efforts described in Exhibit 3-7, analysts for this report interviewed seismic survey firms, oil and gas developers, and environmental services firms that serve the oil and gas industry in coastal Texas. Specifically, oil and gas developers who currently operate under the PAIS Oil and Gas Management Plan provided details about costs they incur as part of current operations on the National Seashore. Details of the estimates developed from these interviews are provided in Exhibit 3-8.
88. The exhibit estimates per project costs of conservation efforts in the 11 units for which beach driving may be affected and for the 13 units for which beach driving is not an issue. In units for which beach driving may be affected (as listed above), total compliance costs associated with future survey efforts are \$47,200 to \$126,000, and would be expected to occur absent proposed critical habitat, and thus are considered to be baseline costs. Total estimated costs of compliance for future wells drilled in critical habitat units for which beach driving may be affected are anticipated to be \$221,000 to \$1.39 million per well under the baseline. Incremental impacts of directional drilling and avoiding discharging fresh water across unvegetated tidal flats at these well sites are forecast to be \$200,000 to \$1.76 million per well due to proposed critical habitat designation.⁵¹

⁴⁹ Written communication with Service biologist, Corpus Christi Ecological Field Services Office, September 3, 2008.

⁵⁰ Information on units for which beach access would be required was provided by the Service via email on October 28, 2008.

⁵¹ BNP Petroleum developed estimates of costs associated with oil and gas "permitting in typical areas as well as in environmentally sensitive areas like proposed critical habitat." BNP estimates that increased costs of permitting in environmentally sensitive areas is approximately \$338,000 to \$555,000, not including "time value of money, extending leases, and in-house staff costs associated with the longer durations in permitting in sensitive areas." BNP also states that recent directional drilling efforts indicate additional exceeding \$1.3 million per well. Taken together, these estimates appear comparable to the high-end estimates developed for this analysis. Written communication with V. Lopez, Surface Operations Manager, BNP Petroleum, "Re: Proposed Rule for the Revised Designation of the Critical Habitat for the Wintering Population of the Piping Plover," September 19, 2008.

89. In units for which beach driving is not an issue and therefore conservation efforts related to minimizing impacts of beach driving are not relevant, there are no project modification costs related to conducting seismic surveys. This is because all conservation recommendations related to seismic surveys in the analysis relate to minimizing the effects of beach driving. In addition, the only impacts quantified for well sites in these units are those related to directional drilling and avoiding discharging fresh water across unvegetated tidal flats. These impacts of \$200,000 to \$1.76 million per well are incremental impacts of the critical habitat designation.

EXHIBIT 3-8 POTENTIAL PROJECT MODIFICATIONS FOR OIL AND GAS ACTIVITIES IN CRITICAL HABITAT AREAS

CONSERVATION EFFORT	DESCRIPTION OF IMPACT	ESTIMATED COSTS PER WELL DRILLED	ESTIMATED COSTS PER SURVEY	TYPE OF IMPACT
(1) During the August to March piping piping plover wintering season, minimize beach driving/minimize driving on tidal flat habitat in bayside areas	On NPS lands, this restriction has resulted in a need to convoy vehicles. Operators report that convoying vehicles frequently result in delays, as scheduling and technical coordination efforts become more challenging. Operators report that for drilling projects, delays of three days are not uncommon.	-Holding costs for rig: \$20,000-\$40,000 per day -Holding costs for 12 cement trucks: \$9,600 per day Costs: \$60,000 to \$148,000 for 3-day delay per well project	- Costs for survey team delay. Assumed to be comparable to holding costs for convoy of trucks in drilling party: \$9,600 per day Costs: \$9,600 to \$28,800 for 1 to 3 day delay per survey	Baseline
(2) If driving is needed, avoid going close to the swash zone when shorebirds are feeding	Operators report that this measure does not typically require a large behavioral change or hindrance to operations.	-	-	Baseline
(3) Try to avoid driving on the high beach, above mean high tide line, in the afternoon or on windy days when plovers are likely to be roosting	Operators state that this requirement would result in additional delays and longer project lengths.	-Assuming 2pm cutoff for operations, assume loss of ¼ of day productivity, or increased project, or approximately 3 additional days of drilling for a 20 day drilling project Costs: \$60,000 to \$148,000, equivalent to an additional 3-day delay per well project	-Assuming 2pm cutoff for operations, assume loss of ¼ of day productivity, or increased project Costs: \$9,600 to \$28,800, equivalent to a 1 to 3 day delay per survey	Baseline

CONSERVATION EFFORT	DESCRIPTION OF IMPACT	ESTIMATED COSTS PER WELL DRILLED	ESTIMATED COSTS PER SURVEY	TYPE OF IMPACT
(4) Have a site monitor to see if birds are in the area	On NPS lands, this requirement has led to a need for beach escorts for drilling operations and survey activities. Operators and monitors report that these costs vary according to the remoteness of the site and the amount of time spent in sensitive habitat.	-Costs include hiring of dispatch, communications, vehicle rental, staff, and reporting at \$5000-\$9000 per day -assumes drilling period of 20 to 120 days Costs: \$100,000 to \$1.08 million per well project	-Monitors cost \$300-\$500/day, projects often last 4-5 months -Reporting costs vary, approx. \$3,000-10,000 per project Costs: \$27,000 to \$60,000 per survey	Baseline
(5) Where possible minimize or avoid ATV or airboats in areas where large numbers of shorebirds are present.	Unknown impacts. Likely to be minimal above and beyond other project modifications.	-	-	Baseline
(6) Use wide track vehicles or board roads to access tidal flats to prevent ruts	Because they are only needed in tidal flats, board roads will not be needed in many beach habitat areas. Operators report that boards or mats for temporary roads are typically rented, and costs may vary. Wide track vehicles would be used if available.	Unknown	Unknown	Baseline

CONSERVATION EFFORT	DESCRIPTION OF IMPACT	ESTIMATED COSTS PER WELL DRILLED	ESTIMATED COSTS PER SURVEY	TYPE OF IMPACT
(7) Smooth over vehicle ruts	Smoothing of vehicle ruts is most likely needed in tidal flat areas, and would be required less often in beach habitat areas. One operator in PAIS performs daily smoothing and wetting activities in a dune area. Required modifications under the existing biological opinion for PAIS include stationing a backhoe on-site to smooth out ruts as needed.	-Daily smoothing and wetting activities: 0.5 to 1 hour per day on average. -assumes drilling period of 20 to 120 days Costs: \$1,000 to \$12,000 per well project	-Because survey activity does not repetitively use beach areas, less need for smoothing ruts is expected. However, activities would still be needed in tidal flat areas. Costs: \$1,000 to \$8,000 per survey	Baseline
(8) Avoid stockpiling materials on sand flats or disposing of dredged material on them	Unknown impacts.	-	-Dredging is not typically required for seismic surveys.	Incremental
(9) Avoid oil and chemical spills on beaches.	Unknown impacts. However, avoidance of oil and chemical spills is typically required as part of most operating permits regardless of plover presence.	-	-N/A	Baseline
(10) Avoid discharging fresh water across unvegetated tidal flats	One operator reports that they built a lined berm that prevented all runoff from leaving a drilling site. This could be the solution for avoiding freshwater discharge.	-Operator estimate of costs to build and line berm Costs: \$0 to \$325,000 per well project	-N/A	Incremental
(11) Directionally drill from adjacent upland and/or previously disturbed areas	Directionally drilling is more costly in the short term, though some benefits may include grouping output into a single flow line.	-Increased operating costs of \$10,000 to \$12,000 per day Costs: \$200,000 to \$1.44 million per well project, assuming 20 to 120 days of drilling	-N/A	Incremental

CONSERVATION EFFORT	DESCRIPTION OF IMPACT	ESTIMATED COSTS PER WELL DRILLED	ESTIMATED COSTS PER SURVEY	TYPE OF IMPACT
PER PROJECT IMPACTS IN UNITS THAT RELY ON BEACH DRIVING	TOTAL BASELINE IMPACTS	\$221,000 to \$1.39 million	\$47,200 to \$126,000	BASELINE
	TOTAL INCREMENTAL IMPACTS	\$200,000 million to \$1.76 million	\$0	INCREMENTAL
PER PROJECT IMPACTS IN UNITS THAT DO NOT RELY ON BEACH DRIVING	TOTAL BASELINE IMPACTS	\$0	\$0	BASELINE
	TOTAL INCREMENTAL IMPACTS	\$200,000 to \$1.76 million	\$0	INCREMENTAL
Sources: Personal communication with J. Copley, Kindee Oil and Gas, September 2, 2008; Personal communication with V. Lopez, BNP Petroleum, September 2, 2008; Personal communication with L. Sherrrod, Horizon Environmental Consulting, September 3, 2008; Service, "Guidance on Consultations for Piping Plover and Piping Plover Critical Habitat," Corpus Christi Ecological Services Field Office, August 27, 2008; Written communication with Service biologist, Corpus Christi Ecological Services Field Office, September 3, 2008; Written communication with V. Lopez, Surface Operations Manager, BNP Petroleum, "Re: Proposed Rule for the Revised Designation of the Critical Habitat for the Wintering Population of the Piping Plover," September 19, 2008.				

3.6.2 LEVEL OF FUTURE SURVEY ACTIVITY IN STUDY AREA

90. This section forecasts the number of seismic surveys likely to occur in the study area over the next 20 years using the past record of seismic survey activity in the area. In general, the Texas Railroad Commission (TXRRC) anticipates that any area that has not been surveyed in the past ten years is likely to be surveyed in the next ten years.⁵² To identify the number of surveys conducted on critical habitat units in recent years, this analysis utilizes available spatial data from TXRRC, which compiles information about the well drilling and land leasing activities related to the oil and gas industry. Based on observations by the TXRRC that any area that has not been surveyed in the past ten years is likely to be surveyed in the next ten years, this analysis estimates that critical habitat areas will be surveyed at a frequency of approximately once every ten years.⁵³
91. The TXRRC data indicate how many times particular land leases have been surveyed between 1989 and 2007, but do not indicate the total geographic scope of any survey. Thus, to estimate which portion of the critical habitat units were surveyed between 1989 and 2007, leases which overlap the study area were identified using spatial analysis. Lease data were then split into three categories: leases surveyed zero times between 1989 and 2007, leases surveyed one time, and leases surveyed two or more times. The weighted average number of times that a critical habitat unit was surveyed is then used to project the number of future surveys expected in each unit.
92. Specifically, the methodology used for forecasting the number of seismic surveys in the critical habitat is as follows:
- Calculate number of acres within each critical habitat that has been surveyed zero times, one time, and two or more times between 1989 and 2007. Derive percentage of land within each unit that falls into each category.
 - Apply the following seismic survey assumptions to each category, to arrive at an approximate estimate of surveying once every ten years:
 - Areas not surveyed from 1989-2007: 2 surveys expected 2008-2027
 - Areas surveyed once from 1989-2007: 1 survey expected 2008-2027
 - Areas surveyed two times or more from 1989-2007: 0 surveys expected 2007-2027
 - For each unit, multiply the percentage land in each category by the numbers of expected surveys. Summing these values for each critical habitat unit yields that unit's estimated average number of seismic surveys for 2008-2027.

The results of this method of forecasting surveys are presented in Exhibit 3-9.

⁵² Personal communication with Representative, Texas Railroad Commission Information Resources, September 3, 2008.

⁵³ Personal communication with Representative, Texas Railroad Commission Information Resources, September 3, 2008.

**EXHIBIT 3-9 ESTIMATED NUMBER OF FUTURE SURVEYS WITHIN PROPOSED CRITICAL HABITAT
2007-2027**

CHD UNIT	PERCENT OF UNIT NOT SURVEYED	PERCENT OF UNIT SURVEYED 1 TIME (1998-2007)	PERCENT OF UNIT SURVEYED 2 TIMES OR MORE (1998-2007)	EXPECTED FUTURE SURVEYS (2008-2027)
TX-3A	39%	0%	59%	1
TX-3B	63%	15%	22%	1
TX-3C	71%	37%	0%	2
TX-3D	90%	10%	0%	2
TX-3E	86%	17%	0%	2
TX-4	91%	9%	1%	2
TX-7	100%	0%	0%	2
TX-8	55%	46%	0%	2
TX-9	41%	59%	0%	1
TX-10A	72%	28%	0%	2
TX-10B	0%	100%	0%	1
TX-10C	9%	91%	0%	1
TX-14	2%	98%	0%	1
TX-15	21%	79%	1%	1
TX-16	31%	34%	35%	1
TX-18	2%	54%	45%	1
TX-19	29%	70%	1%	1
TX-22	67%	33%	0%	2
TX-23	33%	67%	0%	1
TX-27	24%	76%	0%	1
TX-28	8%	92%	0%	1
TX-31	27%	73%	0%	1
TX-32	99%	1%	0%	2
TX-33	100%	0%	0%	2
Total				34
Areas Considered for Possible Exclusion				
TX-3 -NWR lands	58%	24%	18%	1
TX-4 -NWR lands	99%	0%	1%	2
TX-16 -NWR lands	100%	1%	0%	2
TX-18 -NWR lands	70%	29%	1%	2
TX-19 -NWR lands	48%	49%	3%	1
TX-31 -NWR lands	0%	100%	0%	1
Total				9
Sources: Texas Railroad Commission, GIS Data, Oil and Gas Well Records, Oil and Gas Survey Records, and API data for Aransas, Brazoria, Cameron, Calhoun, Matagorda, Nueces, Kenedy, Kleberg and Willacy counties, provided to IEC on August 28, 2008.				

3.6.3 LEVEL OF FUTURE WELL DEVELOPMENT IN STUDY AREA

93. This section attempts to forecast the number of oil and gas wells drilled within critical habitat employing information on the location and frequency of oil and gas well drilling activity from 1989-2007. As described in Section 3.2, considerable uncertainty surrounds this forecast of future well drilling activity. In general, the oil and gas industry and its operations are influenced by economic, political, and ecological factors. The prices of oil and gas determine the marginal revenue that oil and gas companies earn, and thus the amount of money they are willing to invest in specific ventures. Depending on the market, prices for these commodities can affect where oil and gas companies choose to allocate their resources. The best available information to forecast oil and gas activity, however, is where efforts for this activity have been focused to date.
94. The two primary factors that appear to play into the likelihood of future drilling activity within the study area are:
- Survey results, i.e., the precise location of reserves relative to critical habitat areas;
 - Current and future prices of oil and gas. Some areas may be considered uneconomical to drill at times of low fuel prices, but worthwhile efforts at times of higher fuel prices.
95. The analysis uses the following methodology to estimate the number of future wells that may be drilled within the study area over the next 20 years:
- Identify annual rates of well drilling between 1989-2007 within the study area on a per unit basis. These rates are used to project future well-drilling activity assuming past well drilling activity is indicative of existing reserves and thus likely future drilling locations.
 - Assume constant rate of well drilling over the next 20 years.
96. Using these assumptions, this analysis estimates that 53 wells are likely to be drilled within proposed critical habitat areas over the next 20 years, as summarized in Exhibit 3-10. The analysis recognizes, however, that past records of well drilling activity may not accurately reflect likely locations of future well drilling sites. Data on precise locations of future drilling interest areas, however, were not available.

EXHIBIT 3-10 ESTIMATED NUMBER OF FUTURE WELLS WITHIN PROPOSED CRITICAL HABITAT, 2008-2027

CHD UNIT	NUMBER OF PAST WELLS IN CHD (1989-2007)	ANNUAL NUMBER OF WELLS IN CHD	EXPECTED NUMBER OF WELLS OVER 20 YEARS IN CHD
Critical Habitat Units			
TX-3A	1	.05	1
TX-3B	10	0.53	11
TX-3C	16	0.84	17
TX-3E	4	0.21	4
TX-4	3	0.16	3
TX-7	1	0.05	1
TX-10C	3	0.16	3
TX-16	1	0.05	1
TX-23	2	0.11	2
TX-27	3	0.16	3
TX-28	1	0.05	1
Total	45	2.32	47
Areas Considered for Possible Exclusion			
TX-3 -NWR lands	5	0.26	5
TX-31 -NWR lands	1	0.05	1
Total	6	0.52	6
Sources: Texas Railroad Commission, GIS Data, Oil and Gas Well Records, Oil and Gas Survey Records, and API data for Aransas, Brazoria, Cameron, Calhoun, Matagorda, Nueces, Kenedy, Kleberg and Willacy counties, provided to IEC on August 28, 2008.			

3.6.4 PROJECTED FUTURE COSTS WITHIN PROPOSED CRITICAL HABITAT UNITS, BASELINE AND INCREMENTAL

97. Anticipated costs to conduct conservation efforts for piping plovers on a per-survey and per-well basis are described above in Section 3.6.1. Section 3.6.3 presents the number of anticipated future survey and drilling actions in each critical habitat unit over the next 20 years. These are assumed to be distributed evenly over the timeframe for this analysis. This section of the analysis combines these estimates to arrive at a total cost associated with project modifications for each unit in the study area. These estimates are then combined with projected administrative costs, which are assumed to continue at a constant rate from past rates, to arrive at an estimate of total anticipated costs related to the oil and gas industry per critical habitat unit. These costs are summarized in Exhibits 3-11 and 3-12.

**EXHIBIT 3-11 POST-DESIGNATION BASELINE IMPACTS TO OIL AND GAS ACTIVITIES
(2008-2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)**

CHD UNIT	PRESENT VALUE BASELINE IMPACTS	
	LOW	HIGH
TX-3A*	\$153,000	\$859,000
TX-3B*	\$1,240	\$703
TX-3C*	\$1,240	\$703
TX-3D*	\$1,240	\$703
TX-3E*	\$1,240	\$703
TX-4*	\$0	\$0
TX-7	\$179,000	\$930,000
TX-8	\$55,700	\$144,000
TX-9	\$1,730	\$981
TX-10A	\$55,200	\$143,000
TX-10B	\$1,730	\$981
TX-10C	\$1,730	\$981
TX-14	\$0	\$0
TX-15	\$26,800	\$71,200
TX-16*	\$155,000	\$861,000
TX-18*	\$29,900	\$72,900
TX-19*	\$26,800	\$71,200
TX-22	\$55,600	\$144,000
TX-23	\$279,000	\$1,650,000
TX-27	\$2,070	\$1,170
TX-28	\$0	\$0
TX-31*	\$0	\$0
TX-32	\$53,500	\$142,000
TX-33	\$0	\$0
UNKNOWN	\$110,000	\$62,500
Subtotal	\$1,190,000	\$5,160,000
Areas Considered For Possible Exclusion		
TX-3 -NWR lands	\$0	\$0
TX-4 -NWR lands	\$0	\$0
TX-16 -NWR lands	\$53,500	\$142,000
TX-18 -NWR lands	\$53,500	\$142,000
TX-19 -NWR lands	\$26,800	\$71,200
TX-31 -NWR lands	\$0	\$0
Subtotal	\$134,000	\$356,000
Total	\$1,330,000	\$5,510,000
Annualized	\$125,000	\$520,000
*Area considered excludes those areas considered for possible exclusion from the final rule. Note: Totals may not sum due to rounding.		

**EXHIBIT 3-12 INCREMENTAL IMPACTS TO OIL AND GAS ACTIVITIES
(2008-2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)**

CHD UNIT	PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH
TX-3A	\$114,000	\$1,000,000
TX-3B	\$1,250,000	\$11,000,000
TX-3C	\$1,930,000	\$17,000,000
TX-3D	\$235	\$235
TX-3E	\$454,000	\$4,000,000
TX-4	\$340,000	\$3,000,000
TX-7	\$113,000	\$1,000,000
TX-8	\$419	\$419
TX-9	\$327	\$327
TX-10A	\$327	\$327
TX-10B	\$327	\$327
TX-10C	\$340,000	\$3,000,000
TX-14	\$0	\$0
TX-15	\$0	\$0
TX-16	\$114,000	\$1,000,000
TX-18	\$587	\$587
TX-19	\$0	\$0
TX-22	\$391	\$391
TX-23	\$227,000	\$2,000,000
TX-27	\$341,000	\$3,000,000
TX-28	\$113,000	\$1,000,000
TX-31	\$0	\$0
TX-32	\$0	\$0
TX-33	\$0	\$0
UNKNOWN	\$20,900	\$20,900
Subtotal	\$5,350,000	\$47,000,000
Areas Considered For Possible Exclusion		
TX-3 -NWR lands	\$567,000	\$5,000,000
TX-4 -NWR lands	\$0	\$0
TX-16 -NWR lands	\$0	\$0
TX-18 -NWR lands	\$0	\$0
TX-19 -NWR lands	\$0	\$0
TX-31 -NWR lands	\$113,000	\$1,000,000
Subtotal	\$680,000	\$6,000,000
Total	\$6,030,000	\$53,000,000
Annualized	\$570,000	\$5,010,000

CHAPTER 4 | POTENTIAL ECONOMIC IMPACTS TO RESIDENTIAL AND COMMERCIAL DEVELOPMENT ACTIVITIES

4.1 INTRODUCTION

98. The Proposed Rule identifies human, vehicle and domestic animal disturbance, and predation as threats to the piping plover in the study area. Residential and commercial development attracts people to an area, increasing the level of all of these threats. Humans, vehicles and domestic animals may cause piping plovers to flush or disrupt their normal feeding or roosting times and cause excessive alertness or abandonment of the area. Predation rates on piping plovers may increase because human activities attract predators, thereby increasing their numbers. Habitat can also be modified or lost by pedestrian use, off-road vehicle use, and domestic animals.⁵⁴
99. This chapter describes how activities to protect the piping plover and its habitat may affect residential and commercial development in the study area. First, it provides a summary of the results of the analysis. Background information describing areas experiencing development pressure and likely conservation actions follows. The subsequent two sections present the detailed analysis of pre-designation and post-designation baseline impacts. The chapter concludes with quantification of the incremental impacts resulting solely from the designation.

4.1.1 SUMMARY OF IMPACTS

100. Exhibit 4-1 summarizes post-designation impacts to development-related activities. The baseline costs of limiting the effects of residential and commercial development activities on the piping plover over the next 20 years are estimated to range from \$26,600 to \$7,430,000 (discounted at seven percent). The cost range results from the assumption that, in the high-end scenario, all future development projects will undertake conservation efforts for the plover, while at the low-end no future development projects are undertaken. These costs are primarily associated with litter control, monitoring, and exclusion fencing. Unit TX-8 has the highest baseline costs of all proposed units. The incremental costs over the next 20 years are estimated to range from \$8,880 to \$296,000 (discounted at seven percent). These costs are associated with section 7 consultation administrative costs. Unit TX-8 has the highest incremental costs of all proposed units.

⁵⁴ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (*Charadrius melodus*) in Texas; Proposed Rule, 50 CFR Part 17, May 20, 2008.

EXHIBIT 4-1 SUMMARY OF IMPACTS OF PIPING PLOVER CRITICAL HABITAT DESIGNATION ON DEVELOPMENT-RELATED ACTIVITIES (SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
TX-3A	\$111	\$1,590,000	\$37	\$62,100
TX-3B	\$111	\$85,100	\$37	\$3,350
TX-3C	\$111	\$111	\$37	\$37
TX-3D	\$111	\$584,000	\$37	\$22,800
TX-3E	\$111	\$111	\$37	\$37
TX-7	\$7,390	\$631,000	\$2,460	\$24,600
TX-8	\$3,510	\$3,150,000	\$1,170	\$124,000
TX-10C	\$0	\$977,000	\$0	\$38,100
TX-14	\$0	\$389,000	\$0	\$15,200
Unknown	\$15,200	\$15,200	\$5,060	\$5,060
Total	\$26,600	\$7,430,000	\$8,880	\$296,000
Annualized	\$2,510	\$701,000	\$839	\$27,900

Note: Totals may not sum due to rounding.

4.2 LIKELIHOOD OF DEVELOPMENT AND POTENTIAL PROJECT MODIFICATIONS

101. This section begins by explaining the reasons why residential and commercial development is unlikely to occur within the study area. Lands adjacent to the study area, however, may be susceptible to development pressure as identified in this section. The section also reviews historical section 7 consultations and information provided by the Service to identify a set of project modifications likely to be recommended in order to avoid adversely affecting the bird and/or its habitat. The section concludes with a discussion of the costs associated with these project modifications.

4.2.1 LIKELIHOOD OF DEVELOPMENT WITHIN CRITICAL HABITAT

102. Generally, residential and commercial development is not likely within the bounds of the study area due to: a) the physical nature of the units; b) Texas law prohibiting development on beaches; c) a unit's location with a NWR managed by the Service; and/or d) current private landowners' desire to develop his or her property. More detail about these reasons follows.

- **Physical nature of the units.** Habitats used by the wintering plover “are found in geologically dynamic coastal areas that support intertidal beaches and flats (between annual low tide and annual high tide) and associated dune systems and flats above annual high tide.”⁵⁵ Dynamic coastal areas such as these are generally more expensive to develop given unstable topography and risk of flooding.

⁵⁵ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (*Charadrius melodus*) in Texas; Proposed Rule, 50 CFR Part 17, May 20, 2008.

- **Texas law prohibiting beach development.** The Texas Open Beaches Act, which guarantees public access to beaches along the Texas Coast, restricts any development of permanent structures (excluding erosion control measures) seaward of the vegetation line. Furthermore, the Dune Protection Act prohibits constructing housing units seaward of the vegetation line. These two acts will likely prohibit development within the bounds of much of the proposed critical habitat area.
 - **Units in NWR.** A large portion of proposed critical habitat units TX-3A, TX-3B, TX-4, TX-19, and TX-31 are located within a NWR that provides additional protection against development.
 - **Privately-owned units unlikely to develop.** Units TX-15, TX-16, and TX-18 are located on privately-owned San Jose Island. “San Jose Island is a pristine and geographically isolated barrier island that has been under private ownership for generations. The property on the island is used for private recreational purposes and cattle ranching with no commercial development and limited public access.”⁵⁶ For these reasons development in units TX-15, TX-16, and TX-18 is unlikely.
103. For the reasons listed above development is unlikely to occur within the bounds of critical habitat; however, development may occur in lands adjacent to the critical habitat units. The influx of people and activity associated with development projects on adjacent land may threaten the piping plover.

4.2.2 ADJACENT LANDS SUSCEPTABLE TO DEVELOPMENT

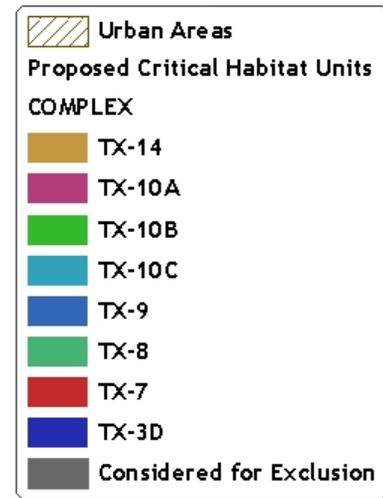
104. Units close to urban areas are more likely to experience development pressure on their adjacent lands. Exhibit 4-2 shows the units that fall in or close to urban areas, specifically the Cities of Corpus Christi and Port Aransas and the Town of South Padre Island. The units not included in this map are located far from urban areas, generally in areas with limited or no road access, and are not expected to experience developmental pressure during the time frame of this analysis.

⁵⁶ Kelly Hart & Hallman LLP. Submitted Public Comments, Subject: Comments on the USFWS Piping Plover Designation of Critical Habitat in Texas. July 17, 2008.

EXHIBIT 4-2 PROPOSED CRITICAL HABITAT UNITS AND ADJACENT URBAN AREAS



Proposed Critical Habitat Units for Wintering Piping Plover and Adjacent Urban Areas: Map 1



0 30 60 120 Miles

IEC



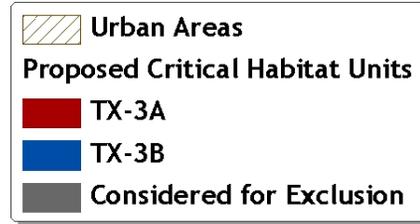
INDUSTRIAL ECONOMICS, INCORPORATED

Source:
 1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



Source:
1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA

Proposed Critical Habitat Units for Wintering Piping Plover and Adjacent Urban Areas: Map 2



105. Exhibit 4-2 shows that TX-3D, TX-7, TX-8, TX-9, TX-10A, TX-10B, TX-10C, and TX-14 fall close to or within the Corpus Christ/Port Aransas urban area.
- Almost all of the land surrounding unit **TX-9** falls within Mustang Island State Park and access is limited by a lack of roads. Therefore, the lands adjacent to TX-9 are unlikely to be developed.
 - Unit **TX-10A** located on an island with no road access. Adjacent lands on this island are unlikely to develop due to their isolated location.
 - Unit **TX-10B** is surrounded by water and unit TX-10C. Since land within the critical habitat units is unlikely to develop, the land surrounding TX-10B is unlikely to develop.
 - The lands adjacent to the remainder of the units within the Corpus Christi/Port Aransas urban area are considered to be potentially threatened by residential or commercial development over the next 20 years. These include **TX-3D, TX-7, TX-8, TX-10C, and TX-14.**
106. Exhibit 4-2 also shows that the southern ends of **TX-3A** and **TX-3B** fall close to the Town of South Padre Island urban area. The lands adjacent to TX-3A and TX-3B that have road access via Ocean Boulevard are likely to be developed. Adjacent lands north of the road's end are unlikely to be developed.
107. In summary, the lands adjacent to units TX-3D, TX-7, TX-8, TX-10C, TX-14, and the southern end of units TX-3A and TX-3B are most likely to be threatened by residential and commercial development. The remainder of this chapter focuses on development in these areas.

4.2.3 TYPICAL PROJECT MODIFICATIONS FOR DEVELOPMENT PROJECTS

108. The Service has conducted 15 consultations related to development projects since the listing of the species in 1985. Three of these consultations have been formal consultations with the USACE related to section 404 permits for construction activities.^{57,58,59} Exhibit 4-3 summarizes these formal consultations.

⁵⁷ U.S. Fish and Wildlife Service. "Biological Opinion on Bank of Brownsville Marina Project." Formal Consultation # 2-11-92-F-010, with U.S. Army Corps of Engineers. May 23, 1994.

⁵⁸ U.S. Fish and Wildlife Service. "Biological Opinion on The Village Development." Formal Consultation # 2-11-95-F-031, with U.S. Army Corps of Engineers. April 25, 1996.

⁵⁹ U.S. Fish and Wildlife Service. "Biological Opinion on Gary Meschi Development." Formal Consultation # 2-11-97-F-0146R1, with U.S. Army Corps of Engineers. August 31, 2005.

EXHIBIT 4-3 SUMMARY OF PAST DEVELOPMENT-RELATED FORMAL CONSULTATIONS

FEDERAL AGENCY	DEVELOPER	PROJECT TYPE	LOCATION	IN CRITICAL HABITAT PROPOSED FOR REDESIGNATION?	NEAREST PROPOSED CRITICAL HABITAT UNIT(S)	CONSULTATION DATE
US Army Corps of Engineers	International Bank of Brownsville	Marina with condominium complex	South Padre Island, Cameron County	No	TX-3A, TX-3B (in TX-2)	May, 1994
US Army Corps of Engineers	Texas General Land Office	Development known as "The Village"	Padre Island at Corpus Christi, Nueces County	Yes	TX-7	April, 1996
US Army Corps of Engineers	Gary Meschi	Retail center and restaurant	South Padre Island, Cameron County	No	TX-3A, TX-3B (in TX-2)	August, 2005

109. The Service recommended a variety of project modifications for protection of the piping plover and its habitat as part of its three past formal consultations. Exhibit 4-4 summarizes these modifications. As shown, these modifications have not involved redesign of proposed development plans.

EXHIBIT 4-4 PROJECT MODIFICATIONS REQUESTED BY THE SERVICE FOR AVOIDING AND MINIMIZING DEVELOPMENT-RELATED IMPACTS FOR PIPING PLOVER IN TEXAS

PROJECT MODIFICATIONS
<ul style="list-style-type: none"> • Avoid planting vegetation in sand flats, mudflats, algal flats, and similar piping plover habitat • Leashing rules for pets • Vermin-proof garbage containers • Keep project premises free of trash and debris • Construct exterior lights as to direct illumination away from flats • Monitor and survey project area for plover, roosting sites, and feeding sites • Public record of all piping plover habitat lost due to actions authorized by USACE • GLO coordination of dredging and filling activities with the Service to avoid peak plover use • Exclusion fencing around developments • Control storm water runoff • Annual report of accomplishments towards reasonable and prudent measures and terms and conditions set forth by the Service

110. In addition to reviewing the consultation history, the Service was also consulted to determine whether future project modifications may be different from those recommended in the past. On August 27, 2008, the Ecological Services Field Office in Corpus Christi issued a memorandum providing guidance on consultations for piping plovers in critical habitat.⁶⁰ That memorandum does not specifically address residential and commercial development projects. Furthermore, the project modifications recommended relate to activities taking place within the units (i.e., on the beach and tidal flats), rather than adjacent to them. Therefore, this analysis assumes that recommended modifications to future development projects threatening the piping plover and/or its habitat will be similar to those requested in past consultations. Because future modifications are expected to be the same as those recommended in the past, this analysis assumes that all costs associated with these modifications are incurred in the baseline.
111. Exhibit 4-5 presents the annual estimated costs associated with each project modification listed in Exhibit 4-4. Most estimates were obtained by reviewing the costs of similar modifications to protect the Alabama, Choctawhatchee, Perdido Key, and St. Andrew beach mice. Project modification costs specific to the piping plover are not readily available because none of the projects described in Exhibit 4-3 were undertaken. The Bank of Brownsville marina was never constructed for reasons unknown, but unlikely to be related to plover.⁶¹ The GLO intended to get the permit for “The Village” development and then lease it to a developer, but ultimately withdrew its application.⁶² The Meschi retail center ended up in a denial of the permit by the USACE for reasons unrelated to the plover⁶³. Items marked as “not quantified” in Exhibit 4-5 were not quantified due to insufficient information or because no monetary impact is anticipated (i.e., implementation of the modification is not anticipated to result in additional costs).

⁶⁰ U.S. Fish and Wildlife Service. “Guidance on Consultations for Piping Plover and Piping Plover Critical Habitat.” Corpus Christi Ecological Services Field Office, August 27, 2009.

⁶¹ Regan Richter at the USACE could find no record for this permit application, but an examination of the development location on Google Earth shows no permanent structure in the area.

⁶² Personal Communication. R. Richter, USACE. September 4, 2008.

⁶³ Personal Communication. R. Richter, USACE. August 26, 2008.

EXHIBIT 4-5 PER MODIFICATION ANNUAL COSTS

MODIFICATION	ANNUAL COST PER ACRE
Leashing rules for pets	Modest
Vermin-proof garbage containers ^{a,b}	\$980
Exclusion fencing ^c	\$262
Monitoring ^d	\$300-\$500
Annual Report ^e	\$460
Avoid planting vegetation in flats habitat	Not quantified
Keep project premises free of trash and debris	Not quantified
Direct lighting away from flats	Not quantified
Record of habitat loss kept by USACE	Not quantified
Avoid dredge/fill activities during peak plover use	Not quantified
Control storm water runoff	Not quantified
Sources:	
^a Written communication from Terry Boyd, Chief of Engineering Section, ADCNR, April 26, 2006.	
^b U.S. Fish and Wildlife Service. "Biological Opinion for Issuance of an Incidental Take Permit Section 10 (a)(1)(B), The Villages at Seagrove and Camp Creek, St. Joe Company, Walton County, Florida," March 23, 2000.	
^c Written communication from Terry Boyd, Chief of Engineering Section, ADCNR, April 26, 2006.	
^d Personal Communication. L. Sherrod, Horizon Environmental Services. September 4, 2008.	
^e U.S. Fish and Wildlife Service. "Biological Opinion for Issuance of an Incidental Take Permit Section 10 (a)(1)(B), The Villages at Seagrove and Camp Creek, St. Joe Company, Walton County, Florida," March 23, 2000.	

4.3 PRE-DESIGNATION IMPACTS (1985 - 2007)

112. The pre-designation period for this analysis extends from the listing of the species in 1985 to 2007. Of the 15 consultations mentioned above, one formal consultation (for "The Village"), five informal consultations, and three technical assistance discussions were initiated for projects located within the study area. The administrative costs of these efforts are included in Exhibit 4-6. Because "The Village" project was never built, no project modification costs were incurred. Total pre-designation impacts are estimated to be \$76,144 (present value assuming a seven percent discount rate). More than half of these administrative costs are in "unknown" units. The location of these consultations/technical assistance discussions is not known by the Service; this analysis assumes that they fall within the study area. This assumption could result in an overstatement of the pre-designation economic impacts.

EXHIBIT 4-6 DEVELOPMENT-RELATED PRE-DESIGNATION ECONOMIC IMPACTS (2008 - 2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST	PRESENT VALUE COST
TX-3A	\$226	\$296
TX-3B	\$226	\$296
TX-3C	\$226	\$296
TX-3D	\$226	\$296
TX-3E	\$226	\$296
TX-7	\$15,000	\$36,100
TX-8	\$7,130	\$10,700
Unknown	\$30,800	\$71,600
Total		\$120,000
Note: Totals may not sum due to rounding.		

4.4 POST-DESIGNATION BASELINE IMPACTS (2008 - 2027)

113. This section discusses the future baseline impacts related to development activities. Two scenarios are considered: a high-end scenario in which all privately-owned land adjacent to units TX-3A, TX-3B, TX-3D, TX-7, TX-8, TX-10C, and TX-14 is developed and a low-end scenario in which there is no development within the study area and only administrative costs resulting from inquiries similar to those taking place in the past. This high/low scenario method is necessary because of a lack of available data on future development activity within the study area. The uncertainty about future development activity is highlighted by giving a range of possible scenarios.

4.4.1 HIGH-END SCENARIO

114. The high-end scenario assumes that all privately-owned land adjacent to units TX-3A, TX-3B, TX-3D, TX-7, TX-8, TX-10C, and TX-14 is developed. This scenario assumes that all development will undertake conservation efforts for the plover, either as part of a section 7 consultation where the USACE serves as the action agency, or as part of a habitat conservation plan (HCP) (though no HCPs have yet been developed for the plover).
115. Despite the fact that no development projects resulting in project modifications have occurred in the study area since designation some development in this area is anticipated over the next 20 years. A recent article in Money Magazine highlights North Padre and Mustang Islands as America's best beach values.⁶⁴ Another similar article in Kiplinger's

⁶⁴ Birger, J. "The Search for the Last Affordable Beach House." Money Magazine, June 1, 2005.
<http://money.cnn.com/magazines/moneymag/moneymag_archive/2005/06/01/8260950/index.htm>

Personal Finance Magazine lists Mustang Island as an area with affordable waterfront property.⁶⁵ These articles both indicate that development pressures on lands adjacent to the proposed critical habitat are likely to increase in the future.

116. This analysis assumes that, as has occurred previously during consultation on the plover, development scope and design will not be changed due to plover concerns. Instead, costs will be incurred related to project modifications that have been requested in the past. These costs are summarized in Exhibit 4-5.
117. Because predicting the precise number of future development projects is difficult, this analysis instead applies per-acre cost estimates uniformly to the developable lands under consideration. This analysis considers all privately-owned land within a 2,087-foot buffer of units TX-3D, TX-7, TX-8, TX-10C, and TX-14 likely to be developed within the time frame of the analysis.⁶⁶ Development on these lands has the potential to affect piping plovers and their habitat. The analysis also includes privately-owned lands within a 2,087 foot buffer of units TX-3A and TX-3B located south of the northern end of Ocean Boulevard on South Padre Island. Exhibit 4-7 depicts these developable lands.
118. The further out in time that the development project occurs, the lower the associated costs due to the time value of money. In order to avoid potentially biasing impact estimates in one unit relative to other, this analysis assumes that development in each unit begins in the next year (2009). While unrealistic, assuming that all development begins in next year enables unbiased cross-unit comparisons.
119. Costs for exclusion fencing and monitoring occur upfront at the start of a project. Specifically, for development projects, monitoring is more essential at the start of a project when land is being cleared and construction is beginning.⁶⁷ Thus it is assumed that these costs are incurred within the first year of a development project. Accomplishment reports of the reasonable and prudent measures and terms and conditions must be submitted annually to the Service beginning one year following the initiation of project construction and ending two years after completion of the project.⁶⁸ For purposes of this analysis it is assumed that an average project lasts two years and thus these costs are incurred annually for four years from the start of a project. Costs for litter management, including vermin-proof garbage containers are incurred annually from the start of a project over the time horizon of this analysis.

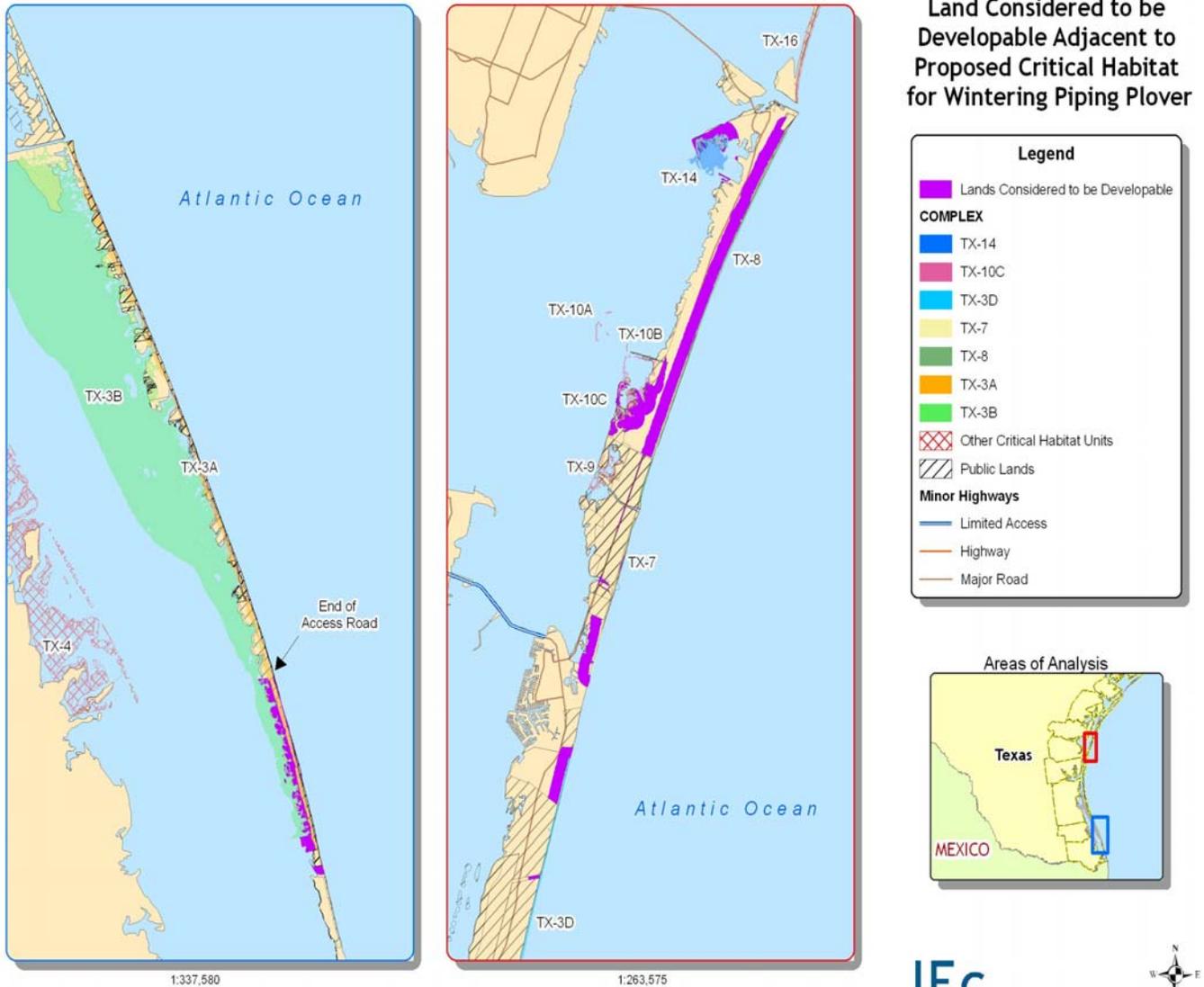
⁶⁵ Kosnett, J. "In Search of Paradise." Kiplinger's Personal Finance Magazine, August 2004.
<<http://www.kiplinger.com/magazine/archives/2004/08/property.html>>

⁶⁶ The buffer size was determined by assuming an average project size of 100 acres (Personal Communication. L. Sherrod, Horizon Environmental Services. September 4, 2008.). Assuming that the project site is square, one side of the lot would be approximately 2,087 feet.

⁶⁷ Personal Communication. L. Sherrod, Horizon Environmental Services. September 4, 2008.

⁶⁸ U.S. Fish and Wildlife Service. "Biological Opinion on Gary Meschi Development." Formal Consultation # 2-11-97-F-0146R1, with U.S. Army Corps of Engineers. August 31, 2005.

EXHIBIT 4-7 DEVELOPABLE LANDS ADJACENT TO PROPOSED CRITICAL HABITAT



Source:
 1. US Fish and Wildlife Service, Corpus Christi, Texas, USA
 2. Environmental Systems Research Institute, Inc. (ESRI), Redlands, California, USA



120. In addition to future baseline costs due to project modifications, project proponents, the action agency, and the Service incur administrative costs of section 7 consultations. Because no information is available to determine whether forecast projects will undertake a section 7 consultation or an HCP, this analysis assumes that all projects complete section 7 consultations. The direction of bias imposed by this assumption is unclear. If some projects rely on HCPs to address piping plover concerns, then those involved will incur administrative costs associated with preparing and reviewing the HCPs. Whether the preparation of an HCP will more be more or less costly than undergoing the section 7 process is unknown. Assuming a Federal nexus is present; developers may prefer the section 7 consultation route to completing an HCP because Service regulations define a timeline for completion of a section 7 consultation.⁶⁹ No such timeline exists for HCPs. The administrative costs of addressing the jeopardy standard are assigned to the baseline. Additional costs associated with addressing the adverse modification standard are included in the next section.
121. In the high-end scenario it is assumed that all new development projects will undertake a formal consultation in the year development begins (2009). The number of projects was arrived at by dividing the amount of developable land per unit by a 100-acre average project size.⁷⁰ In addition, informal consultations and technical assistance discussions are assumed to continue following pre-designation rates.

4.4.2 LOW-END SCENARIO

122. The low-end scenario assumes that there are no new development projects within the study area. This scenario assumes that what has happened in the pre-designation time period is an indicator of what may happen in the future with respect to development near the study area. The Service will continue to consult on projects, but no projects will actually be constructed and thus, there will be no project modification costs. There will be administrative costs for formal consultation, informal consultations, and technical assistance discussions. These consultations are forecast to occur at the pre-designation rates.

4.4.3 HIGH- AND LOW-END SCENARIO BASELINE IMPACTS

123. Exhibit 4-8 summarizes the post-designation baseline impacts for the high- and low-end scenarios. The findings for the high-end scenario are largely based on the number of developable acres within each unit. The impacts to unit TX-8 in the high-end scenario are high due to the 2,632 developable acres. When looking at these results emphasis should be placed on the fact that the high-end scenario is indeed a high-cost estimate. The high-end scenario makes many assumptions that likely lead to an overstatement of future impacts. A few key assumptions/methodological decisions that lead to an overstatement of the impacts include:

⁶⁹ U.S. Fish and Wildlife Service and National Marine Fisheries Service. "Endangered Species Act Consultation Handbook: Procedures for Conducting Section 7 Consultations and Conferences." March 1998.

⁷⁰ Personal Communication. L. Sherrod, Horizon Environmental Services. September 4, 2008.

- The assumption of full build-out over the next 20 years;
- The assumption that all development in 2009; and
- The assumption that all development in the study area must undertake section 7 consultation.

Actual impacts are likely to lie somewhere between the low- and high-end scenarios. No additional information about the relative probability of either scenario is available.

EXHIBIT 4-8 POST-DESIGNATION BASELINE IMPACTS PER UNIT (2008 - 2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	DEVELOPABLE ACRES	LOW-END SCENARIO			HIGH-END SCENARIO		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	1329	\$197	\$111	\$11	\$2,200,000	\$1,590,000	\$150,000
TX-3B	71	\$197	\$111	\$11	\$117,000	\$85,100	\$8,030
TX-3C	0	\$197	\$111	\$11	\$197	\$111	\$11
TX-3D	488	\$197	\$111	\$11	\$806,000	\$584,000	\$55,100
TX-3E	0	\$197	\$111	\$11	\$197	\$111	\$11
TX-7	527	\$13,000	\$7,390	\$698	\$870,000	\$631,000	\$59,500
TX-8	2632	\$6,200	\$3,510	\$332	\$4,350,000	\$3,150,000	\$298,000
TX-10C	816	\$0	\$0	\$0	\$1,350,000	\$977,000	\$92,200
TX-14	325	\$0	\$0	\$0	\$537,000	\$389,000	\$36,700
Unknown	0	\$26,800	\$15,200	\$1,430	\$26,800	\$15,200	\$1,430
Total	6188		\$26,600	\$2,510		\$7,430,000	\$701,000

Note: Totals may not sum due to rounding.

4.5 INCREMENTAL IMPACTS (2008 - 2027)

124. The only incremental cost for both the high- and low-end scenarios is a portion of the future administrative costs required to address adverse modification in the section 7 consultation. Exhibit 4-9 presents these incremental impacts. The difference in the incremental impact between the two scenarios is driven by the larger number of formal consultations in the high-end scenario (following the above stated assumption that all new development projects will undertake a formal consultation in the high-end scenario).

EXHIBIT 4-9 INCREMENTAL IMPACTS PER UNIT (2008 - 2027, 2008 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW-END SCENARIO			HIGH-END SCENARIO		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	\$65	\$37	\$3	\$66,500	\$62,100	\$5,870
TX-3B	\$65	\$37	\$3	\$3,620	\$3,350	\$317
TX-3C	\$65	\$37	\$3	\$65	\$37	\$3
TX-3D	\$65	\$37	\$3	\$24,500	\$22,800	\$2,160
TX-3E	\$65	\$37	\$3	\$65	\$37	\$3
TX-7	\$4,350	\$2,460	\$233	\$26,400	\$24,600	\$2,320
TX-8	\$2,070	\$1,170	\$111	\$134,000	\$124,000	\$11,700
TX-10C	\$0	\$0	\$0	\$40,800	\$38,100	\$3,600
TX-14	\$0	\$0	\$0	\$16,300	\$15,200	\$1,430
Unknown	\$8,930	\$5,060	\$478	\$8,930	\$5,060	\$478
Total		\$8,880	\$839		\$296,000	\$27,900

Note: Totals may not sum due to rounding.

CHAPTER 5 | POTENTIAL ECONOMIC IMPACTS TO RECREATION ACTIVITIES

5.1 INTRODUCTION

125. According to the Proposed Rule, recreational activities commonly occurring on beaches, such as walking along the beach, flying kites, and shooting fireworks, may flush birds or disrupt normal feeding or roosting times, causing excessive alertness or abandonment of the area, and may attract piping plover predators to an area.⁷¹ Furthermore, foraging and roosting may be disrupted by vehicles driven on the beach and unleashed pets.⁷² Uncontrolled recreational use of piping plover habitat is identified as a threat in all but three of the proposed critical habitat units. In the remaining units, the Service identifies pedestrian recreational access and use as a threat.
126. Recreational use and enjoyment of beaches are often supported by beach stabilization efforts (e.g., beach nourishment, beach maintenance, sediment dredging and disposal, inlet channelization, and construction of jetties and other hard structures), which may also threaten the piping plover. These activities may prevent the natural transfer, erosion, and accretion of sediments along the shoreline resulting in habitat modification and loss.⁷³ The Service believes beach stabilization efforts pose a threat in units TX-3A, TX-3D, TX-7, TX-8, TX-10B, TX-10C, TX-15, and TX-18.
127. The Service is unlikely to recommend plover conservation efforts with respect to on going and forecast recreation activities. The Texas Open Beaches Act places land between mean low tide and the vegetation line or 200 feet landward (whichever is smaller) within the public trust, thereby guaranteeing the public's right of free and unrestricted access to beaches along the Texas coast.⁷⁴ The protection of recreation afforded by this law makes it unlikely that the Service or other entities will restrict recreational use in the foreseeable future. Furthermore, history also supports the assumption that recreational use of the beaches will continue unimpeded. Specifically, critical habitat for the piping plover was in place in Texas between 2001 and 2006, and

⁷¹ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (*Charadrius melodus*) in Texas; Proposed Rule, 50 CFR Part 17, May 20, 2008, p. 29299.

⁷² U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (*Charadrius melodus*) in Texas; Proposed Rule, 50 CFR Part 17, May 20, 2008, p. 29299.

⁷³ U.S. Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Wintering Population of the Piping Plover (*Charadrius melodus*) in Texas; Proposed Rule, 50 CFR Part 17, May 20, 2008.

⁷⁴ Texas Statutes, Natural Resources Code. Chapter 61, Use and Maintenance of Public Beaches.

continues to exist in a number of locations, and recreational use of the habitat has not been affected.

128. On the other hand, historically, the Service has consulted on beach maintenance, beach protection/renourishment, and shoreline protection projects. These projects generally require a permit from the USACE, resulting in a Federal nexus requiring section 7 consultation. In particular, one recent beach maintenance project has reached the status of a formal consultation. In this instance, the Service has requested project modifications to minimize the level of threat associated with beach maintenance and afford protection to the species and its habitat.
129. This chapter describes how activities to protect the piping plover and its habitat may affect recreation in the currently proposed critical habitat area. In this analysis, recreation-related impacts are only expected on beaches that the USACE indicates have or will be seeking permits for beach maintenance activities. These include beaches in close proximity to Corpus Christi (TX-3D, TX-7, and TX-8), Port Aransas (TX-8), and Cameron County (TX-3A).

5.1.1 SUMMARY OF IMPACTS

130. Exhibit 5-1 summarizes post-designation impacts to recreation-related activities. The baseline costs of limiting the effects of recreation activities on the piping plover over the next 20 years are estimated to range from \$309,000 to \$422,000 (present value using a seven percent discount rate). These costs are primarily associated with staff training to identify the piping plover and annual plover monitoring reports. Unit TX-8 has the highest baseline costs of all proposed units. The incremental costs over the next 20 years are estimated to range from \$231,000 to \$344,000 (present value using a seven percent discount rate). These costs are primarily associated with the additional effort to train staff to identify piping plover habitat and incorporate habitat into annual plover monitoring reports. Unit TX-8 also has the highest incremental costs of all proposed units.

EXHIBIT 5-1 SUMMARY OF FUTURE IMPACTS OF PIPING PLOVER CRITICAL HABITAT DESIGNATION ON RECREATION-RELATED ACTIVITIES (2008 - 2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
TX-3A	\$98,200	\$135,000	\$74,000	\$111,000
TX-3B	\$78	\$78	\$26	\$26
TX-3C	\$78	\$78	\$26	\$26
TX-3D	\$28,400	\$37,500	\$19,800	\$28,900
TX-3E	\$78	\$78	\$26	\$26
TX-7	\$29,900	\$39,900	\$21,300	\$31,200
TX-8	\$147,000	\$205,000	\$114,000	\$172,000
TX-31	\$184	\$184	\$61	\$61
TX-32	\$184	\$184	\$61	\$61
TX-33	\$3,700	\$3,700	\$1,230	\$1,230
Unknown	\$557	\$557	\$185	\$185
Total	\$309,000	\$422,000	\$231,000	\$344,000
Annualized	\$29,100	\$39,800	\$21,800	\$32,500

Note: Totals may not sum due to rounding.

5.2 LOCATION OF AFFECTED BEACHES AND LIKELY PROJECT MODIFICATIONS

131. In order to estimate future baseline and incremental costs, two pieces of information are required. First, the analysis identifies past and anticipated future projects that might be affected by efforts to conserve the piping plover and its habitat. Then, information about the types of conservation activities likely to be implemented is obtained from the Service. Both steps are discussed in greater detail below.

5.2.1 LOCATION OF PAST AND FUTURE BEACH MAINTENANCE PROJECTS

132. Since 1985, the Service has conducted three consultations related to beach maintenance, ten consultations related to beach protection/renourishment, and one consultation related to shoreline protection. These efforts include formal and informal section 7 consultations and technical assistance provided by the Service for projects not requiring consultation under the Act. Only five of these consultations, one informal consultation and four technical assistance discussions, were initiated for projects located within the study area.

133. In the past, municipalities have undertaken beach maintenance activities including removal of non-natural materials, removal of sargassum or seaweed, and repositioning sand without a permit from the USACE. Thus, the Service has not previously consulted on such activities. However, USACE has recently begun requiring permits for this type

of work and has stated that it will continue to do so in the future.⁷⁵ For example, beach maintenance has been carried out by the City of Corpus Christi since 2002 without a permit, however the city is currently engaged in a section 7 consultation with the USACE and the Service on its planned future maintenance activities.

134. As the permitting authority for beach maintenance, protection, and nourishment projects, the USACE represents the best available source of information about current and future projects. The USACE identifies three future beach maintenance projects located within the study area.^{76,77} Exhibit 5-2 summarizes these expected projects, which are all at different stages in the permitting process. The City of Corpus Christi has entered into consultation with the Service and the Service issued a draft biological opinion on August 7, 2008. The USACE has received a permit application from the City of Port Aransas and expects to receive a permit application from Cameron County.⁷⁸

EXHIBIT 5-2 EXPECTED BEACH MAINTENANCE PROJECTS

PERMIT APPLICANT	UNITS AFFECTED BY PROJECT	YEAR PROJECT EXPECTED TO BEGIN
City of Corpus Christi	TX-3D, TX-7, TX-8	2008
City of Port Aransas	TX-8	2009
Cameron County	TX-3A	2009

5.2.2 TYPICAL PROJECT MODIFICATIONS FOR BEACH MAINTENANCE PROJECTS IN PROPOSED CRITICAL HABITAT

135. Only one consultation conducted by the Service has reached the level of a formal consultation and included recommended project modifications. The City of Corpus Christi has proposed to undertake beach maintenance and cleaning activities on Mustang Island, which overlaps with Units TX-3D, TX-7, and TX-8.⁷⁹ In August 2008, the Service issued a draft biological opinion recommending the project modifications summarized in Exhibit 5-3.⁸⁰

⁷⁵ U.S. Fish and Wildlife Service. "Draft Biological Opinion on City of Corpus Christi Beach Maintenance." Formal Consultation # 21410-2006-F-0265, with U.S. Army Corps of Engineers. August 7, 2008.

⁷⁶ The USACE also anticipates a permit request from the Town of South Padre Island, but the project falls outside of the study area. (Personal Communication. R. Richter, USACE. August 26, 2008.)

⁷⁷ The Service is currently consulting with USACE regarding a beach renourishment project on the upper-Texas coast, and recent inquiries have been made into permits for beach cleaning near Surfside Beach. However, these areas are outside of the study area. (Personal Communication. J. Butello, USACE Permitting. September 9, 2008.)

⁷⁸ Personal Communication. R. Richter, USACE. August 11, 2008.

⁷⁹ U.S. Fish and Wildlife Service. "Draft Biological Opinion on City of Corpus Christi Beach Maintenance." Formal Consultation # 21410-2006-F-0265, with U.S. Army Corps of Engineers. August 7, 2008.

⁸⁰ The Service lists project modifications for the piping plover and the sea turtles in their biological opinion. Conversations with the Service have determined which project modifications listed for the sea turtles would also have been called for if only plover were present. (Personal Communication. D. Whitehead, USFWS. August 26, 2008 and September 10, 2008.)

EXHIBIT 5-3 PROJECT MODIFICATIONS REQUESTED BY THE SERVICE FOR AVOIDING AND MINIMIZING RECREATION-RELATED IMPACTS FOR PIPING PLOVER IN TEXAS

PROJECT MODIFICATIONS
<ul style="list-style-type: none"> • Annual training of beach cleaning staff to identify plover and its habitat • Habitat monitoring accompanied by an annual report to the USACE • Smooth ruts and berms left by machinery • Avoid maintenance work in foredune area after 2 p.m. • Specifications for size and placement of driving lanes • Drive equipment above “wet line”

136. The City of Corpus Christi consultation began after the critical habitat was proposed and thus, the consultation considers both the potential for the project to jeopardize the continued existence of the species and adversely modify critical habitat. It is difficult to determine which of these project modifications may be due solely to critical habitat. Therefore, a memorandum from the Service providing guidance for piping plover consultations in Texas and subsequent email correspondence are used to determine which project modifications would not have been requested absent the proposed designation.⁸¹
137. The Service indicates that project modifications related to driving through the habitat would also be recommended for avoiding jeopardy to the species.⁸² Therefore, the analysis assumes that the costs of smoothing ruts and berms left by machinery, avoiding maintenance work in the foredune area after 2 pm, altering size and placement of driving lanes, and driving equipment above the “wet line” are incurred in the baseline. Annual training of staff and habitat monitoring/annual reporting would likely also be required in the baseline, however additional effort may be required to address habitat concerns. Therefore, the analysis assumes that half of these costs would be incurred regardless of the designation of critical habitat, and the other half represent incremental costs.
138. Exhibit 5-4 presents the annual estimated costs associated with project modifications listed in Exhibit 5-3. These cost estimates are provided by the City of Corpus Christi.⁸³ For items marked as “not quantified,” insufficient cost information is available or no monetary impact is anticipated (i.e., implementation of the modification is not anticipated to result in additional costs). If a project takes place over multiple units, costs are divided proportionally over the units based on their size.

⁸¹ U.S. Fish and Wildlife Service. “Guidance on Consultations for Piping Plover and Piping Plover Critical Habitat.” Corpus Christi Ecological Services Field Office, August 27, 2008.

⁸² Written communication with Service biologist. Corpus Christi Ecological Services Field Office, September 3, 2008.

⁸³ Personal Communication. M. Thomas, City of Corpus Christi. September 3, 2008 and September 10, 2008.

EXHIBIT 5-4 ESTIMATED COSTS ASSOCIATED WITH BEACH MAINTENANCE PROJECT MODIFICATIONS

MODIFICATION	COST PER PROJECT
Staff training	\$1,844-\$5,531
Monitoring	Modest
Annual monitoring report	\$10,140-\$13,520
Smoothing ruts and berms	Modest
Avoid work after 2 p.m.	Not quantified
Specifications for driving lanes	Not quantified
Drive equipment above "wet line"	Not quantified
<p>Sources:</p> <p>1. Personal Communication. M. Thomas, City of Corpus Christi. September 3, 2008 and September 10, 2008.</p> <p>2. U.S. Office of Personnel Management. 2008 General Schedule (GS) Locality Pay Tables. Accessed September 2008. <http://www.opm.gov/oca/08tables/indexGS.asp></p> <p>Note: Staff training cost based on an estimate of 20 to 30 workers being trained for two to four hours at an average salary equivalent to that of a Houston-Baytown-Huntsville, TX locality payment GS Level-5 with 150 percent overhead. Monitoring report cost based on an estimate of three to four workers working 40 hours at an average salary equivalent to that of a Houston-Baytown-Huntsville, TX locality payment GS Level-11 with 150 percent overhead.</p>	

5.3 PRE-DESIGNATION IMPACTS (1985 - 2007)

139. The pre-designation period for this analysis extends from the listing of the species in 1985 to 2007. Since there were no recreation-related formal consultations during this time period there are no associated project modification impacts (the formal consultation discussed above was conducted in August 2008, after the Proposed Rule was published). However, of the 14 consultations mentioned above, one informal consultation and four technical assistance discussions were initiated for projects located within the study area. The administrative costs of these efforts are included in Exhibit 5-5.⁸⁴ Total pre-designation impacts are estimated to be \$12,535 (present value assuming a seven percent discount rate). More than half of these impacts are in unit TX-33.

⁸⁴ Unit administrative costs of consultations are provided in Chapter 2.

EXHIBIT 5-5 RECREATION-RELATED PRE-DESIGNATION ECONOMIC IMPACTS (1985 - 2007, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST	PRESENT VALUE COST
TX-3A	\$158	\$169
TX-3B	\$158	\$169
TX-3C	\$158	\$169
TX-3D	\$158	\$169
TX-3E	\$158	\$169
TX-7	\$158	\$181
TX-8	\$1,290	\$1,380
TX-31	\$373	\$427
TX-32	\$373	\$427
TX-33	\$7,500	\$8,590
Unknown	\$1,130	\$2,080
Total		\$13,900
Note: Totals may not sum due to rounding.		

5.4 POST-DESIGNATION BASELINE IMPACTS (2008 - 2027)

140. This section presents the future baseline impacts related to recreation activities. As discussed above, beach maintenance projects are expected in proposed critical habitat units TX-3A, TX-3D, TX-7, and TX-8, including the City of Corpus Christi's project described above. Based on that consultation, permits for future projects are expected to be renewed on a five-year basis over the next 20 years. This analysis assumes that all future beach maintenance projects will undertake project modification efforts to protect the plover similar to those required under the Corpus Christi permit. These assumptions may over- or understate actual costs if the Port Aransas and Cameron County beach maintenance projects require a different level of effort than the Corpus Christi project.
141. In addition, each project will experience section 7 administrative consultation costs. Administrative costs associated with the beach maintenance projects in Corpus Christi, Port Aransas, and Cameron County are incurred every five years when the project permit is renewed. The analysis also assumes that informal consultations and technical assistance discussions continue at pre-designation rates. Thus, additional costs are incurred for these types of administrative efforts.
142. Exhibit 5-6 summarizes the post-designation baseline impacts. Unit TX-8 has the highest expected future baseline costs, mostly due to the two future beach maintenance projects to take place in the unit (Corpus Christi and Port Aransas projects).

EXHIBIT 5-6 POST-DESIGNATION BASELINE IMPACTS PER UNIT (2008 - 2027, ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	\$174,000	\$98,200	\$9,270	\$241,000	\$135,000	\$12,700
TX-3B	\$138	\$78	\$7	\$138	\$78	\$7
TX-3C	\$138	\$78	\$7	\$138	\$78	\$7
TX-3D	\$47,400	\$28,400	\$2,680	\$63,400	\$37,500	\$3,540
TX-3E	\$138	\$78	\$7	\$138	\$78	\$7
TX-7	\$50,000	\$29,900	\$2,820	\$67,600	\$39,900	\$3,770
TX-8	\$258,000	\$147,000	\$13,900	\$362,000	\$205,000	\$19,300
TX-31	\$324	\$184	\$17	\$324	\$184	\$17
TX-32	\$324	\$184	\$17	\$324	\$184	\$17
TX-33	\$6,520	\$3,700	\$349	\$6,520	\$3,700	\$349
Unknown	\$983	\$557	\$53	\$983	\$557	\$53
Total		\$309,000	\$29,100		\$422,000	\$39,800

Note: Totals may not sum due to rounding.

143. The range in these impacts results from the project modification cost ranges presented in Exhibit 5-4. The City of Corpus Christi is uncertain about the level of effort required to undertake staff training and annual report writing activities. As a result, they offer a range of estimates based on their expectations for the plover and experience with the sea turtles.

5.5 INCREMENTAL IMPACTS (2008 - 2027)

144. Incremental costs include a portion of future administrative consultation costs, and half the costs of staff training and annual reporting. Exhibit 5-7 presents these incremental impacts. Unit TX-8 has the highest expected future incremental costs, again due to the fact that two beach maintenance projects are expected to take place in this unit. A number of the units (TX-3B, TX-3C, TX-3E, TX-31, TX-32, and TX-33) have relatively low incremental impacts because the only impacts are a portion of the section 7 consultation administrative costs.

EXHIBIT 5-7 INCREMENTAL IMPACTS PER UNIT (2008 - 2027, 2008 DOLLARS ASSUMING A SEVEN PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	\$134,000	\$74,000	\$6,990	\$201,000	\$111,000	\$10,400
TX-3B	\$46	\$26	\$2	\$46	\$26	\$2
TX-3C	\$46	\$26	\$2	\$46	\$26	\$2
TX-3D	\$33,900	\$19,800	\$1,870	\$50,000	\$28,900	\$2,720
TX-3E	\$46	\$26	\$2	\$46	\$26	\$2
TX-7	\$36,600	\$21,300	\$2,010	\$54,200	\$31,200	\$2,950
TX-8	\$204,000	\$114,000	\$10,800	\$308,000	\$172,000	\$16,200
TX-31	\$108	\$61	\$6	\$108	\$61	\$6
TX-32	\$108	\$61	\$6	\$108	\$61	\$6
TX-33	\$2,180	\$1,230	\$116	\$2,180	\$1,230	\$116
Unknown	\$326	\$185	\$17	\$326	\$185	\$17
Total		\$231,000	\$21,800		\$344,000	\$32,500

Note: Totals may not sum due to rounding.

CHAPTER 6 | POTENTIAL ECONOMIC IMPACTS TO MARINE CONSTRUCTION AND OTHER ACTIVITIES

145. This chapter evaluates pre- and post-designation impacts of piping plover conservation activities related to marine construction activities, as well as other potentially affected activities not previously addressed in this report. This chapter first characterizes major past and anticipated marine construction activities within the study area. It then provides estimates of the pre-designation, post-designation baseline, and incremental impacts of plover conservation on marine construction and other activities.

6.1 SUMMARY OF ECONOMIC IMPACTS TO MARINE CONSTRUCTION AND OTHER ECONOMIC ACTIVITIES

146. Since the piping plover was listed in 1985, two formal consultations have occurred within the study area related to marine construction, and both were related to the same project. Pre-designation impacts on marine construction and other activities not previously addressed in this report include costs associated with project modifications for the plover related to the two formal consultations as well as administrative costs associated with 55 past consultation actions and technical assistance efforts, of which 51 were related to marine construction. The present value costs of these efforts are estimated to be between \$440,000 and \$542,000, assuming a seven percent discount rate.

147. Future impacts of plover conservation in critical habitat areas on marine construction and other activities primarily include administrative costs of consultations initiated for marine construction activities within the study area. Future impacts also include costs associated with anticipated project modifications related to two large marine construction projects expected to occur within the study area in the foreseeable future. The majority of forecast impacts would be expected to occur absent critical habitat designation, and hence are included in the baseline for this analysis. Total future baseline costs related to marine construction and other activities are estimated to be between \$249,000 and \$395,000 in present value terms, assuming a seven percent discount rate. Future incremental costs, which are limited to administrative costs of consultation (i.e., no incremental consultation recommendations are forecast as a result of critical habitat designation), are estimated to be \$28,200 in present value terms assuming a seven percent discount rate.

6.2 MARINE CONSTRUCTION ACTIVITIES IN PLOVER CRITICAL HABITAT AREAS

148. Because piping plover critical habitat occurs on barrier islands and on coastal habitats along the Texas Gulf coast, it may be threatened by shoreline or nearshore marine construction activities. Marine construction activities include projects that open channels and waterways to encourage hydraulic flow, increase human accessibility to water for the purposes of recreation, and modify existing waterways for safety reasons.

6.2.1 PAST MARINE CONSTRUCTION ACTIVITIES

149. On February 12, 2003, the Service conducted a formal consultation with the USACE regarding the impacts of reopening and maintaining the Packery Channel. This project entailed dredging 560,000 cubic yards of material to reopen a 300 foot by 4,500 foot portion of the Packery Channel between the Laguna Madre and the Gulf. Critical habitat units TX-6 and TX-7 were affected by this project. Half of material dredged during the course of the project was used as nourishment material for dune restoration projects in the area and the other half was disposed offsite. The project also included the construction of a bulkhead, two jetties and a sand transfer system.⁸⁵

150. In its 2003 Biological Opinion on the Packery Channel project, the Service concluded that the following conservation efforts were necessary to minimize impacts to the piping plover and its habitat:

- 1) Monitoring for piping plover activity must occur prior to and during construction. If construction is occurring during piping plover wintering season (August 1 to May 1), the Service may initiate surveys for foraging and roosting plovers. Monitoring should be conducted 30 minutes prior to sunrise and 30 minutes after sunset and conducted on a wide range of tidal conditions and habitat types. Area should be surveyed thoroughly. Monitors should have an established methodology for handling dead plovers found while monitoring and notify the Service Field Office if construction activities result in the direct take of piping plover;
- 2) Data collection and reporting should include dates of monitoring period; dates, times, and locations of each observation of piping plover; number of birds observed; microhabitat of occurrence; observed bird activity; any visible markings or identifying features; locations of foraging territories; and indicators of predation;
- 3) No sediments or dredged materials will be placed within 1,000 feet of Newport Pass; and
- 4) No staging of equipment or construction materials will occur within 1,000 feet of Newport Pass.

⁸⁵ US Fish and Wildlife Service, Consultation # 2-11-02-F-255, February 12, 2003.

6.2.2 ANTICIPATED FUTURE MARINE CONSTRUCTION ACTIVITIES

151. The USACE anticipates that two large marine construction activities will occur within the study area for the piping plover in the foreseeable future: 1) restoration of the mouth of the San Bernard River and 2) Cedar Bayou and Vinson Slough habitat restoration project.

San Bernard River

152. USACE proposes to restore the mouth of the San Bernard River where it meets the Gulf of Mexico. The Brazos River Diversion Channel was constructed in 1929, and since then, the mouth of the San Bernard River has almost closed due to the accumulation of sand. The project will consist of dredging 385,000 cubic yards of material and 45,000 cubic yards of vegetative debris from the San Bernard River channel and surrounding areas. A new channel will then be constructed that will connect the Gulf Intercoastal Waterway in Brazoria County with the San Bernard River before it empties into the Gulf of Mexico. After construction, an estimated 300,000 to 500,000 cubic yards of maintenance material will be dredged from the channel every six years.⁸⁶
153. This project is located in critical habitat unit TX-32 and adjacent to TX-31 and is expected to commence in the fall of 2008. This project will destroy 1.1 acres of piping plover critical habitat. Temporary impacts to an additional 7.1 acres will also result from corridor and pipeline construction. In order to minimize these impacts, the pipeline corridor will be placed as high up on the beach as possible to avoid the swash zone.⁸⁷
154. Although the project will destroy 1.1 acres of critical habitat, the closure of the existing mouth of the river and beach nourishment associated with the project are estimated to generate 2.5 acres of habitat, resulting in a net gain of 1.4 acres of critical habitat. Periodic beach nourishment will also serve to maintain critical habitat in this area.

Cedar Bayou/Vinson Slough

155. The Cedar Bayou and Vinson Slough habitat restoration project is a dredging project designed to reconnect the Aransas Bay with the Gulf of Mexico by re-opening the Cedar Bayou. Cedar Bayou and Vinson Slough are channels that will help to maintain a hydraulic connection between the bay and the Gulf. In order to open the channel, 503,000 cubic yards of material must be excavated from 58.8 acres of Cedar Bayou and Vinson Slough in order to dredge a straight channel along the existing Cedar Bayou Channel. Excavating material in between both channels will allow them to connect before emptying into the Gulf of Mexico. The excavated material will be placed in two areas located near the project site and used for beach re-nourishment around these areas.⁸⁸

⁸⁶ U.S. Army Corps of Engineers, Draft Environmental Assessment, Restoration of the mouth of the San Bernard River to the Gulf of Mexico, Brazoria, TX, June 2008.

⁸⁷ U.S. Army Corps of Engineers, Draft Environmental Assessment, Restoration of the mouth of the San Bernard River to the Gulf of Mexico, Brazoria, TX, June 2008.

⁸⁸ U.S. Army Corps of Engineers, Public Notice, Permit No SWG-2007-813, May 18, 2007.

156. No specific geographic data were available to describe the exact locations of the project in relation to the piping plover critical habitat. Based on the project location descriptions, the project will take place near critical habitat units TX-18 and TX-19. Effects of the proposed project are temporary displacement of individuals due to equipment traffic necessary for construction, dredging, and production activities. Conservation efforts intended to mitigate this threat are restricting vehicular traffic to above the tide line and reducing speed limits to 15 mph in these areas.⁸⁹
157. Indirect effects of the project include impacts to benthic invertebrate populations, which are the primary food source for the piping plover. Benthic invertebrates are sensitive to changes in the interstitial spaces between sand grains and sand compaction caused by construction equipment could result in crushing these organisms. There are no proposed conservation efforts proposed for minimizing this threat.⁹⁰
158. Project modifications associated with minimizing impacts to the whooping crane wintering population include requiring all project activities to be completed between April 15 and October 15. This may indirectly serve to mitigate impacts to the piping plover critical habitat by eliminating project activity during the periods when piping plovers inhabit the area and would be threatened by the project.⁹¹

6.3 PRE-DESIGNATION IMPACTS ON MARINE CONSTRUCTION AND OTHER ACTIVITIES (1985-2007)

159. Since the listing of the species, the Service has conducted approximately 51 consultation actions regarding the effects of marine construction activities on the piping plover with USACE (41 actions), U.S Department of Transportation (7 actions), the Federal Emergency Management Agency (FEMA) (1 action) and itself (2 actions). Of these actions, 25 occurred within the study area for this analysis.⁹² Two of the actions within the study area resulted in formal consultations, both related to the Packery Channel project. Remaining actions consisted of 15 informal consultations and eight technical assistance efforts. Most of these actions addressed dredging activities and/or dredge material placement conducted by USACE.
160. This analysis estimates impacts associated with project modifications that were implemented for the piping plover during the Packery Channel project in 2003. Conservation efforts outlined in the final biological opinion and estimated costs

⁸⁹ Save the Bayou, Permit Application, <http://texasflats.net/cedarbayou/permit.pdf>, accessed on September 10, 2008.

⁹⁰ Save the Bayou, Permit Application, <http://texasflats.net/cedarbayou/permit.pdf>, accessed on September 10, 2008.

⁹¹ U.S. Army Corps of Engineers, Public Notice, Permit No SWG-2007-813, May 18, 2007.

⁹² More than half of these administrative costs are in "unknown" units. The location of these consultations/technical assistance discussions is not known by the Service, but for this analysis it is assumed that they fall within the study area. This assumption could lead to an overstatement of the pre-designation economic impacts.

associated with those actions are presented in Exhibit 6-1. The project lies adjacent to Unit TX-7.⁹³

EXHIBIT 6-1 PROJECT MODIFICATIONS AND ESTIMATED COSTS FOR PACKERY CHANNEL PROJECT

MODIFICATION	DESCRIPTION OF IMPACT	PROJECT COSTS (UNDISCOUNTED 2008\$)
Survey and monitoring efforts	Monitors cost \$300-\$500/day, assuming project lasts 50 weeks	\$75,000 to \$125,000
Reporting	Typical project report for 4-5 months is \$3,000 to \$10,000. This project is large, therefore it is assumed to have required the high-end costs over a one-year period	\$7,200 to \$30,000
No sediments or dredged materials will be placed within 1000 feet of Newport Pass	It is unclear whether this requirement changed USACE actions. Efforts associated with avoiding sediment deposition in this area are assumed to be minimal.	Modest
No staging of equipment or construction materials will occur within 1000 feet of Newport Pass.	It is unclear whether this requirement changed USACE behavior. Efforts associated with not staging equipment in this area are assumed to be minimal.	Modest
Total project costs		\$82,200 to \$155,000
Source: Personal communication with L. Sherrod, Horizon Environmental Consulting, September 3, 2008.		

161. Total pre-designation impacts related to marine construction activities are estimated to range from \$295,000 (undiscounted) to \$222,000 (undiscounted). These estimates include both administrative and consultation-related impacts.
162. This section also quantifies minor administrative impacts associated with four informal and technical assistances for activities not related to marine construction but initiated within the study area since the listing of the species. Administrative costs associated with these consultations are included in pre-designation impacts presented in Exhibit 6-2.

⁹³ Packery Channel Environmental Impact Assessment, http://packery.com/DEIS/PackeryDEIS_C.pdf accessed September 16, 2008.

EXHIBIT 6-2 TOTAL PRE-DESIGNATION IMPACTS ON MARINE CONSTRUCTION AND OTHER ACTIVITIES (1985 - 2007, 2008 DOLLARS)

UNIT	ADMINISTRATIVE COSTS (UNDISCOUNTED)	PROJECT MODIFICATION COSTS (UNDISCOUNTED)		TOTAL IMPACTS DISCOUNTED AT SEVEN PERCENT	
		LOW	HIGH	LOW	HIGH
TX-3A*	\$5,110	\$0	\$0	\$7,490	\$7,490
TX-3B*	\$5,110	\$0	\$0	\$7,490	\$7,490
TX-3C*	\$5,110	\$0	\$0	\$7,490	\$7,490
TX-3D*	\$5,110	\$0	\$0	\$7,490	\$7,490
TX-3E*	\$5,110	\$0	\$0	\$7,490	\$7,490
TX-4*	\$377	\$0	\$0	\$566	\$566
TX-7	\$31,100	\$82,200	\$155,000	\$184,000	\$286,000
TX-14	\$8,260	\$0	\$0	\$12,100	\$12,100
TX-16*	\$3,570	\$0	\$0	\$9,840	\$9,840
TX-18*	\$17,800	\$0	\$0	\$40,100	\$40,100
TX-19*	\$7,130	\$0	\$0	\$7,630	\$7,630
TX-22	\$1,130	\$0	\$0	\$1,290	\$1,290
TX-23	\$565	\$0	\$0	\$605	\$605
TX-27	\$565	\$0	\$0	\$605	\$605
TX-28	\$7,130	\$0	\$0	\$8,730	\$8,730
TX-31*	\$2,350	\$0	\$0	\$2,690	\$2,690
TX-32	\$2,350	\$0	\$0	\$2,690	\$2,690
TX-33	\$2,350	\$0	\$0	\$2,690	\$2,690
UNKNOWN	\$61,600	\$0	\$0	\$128,000	\$128,000
Total				\$440,000	\$542,000

6.4 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS ON MARINE CONSTRUCTION AND OTHER ACTIVITIES (2008-2027)

163. To estimate post-designation impacts, this analysis assumes that USACE will undertake formal section 7 consultation with the Service on the San Bernard River project in critical habitat unit TX-32. A formal consultation is also expected for the Cedar Bayou-Vinson Slough project in Units TX-18 and TX-19. Costs associated with this project are assumed to be split between these two units. Although project modifications associated with these future consultations are unknown at this time, it appears likely that the outcomes of these projects, which bear some resemblance to the Packery Channel project, will be similar to that project. Thus, project modifications quantified for the Packery Channel project are applied to these expected projects. Because these are likely to be associated, at least in part, with vehicle-related actions (e.g., monitoring of vehicle

driving on beaches and associated reporting costs), and such requirements have already been implemented for many activities, these costs are included in the baseline for the analysis. Including administrative costs of the two large projects and other marine construction projects, estimated future baseline costs associated with marine construction activities are anticipated to range from \$286,000 to \$432,000 (undiscounted).

164. Post-designation baseline impacts also include consultation costs associated with other activities, such as species management and miscellaneous uncategorized projects. The estimated number of these consultations is assumed to be consistent with the past rate of consultations. Estimated costs associated with incremental costs to these activities are anticipated to be \$27,700 (undiscounted). Exhibit 6-3 summarizes the post-designation baseline impacts of marine construction and other activities.

EXHIBIT 6-3 TOTAL POST-DESIGNATION BASELINE IMPACTS ON MARINE CONSTRUCTION AND OTHER ACTIVITIES (2008 - 2027, 2008 DOLLARS)

UNIT	ADMINISTRATIVE COSTS (UNDISCOUNTED)	PROJECT MODIFICATION COSTS (UNDISCOUNTED)		TOTAL IMPACTS DISCOUNTED AT SEVEN PERCENT	
	LOW	LOW	HIGH	LOW	HIGH
TX-3A*	\$4,440	\$0	\$0	\$2,520	\$2,520
TX-3B*	\$4,440	\$0	\$0	\$2,520	\$2,520
TX-3C*	\$4,440	\$0	\$0	\$2,520	\$2,520
TX-3D*	\$4,440	\$0	\$0	\$2,520	\$2,520
TX-3E*	\$4,440	\$0	\$0	\$2,520	\$2,520
TX-4*	\$328	\$0	\$0	\$186	\$186
TX-7	\$27,100	\$0	\$0	\$15,300	\$15,300
TX-14	\$7,180	\$0	\$0	\$4,070	\$4,070
TX-16*	\$3,100	\$0	\$0	\$1,760	\$1,760
TX-18*	\$15,500	\$41,100	\$77,500	\$49,900	\$86,300
TX-19*	\$6,200	\$41,100	\$77,500	\$44,600	\$81,000
TX-22	\$983	\$0	\$0	\$557	\$557
TX-23	\$491	\$0	\$0	\$278	\$278
TX-27	\$491	\$0	\$0	\$278	\$278
TX-28	\$6,200	\$0	\$0	\$3,510	\$3,510
TX-31*	\$2,050	\$0	\$0	\$1,160	\$1,160
TX-32	\$2,050	\$82,200	\$155,000	\$83,400	\$156,000
TX-33	\$2,050	\$0	\$0	\$1,160	\$1,160
UNKNOWN	\$53,500	\$0	\$0	\$30,300	\$30,300
Subtotal				\$249,000	\$395,000
Total				\$249,000	\$395,000

165. Incremental impacts of marine construction activities include administrative costs associated with expected consultations regarding marine construction. No additional project modifications are anticipated for these projects following critical habitat designation for the plover. Thus, estimated incremental impact to marine construction activities are solely administrative in nature, and are expected to be \$40,600 (undiscounted).
166. This section also quantifies incremental impacts due to administrative costs of consultations initiated for other activities. As with marine construction, these are expected to be solely administrative in nature. Estimated costs associated with incremental costs to these activities are anticipated to be \$9,260 (undiscounted). Exhibit 6-4 summarizes the incremental per unit impacts of marine construction and other activities.

EXHIBIT 6-4 INCREMENTAL IMPACTS ON MARINE CONSTRUCTION AND OTHER ACTIVITIES (2008 - 2027, 2008 DOLLARS)

UNIT	ADMINISTRATIVE COSTS (UNDISCOUNTED)	TOTAL IMPACTS DISCOUNTED AT SEVEN PERCENT
		LOW
TX-3A*	\$1,480	\$839
TX-3B*	\$1,480	\$839
TX-3C*	\$1,480	\$839
TX-3D*	\$1,480	\$839
TX-3E*	\$1,480	\$839
TX-4*	\$109	\$62
TX-7	\$9,020	\$5,110
TX-8	\$0	\$0
TX-9	\$0	\$0
TX-10A	\$0	\$0
TX-10B	\$0	\$0
TX-10C	\$0	\$0
TX-14	\$2,400	\$1,360
TX-15	\$0	\$0
TX-16*	\$1,030	\$586
TX-18*	\$5,170	\$2,930
TX-19*	\$2,070	\$1,170
TX-22	\$326	\$185
TX-23	\$163	\$92
TX-27	\$163	\$92
TX-28	\$2,070	\$1,170
TX-31*	\$683	\$387
TX-32	\$683	\$387
TX-33	\$683	\$387
UNKNOWN	\$17,900	\$10,100
Total		\$28,200

APPENDIX A | SMALL BUSINESS ANALYSIS AND ENERGY IMPACTS ANALYSIS

1. 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 Endangered Species Act (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.”

2. 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.

3. The courts have held that the RFA/SBREFEA 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.⁹⁴
4. 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.⁹⁵ The basis of EPA's RFA/SBREFEA 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.
5. 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.⁹⁶ "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."⁹⁷
6. 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

⁹⁴ 773 F. 2d 327 (D.C. Cir. 1985).

⁹⁵ 175 F. 3d 1027, 1044 (D.C. Cir. 1999).

⁹⁶ Small Business Administration, Office of Advocacy. May 2003. A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act. pg. 20.

⁹⁷ *Ibid.*, pg. 21.

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.

7. This screening analysis focuses on small entities that may bear the incremental impacts of this rulemaking quantified in Chapters 3 through Chapter 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. This analysis concludes that the only incremental impacts of this rulemaking potentially affecting small entities are related to residential and commercial development projects.

A.1 SBREFA ANALYSIS

8. 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).⁹⁸ 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 piping plover conservation efforts to affect small entities.
9. To ensure broad consideration of impacts on small entities, the Service has prepared this small business analysis without first making the threshold determination whether the proposed critical habitat designation could be certified as not having a significant economic impact on a substantial number of small entities.

A.1.1 IDENTIFICATION OF ACTIVITIES THAT MAY INVOLVE SMALL ENTITIES

10. This screening analysis is based on the estimated incremental impacts associated with the proposed rulemaking as described in Chapters 3 through 6 of this analysis. The analysis evaluates the potential for economic impacts related to the following activity categories:
 - Marine construction
 - Oil and gas
 - Recreation
 - Residential and commercial development
11. In two of the four categories, impacts of piping plover conservation are not anticipated to affect small businesses for the following reasons:

⁹⁸ 5 U.S.C. § 601 et seq.

- **Marine Construction:** Chapter 6 of this analysis discusses the potential impacts of piping plover conservation efforts on marine construction that may be affected by the proposed critical habitat designation. The two anticipated future marine construction projects discussed in this chapter (Cedar Bayou and San Brenard) will be undertaken by the USACE, which is not a small government entity. This analysis does not expect any small entities affected.
- **Oil and Gas:** Chapter 3 of this analysis details the potential impacts of piping plover conservation efforts on oil and gas activities that may be affected by the proposed critical habitat. Although there are significant impacts expected to the oil and gas industry, this analysis assumes that those costs will not be borne by small entities. Most of the companies engaged in the affected (i.e. oil and gas exploration and well drilling) are not considered small entities. Exhibit A-1 shows the total number of entities and the number of small entities engaged in affected sectors in the nine counties of the study area. There are only three small entities engaged in extraction efforts (NAICS code 211111 and 213111) and no small entities engaged in exploration. There is no way of determining if these three small entities will be involved in future projects, but because they represent only two percent of the industry this analysis assumes that they are unlikely to be involved.

EXHIBIT A-1 TOTAL ENTITIES AND SMALL ENTITIES IN THE OIL AND GAS INDUSTRY

NAICS CODE	DESCRIPTION	TOTAL NUMBER OF ENTITIES	NUMBER OF SMALL ENTITIES
211111	Crude Petroleum and Natural Gas Extraction	119	0
213111	Drilling Oil and Gas Wells	29	3
211112	Natural Gas Liquid Exploration	5	0
TOTAL		153	3

12. The remainder of this chapter addresses the potential economic impacts to recreation and development activities, and how those impacts may affect small entities.

A.1.2 ANALYSIS OF THE IMPACTS TO RECREATION

13. Chapter 5 of this analysis discusses the potential impacts of piping plover critical habitat conservation efforts on recreation. As discussed in Chapter 5, few impacts on recreational beach use are anticipated. Instead, the majority of the impacts will be borne by coastal cities and towns which undertake beach maintenance projects. Projects are anticipated to be undertaken by the City of Corpus Christi (2007 estimated population of 285,507), the City of Port Aransas (2007 estimated population of 3,775), and the Town of South Padre Island (2007 estimated population of 2,752).⁹⁹ Port Aransas and South Padre

⁹⁹ U.S. Census Bureau, 2007 Population Estimates, Census 2000, 1990 Census.

Island have populations less than 50,000 and thus are considered small entities under SBREFA.

14. Over the next 20 years, the incremental impacts to each small municipality due to critical habitat designation is estimated to range from \$61,900 to \$98,400. Annually, the impacts to these municipalities will range from \$5,850 to \$9,290.

A.1.3 ANALYSIS OF THE IMPACTS TO DEVELOPMENT

15. This analysis expects piping plover conservation efforts to affect small developers. Exhibit A-2 shows the total number of entities and the number of small entities engaged in development activities in the nine counties of the study area. Unlike the oil and gas industry, a large percent of developers are considered small. Out of the total number of entities engaged in single-family construction, multi-family construction, and land subdivision, 91 percent are small entities.

EXHIBIT A-1 TOTAL ENTITIES AND SMALL ENTITIES IN THE DEVELOPMENT INDUSTRY

NAICS CODE	DESCRIPTION	TOTAL NUMBER OF ENTITIES	NUMBER OF SMALL ENTITIES
236115	Single-Family Construction	1,335	1329
236116	Multi-Family Construction	197	195
237210	Land Subdivision	146	143
TOTAL		1,831	1,670

16. Chapter 4 of this analysis details the potential impacts of piping plover conservation efforts on residential and commercial development. This analysis assumes that project modification costs associated with piping plover conservation efforts (e.g. vermin-proof garbage containers, exclusion fencing) will be borne by the existing home or building owner, regardless of whether that owner undertook the development project himself.¹⁰⁰ Many of these owners may be individuals or families that are not registered businesses. No NAICS code exists for homeowners, and the SBA does not provide a definition of small landowner. To understand the potential impacts on small entities, this analysis makes the assumption that all of the private owners of developable lands affected by future plover conservation efforts will be developers. This assumption is likely to overstate the actual impacts to small development firms.
17. To estimate the number of developers potentially affected and the magnitude of that impact by plover conservation efforts, the analysis first estimates the number of

¹⁰⁰ Before purchasing a parcel the developer will consider the regulatory restrictions associated with that parcel. Therefore, any costs associated with conservation efforts for the piping plover will be reflected in the price paid for the parcel. Thus, the cost of piping plover conservation efforts are ultimately borne by the current landowners in the form of reduced land values.

developments potentially constructed within the timeframe of this analysis. Second, the analysis estimates the number of developers required to undertake these projects and determines how many of those developers may be small. Lastly, the analysis determines the incremental impact that the plover conservation efforts may have on the revenues of small developers. Impacts are calculated for a high-cost scenario and a low-cost scenario as outlined in Chapter 4. These steps are detailed below.

- **Estimate number of development projects.** For the high-cost scenario this analysis assumes full build out on all developable lands (as defined in Chapter 4) within the next 20 years. Assuming a 100-acre average development size yields approximately 59 development projects over the next 20 years or three projects annually. In the low-cost scenario, no development projects will be impacted by plover conservation efforts.
- **Estimate number of developers required to construct potential developments and determine how many of those developers may be small.** This analysis assumes that one developer is required per development project. Because there are no known developers for future development projects, this analysis assumes that all developers are considered small. This assumption may overstate the impacts to small entities if some developers are not considered small.
- **Estimate the incremental impact of piping plover conservation efforts on small developers.** Over the next 20 years the incremental impact due to critical habitat designation is estimated to range from \$150 to \$5000 per small developer. Annually, the impact will range from \$10 to \$337.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

18. 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.”¹⁰¹
19. 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
 - Other similarly adverse outcomes.¹⁰²
20. Three of these criteria are relevant to this analysis: (1) reductions in crude oil supply in excess of 10,000 barrels per day (bbls); (2) reductions in natural gas production in excess of 25 million Mcf per year; and (3) increases in the cost of energy production in excess of one percent.
21. Importantly, this analysis does not assume any reduction in production. Rather, exploration and drilling will continue by incorporating project modifications such as directional drilling. However, in the worst case, even if no new wells were drilled, the impact would not be significant from the perspective of Executive Order 13211. To estimate the production of wells within critical habitat, this analysis assumes an average oil production of 6.01 barrels per well per day and average gas production of 199 Mcfs per well per day.¹⁰³ These values are 2007 production rates, and this analysis assumes

¹⁰¹ 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>.

¹⁰² Ibid.

¹⁰³ Texas Railroad Commission, Oil and Gas division, 2007 Oil and Gas well Production values, <http://www.rrc.state.tx.us/divisions/og/statistics/production/ogisopwc.html>

that these rates stay constant throughout the period of our analysis. Our GIS analysis of data compiled by the Texas Railroad Commission indicates that an estimated 47 oil and gas wells will be drilled within the critical habitat designation for the piping plover. Thus, the maximum amount of oil production that could be affected by the critical habitat designation is 282 barrels of oil per day or 103,100 barrels of oil per year. The maximum amount of natural gas production that could be affected by the critical habitat designation is 9,353 Mcfs per day or 3.4 million Mcfs per year. This estimate is conservative due to the fact that all of these wells may not be drilled. Both amounts appear to be well below the respective thresholds of 10,000 barrels of crude oil per day and 25 million Mcf of natural gas per year. Furthermore, the production of these wells represents 1.8 percent of 2007 national natural gas production. The production of these wells represents 1.2 percent of 2007 national oil production.¹⁰⁴ Therefore, the relatively minor costs of project modifications (\$200,000 to \$1.76 million per well) are unlikely to increase energy costs by more than one percent. Therefore, it appears unlikely that the energy industry will experience a significant adverse effect.

¹⁰⁴ Energy Information Administration, Official Energy Statistics,
http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=US, accessed September 18, 2008.

APPENDIX B | THREE PERCENT DISCOUNT RATE EXHIBITS

1. This appendix summarizes the pre-designation, post-designation baseline, and incremental impacts discounted at three percent for all activities in this analysis.

B.1 OIL AND GAS CHAPTER EXHIBITS

EXHIBIT B-1 TOTAL PRE-DESIGNATION IMPACTS ON OIL AND GAS ACTIVITIES (THREE PERCENT DISCOUNT RATE)

	PRESENT VALUE BASELINE IMPACTS	
	LOW	HIGH
Areas Considered for Final Designation	\$1,320,000	\$3,060,000
Areas Considered For Possible Exclusion	\$0	\$0
Total Proposed Area	\$1,320,000	\$3,060,000

EXHIBIT B-2 TOTAL POST-DESIGNATIONS BASELINE AND INCREMENTAL IMPACTS ON OIL AND GAS ACTIVITIES (THREE PERCENT DISCOUNT RATE)

	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
Areas Considered for Final Designation	\$1,560,000	\$6,970,000	\$7,240,000	\$63,600,000
Areas Considered For Possible Exclusion	\$181,000	\$481,000	\$919,000	\$8,110,000
Total Proposed Area	\$1,740,000	\$7,450,000	\$8,160,000	\$71,700,000
Total Annualized	\$117,000	\$501,000	\$548,000	\$4,820,000

**EXHIBIT B-3 POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS ON OIL AND GAS ACTIVITIES
BY UNIT (THREE PERCENT DISCOUNT RATE)**

CHD UNIT	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
TX-3A	\$207,000	\$1,160,000	\$154,000	\$1,350,000
TX-3B	\$1,240	\$950	\$1,690,000	\$14,900,000
TX-3C	\$1,240	\$950	\$2,610,000	\$23,000,000
TX-3D	\$1,240	\$950	\$317	\$317
TX-3E	\$1,240	\$950	\$613,000	\$5,410,000
TX-4	\$0	\$0	\$460,000	\$4,060,000
TX-7	\$242,000	\$1,260,000	\$153,000	\$1,350,000
TX-8	\$74,600	\$194,000	\$567	\$567
TX-9	\$1,730	\$1,330	\$442	\$442
TX-10A	\$74,100	\$194,000	\$442	\$442
TX-10B	\$1,730	\$1,330	\$442	\$442
TX-10C	\$1,730	\$1,330	\$460,000	\$4,060,000
TX-14	\$0	\$0	\$0	\$0
TX-15	\$36,200	\$96,200	\$0	\$0
TX-16	\$209,000	\$1,160,000	\$154,000	\$1,350,000
TX-18	\$39,300	\$98,600	\$793	\$793
TX-19	\$36,200	\$96,200	\$0	\$0
TX-22	\$74,400	\$194,000	\$529	\$529
TX-23	\$377,000	\$2,230,000	\$307,000	\$2,710,000
TX-27	\$2,070	\$1,580	\$460,000	\$4,060,000
TX-28	\$0	\$0	\$153,000	\$1,350,000
TX-31	\$0	\$0	\$0	\$0
TX-32	\$72,300	\$192,000	\$0	\$0
TX-33	\$0	\$0	\$0	\$0
UNKNOWN	\$110,000	\$84,500	\$28,200	\$28,200
Subtotal	\$1,560,000	\$6,970,000	\$7,240,000	\$63,600,000
Areas Considered For Possible Exclusion				
TX-3 -NWR lands	\$0	\$0	\$766,000	\$6,760,000
TX-4 -NWR lands	\$0	\$0	\$0	\$0
TX-16 -NWR lands	\$72,300	\$192,000	\$0	\$0
TX-18 -NWR lands	\$72,300	\$192,000	\$0	\$0
TX-19 -NWR lands	\$36,200	\$96,200	\$0	\$0
TX-31 -NWR lands	\$0	\$0	\$153,000	\$1,350,000
Subtotal	\$181,000	\$481,000	\$919,000	\$8,110,000
Total	\$1,740,000	\$7,450,000	\$8,160,000	\$71,700,000
Annualized	\$117,000	\$501,000	\$548,000	\$4,820,000
Note: Costs are calculated using a discount rate of three percent. Entries may not sum to totals reported due to rounding.				

B.2 RESIDENTIAL AND COMMERCIAL DEVELOPMENT CHAPTER EXHIBITS

EXHIBIT B-4 SUMMARY OF IMPACTS OF PIPING PLOVER CRITICAL HABITAT DESIGNATION ON DEVELOPMENT-RELATED ACTIVITIES (THREE PERCENT DISCOUNT RATE)

CHD UNIT	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
TX-3A	\$151	\$1,880,000	\$50	\$64,600
TX-3B	\$151	\$100,000	\$50	\$3,500
TX-3C	\$151	\$151	\$50	\$50
TX-3D	\$151	\$689,000	\$50	\$23,700
TX-3E	\$151	\$151	\$50	\$50
TX-7	\$9,990	\$744,000	\$3,330	\$25,600
TX-8	\$4,750	\$3,720,000	\$1,590	\$129,000
TX-10C	\$0	\$1,150,000	\$0	\$39,600
TX-14	\$0	\$459,000	\$0	\$15,800
UNKNOWN	\$20,500	\$20,500	\$6,840	\$6,840
Total	\$36,000	\$8,760,000	\$12,000	\$309,000
Annualized	\$2,420	\$589,000	\$807	\$20,800

Note: Costs are calculated using a discount rate of three percent. Entries may not sum to totals reported due to rounding.

EXHIBIT B-5 DEVELOPMENT-RELATED PRE-DESIGNATION ECONOMIC IMPACTS (2008 - 2027, ASSUMING A THREE PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST	PRESENT VALUE COST
TX-3A	\$226	\$254
TX-3B	\$226	\$254
TX-3C	\$226	\$254
TX-3D	\$226	\$254
TX-3E	\$226	\$254
TX-7	\$15,000	\$22,000
TX-8	\$7,130	\$8,510
Unknown	\$30,800	\$44,300
Total		\$76,100

Note: Totals may not sum due to rounding.

EXHIBIT B-6 POST-DESIGNATION BASELINE IMPACTS PER UNIT (2008 - 2027, ASSUMING A THREE PERCENT DISCOUNT RATE)

UNIT	DEVELOPABLE ACRES	LOW-END SCENARIO			HIGH-END SCENARIO		
		UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	1329	\$197	\$151	\$10	\$2,200,000	\$1,880,000	\$126,000
TX-3B	71	\$197	\$151	\$10	\$117,000	\$100,000	\$6,750
TX-3C	0	\$197	\$151	\$10	\$197	\$151	\$10
TX-3D	488	\$197	\$151	\$10	\$806,000	\$689,000	\$46,300
TX-3E	0	\$197	\$151	\$10	\$197	\$151	\$10
TX-7	527	\$13,000	\$9,990	\$672	\$870,000	\$744,000	\$50,000
TX-8	2632	\$6,200	\$4,750	\$319	\$4,350,000	\$3,720,000	\$250,000
TX-10C	816	\$0	\$0	\$0	\$1,350,000	\$1,150,000	\$77,400
TX-14	325	\$0	\$0	\$0	\$537,000	\$459,000	\$30,800
Unknown	0	\$26,800	\$20,500	\$1,380	\$26,800	\$20,500	\$1,380
Total	6188		\$36,000	\$2,420		\$8,760,000	\$589,000

Note: Totals may not sum due to rounding.

EXHIBIT B-7 INCREMENTAL IMPACTS PER UNIT (2008 - 2027, ASSUMING A THREE PERCENT DISCOUNT RATE)

UNIT	LOW-END SCENARIO			HIGH-END SCENARIO		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	\$65	\$50	\$3	\$66,500	\$64,600	\$4,340
TX-3B	\$65	\$50	\$3	\$3,620	\$3,500	\$235
TX-3C	\$65	\$50	\$3	\$65	\$50	\$3
TX-3D	\$65	\$50	\$3	\$24,500	\$23,700	\$1,600
TX-3E	\$65	\$50	\$3	\$65	\$50	\$3
TX-7	\$4,350	\$3,330	\$224	\$26,400	\$25,600	\$1,720
TX-8	\$2,070	\$1,590	\$107	\$134,000	\$129,000	\$8,690
TX-10C	\$0	\$0	\$0	\$40,800	\$39,600	\$2,660
TX-14	\$0	\$0	\$0	\$16,300	\$15,800	\$1,060
Unknown	\$8,930	\$6,840	\$460	\$8,930	\$6,840	\$460
Total		\$12,000	\$807		\$309,000	\$20,800

Note: Totals may not sum due to rounding.

B.3 RECREATION CHAPTER EXHIBITS**EXHIBIT B-8 TOTAL POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS ON RECREATION ACTIVITIES (THREE PERCENT)**

CHD UNIT	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
TX-3A	\$133,000	\$184,000	\$102,000	\$152,000
TX-3B	\$105	\$105	\$35	\$35
TX-3C	\$105	\$105	\$35	\$35
TX-3D	\$37,200	\$49,500	\$26,300	\$38,600
TX-3E	\$105	\$105	\$35	\$35
TX-7	\$39,200	\$52,700	\$28,300	\$41,800
TX-8	\$198,000	\$277,000	\$155,000	\$234,000
TX-31	\$248	\$248	\$82	\$82
TX-32	\$248	\$248	\$82	\$82
TX-33	\$5,000	\$5,000	\$1,670	\$1,670
UNKNOWN	\$753	\$753	\$250	\$250
Total	\$415,000	\$570,000	\$314,000	\$469,000
Annualized	\$27,900	\$38,300	\$21,100	\$31,500

Note: Costs are calculated using a discount rate of three percent. Entries may not sum to totals reported due to rounding.

EXHIBIT B-9 RECREATION-RELATED PRE-DESIGNATION ECONOMIC IMPACTS (1985 - 2007, ASSUMING A THREE PERCENT DISCOUNT RATE)

UNIT	UNDISCOUNTED COST	PRESENT VALUE COST
TX-3A	\$158	\$163
TX-3B	\$158	\$163
TX-3C	\$158	\$163
TX-3D	\$158	\$163
TX-3E	\$158	\$163
TX-7	\$158	\$168
TX-8	\$1,290	\$1,330
TX-31	\$373	\$396
TX-32	\$373	\$396
TX-33	\$7,500	\$7,960
Unknown	\$1,130	\$1,470
Total		\$12,500

Note: Totals may not sum due to rounding.

EXHIBIT B-10 POST-DESIGNATION BASELINE IMPACTS PER UNIT (2008 - 2027, ASSUMING A THREE PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	\$174,000	\$133,000	\$8,960	\$241,000	\$184,000	\$12,400
TX-3B	\$138	\$105	\$7	\$138	\$105	\$7
TX-3C	\$138	\$105	\$7	\$138	\$105	\$7
TX-3D	\$47,400	\$37,200	\$2,500	\$63,400	\$49,500	\$3,330
TX-3E	\$138	\$105	\$7	\$138	\$105	\$7
TX-7	\$50,000	\$39,200	\$2,640	\$67,600	\$52,700	\$3,540
TX-8	\$258,000	\$198,000	\$13,300	\$362,000	\$277,000	\$18,600
TX-31	\$324	\$248	\$17	\$324	\$248	\$17
TX-32	\$324	\$248	\$17	\$324	\$248	\$17
TX-33	\$6,520	\$5,000	\$336	\$6,520	\$5,000	\$336
Unknown	\$983	\$753	\$51	\$983	\$753	\$51
Total		\$415,000	\$27,900		\$570,000	\$38,300

Note: Totals may not sum due to rounding.

EXHIBIT B-11 INCREMENTAL IMPACTS PER UNIT (2008 - 2027, 2008 DOLLARS ASSUMING A THREE PERCENT DISCOUNT RATE)

UNIT	LOW ESTIMATE			HIGH ESTIMATE		
	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST	UNDISCOUNTED COST	PRESENT VALUE COST	ANNUALIZED COST
TX-3A	\$134,000	\$102,000	\$6,830	\$201,000	\$152,000	\$10,200
TX-3B	\$46	\$35	\$2	\$46	\$35	\$2
TX-3C	\$46	\$35	\$2	\$46	\$35	\$2
TX-3D	\$33,900	\$26,300	\$1,770	\$50,000	\$38,600	\$2,600
TX-3E	\$46	\$35	\$2	\$46	\$35	\$2
TX-7	\$36,600	\$28,300	\$1,900	\$54,200	\$41,800	\$2,810
TX-8	\$204,000	\$155,000	\$10,400	\$308,000	\$234,000	\$15,800
TX-31	\$108	\$82	\$6	\$108	\$82	\$6
TX-32	\$108	\$82	\$6	\$108	\$82	\$6
TX-33	\$2,180	\$1,670	\$112	\$2,180	\$1,670	\$112
Unknown	\$326	\$250	\$17	\$326	\$250	\$17
Total		\$314,000	\$21,100		\$469,000	\$31,500

Note: Totals may not sum due to rounding.

B.4 MARINE CONSTRUCTION AND OTHER ACTIVITIES CHAPTER EXHIBITS**EXHIBIT B-12 TOTAL POST-DESIGNATION BASELINE AND INCREMENTAL IMPACTS ON RECREATION ACTIVITIES (THREE PERCENT)**

CHD UNIT	PRESENT VALUE BASELINE IMPACTS		PRESENT VALUE INCREMENTAL IMPACTS	
	LOW	HIGH	LOW	HIGH
TX-3A	\$3,400	\$3,400	\$1,130	\$1,130
TX-3B	\$3,400	\$3,400	\$1,130	\$1,130
TX-3C	\$3,400	\$3,400	\$1,130	\$1,130
TX-3D	\$3,400	\$3,400	\$1,130	\$1,130
TX-3E	\$3,400	\$3,400	\$1,130	\$1,130
TX-4	\$251	\$251	\$83	\$83
TX-7	\$20,700	\$20,700	\$6,910	\$6,910
TX-8	\$0	\$0	\$0	\$0
TX-9	\$0	\$0	\$0	\$0
TX-10A	\$0	\$0	\$0	\$0
TX-10B	\$0	\$0	\$0	\$0
TX-10C	\$0	\$0	\$0	\$0
TX-14	\$5,500	\$5,500	\$1,840	\$1,840
TX-15	\$0	\$0	\$0	\$0
TX-16	\$2,380	\$2,380	\$793	\$793
TX-18	\$53,000	\$89,400	\$3,960	\$3,960
TX-19	\$45,900	\$82,300	\$1,590	\$1,590
TX-22	\$753	\$753	\$250	\$250
TX-23	\$376	\$376	\$125	\$125
TX-27	\$376	\$376	\$125	\$125
TX-28	\$4,750	\$4,750	\$1,590	\$1,590
TX-31	\$1,570	\$1,570	\$523	\$523
TX-32	\$83,800	\$157,000	\$523	\$523
TX-33	\$1,570	\$1,570	\$523	\$523
UNKNOWN	\$41,000	\$41,000	\$13,700	\$13,700
Subtotal	\$279,000	\$424,000	\$38,200	\$38,200

APPENDIX C | UNDISCOUNTED VALUES OF IMPACTS OF THE PROPOSED CRITICAL HABITAT DESIGNATION FOR THE PIPING PLOVER

1. This appendix summarizes the undiscounted values of pre-designation, post-designation baseline, and incremental impacts quantified in this analysis.

EXHIBIT C-1 UNDISCOUNTED PRE-DESIGNATION, POST-DESIGNATION BASELINE, AND INCREMENTAL IMPACTS ON EACH ACTIVITY
BETWEEN 1985 AND 2027

YEAR	OIL AND GAS		DEVELOPMENT		RECREATION		MARINE CONSTRUCTION/OTHER		TOTAL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
PRE-DESIGNATION IMPACTS										
1985	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1986	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1987	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1988	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1989	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1990	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
1991	\$0	\$0	\$0	\$0	\$0	\$0	\$1,130	\$1,130	\$1,130	\$1,130
1992	\$0	\$0	\$0	\$0	\$0	\$0	\$15,000	\$15,000	\$15,000	\$15,000
1993	\$89,500	\$208,000	\$2,260	\$2,260	\$0	\$0	\$9,390	\$9,390	\$101,000	\$220,000
1994	\$179,000	\$416,000	\$14,300	\$14,300	\$0	\$0	\$22,500	\$22,500	\$216,000	\$453,000
1995	\$44,700	\$104,000	\$22,100	\$22,100	\$0	\$0	\$7,130	\$7,130	\$74,000	\$133,000
1996	\$313,000	\$727,000	\$0	\$0	\$0	\$0	\$0	\$0	\$313,000	\$727,000
1997	\$45,900	\$105,000	\$0	\$0	\$0	\$0	\$0	\$0	\$45,900	\$105,000
1998	\$48,100	\$107,000	\$0	\$0	\$0	\$0	\$7,130	\$7,130	\$55,300	\$114,000
1999	\$1,130	\$1,130	\$0	\$0	\$1,130	\$1,130	\$9,390	\$9,390	\$11,700	\$11,700
2000	\$44,700	\$104,000	\$0	\$0	\$0	\$0	\$7,130	\$7,130	\$51,900	\$111,000
2001	\$91,700	\$210,000	\$7,130	\$7,130	\$0	\$0	\$21,400	\$21,400	\$120,000	\$239,000
2002	\$44,700	\$104,000	\$7,130	\$7,130	\$0	\$0	\$38,700	\$38,700	\$90,500	\$150,000
2003	\$0	\$0	\$0	\$0	\$0	\$0	\$89,300	\$162,000	\$89,300	\$162,000
2004	\$0	\$0	\$1,130	\$1,130	\$0	\$0	\$0	\$0	\$1,130	\$1,130
2005	\$1,130	\$1,130	\$0	\$0	\$0	\$0	\$7,130	\$7,130	\$8,260	\$8,260
2006	\$0	\$0	\$0	\$0	\$8,410	\$8,410	\$9,320	\$9,320	\$17,700	\$17,700
2007	\$44,700	\$104,000	\$0	\$0	\$2,080	\$2,080	\$9,390	\$9,390	\$56,200	\$115,000

YEAR	OIL AND GAS		DEVELOPMENT		RECREATION		MARINE CONSTRUCTION/OTHER		TOTAL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
POST-DESIGNATION BASELINE IMPACTS										
2008	\$243,000	\$486,000	\$2,350	\$1,700	\$21,500	\$25,000	\$172,000	\$317,000	\$439,000	\$830,000
2009	\$105,000	\$486,000	\$2,350	\$4,890,000	\$48,500	\$59,100	\$7,470	\$7,470	\$163,000	\$5,440,000
2010	\$105,000	\$486,000	\$2,350	\$349,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$872,000
2011	\$105,000	\$486,000	\$2,350	\$349,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$872,000
2012	\$105,000	\$486,000	\$2,350	\$349,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$872,000
2013	\$105,000	\$486,000	\$2,350	\$288,000	\$33,500	\$44,100	\$7,470	\$7,470	\$148,000	\$826,000
2014	\$105,000	\$486,000	\$2,350	\$288,000	\$48,500	\$59,100	\$7,470	\$7,470	\$163,000	\$841,000
2015	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2016	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2017	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2018	\$105,000	\$486,000	\$2,350	\$288,000	\$33,500	\$44,100	\$7,470	\$7,470	\$148,000	\$826,000
2019	\$105,000	\$486,000	\$2,350	\$288,000	\$48,500	\$59,100	\$7,470	\$7,470	\$163,000	\$841,000
2020	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2021	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2022	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2023	\$105,000	\$486,000	\$2,350	\$288,000	\$33,500	\$44,100	\$7,470	\$7,470	\$148,000	\$826,000
2024	\$105,000	\$486,000	\$2,350	\$288,000	\$48,500	\$59,100	\$7,470	\$7,470	\$163,000	\$841,000
2025	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2026	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000
2027	\$105,000	\$486,000	\$2,350	\$288,000	\$18,500	\$29,100	\$7,470	\$7,470	\$133,000	\$811,000

YEAR	OIL AND GAS		DEVELOPMENT		RECREATION		MARINE CONSTRUCTION/OTHER		TOTAL	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
INCREMENTAL IMPACTS										
2008	\$532,000	\$4,680,000	\$784	\$566	\$11,200	\$14,700	\$2,490	\$2,490	\$547,000	\$4,700,000
2009	\$532,000	\$4,680,000	\$784	\$310,000	\$28,100	\$38,700	\$2,490	\$2,490	\$564,000	\$5,030,000
2010	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2011	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2012	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2013	\$532,000	\$4,680,000	\$784	\$566	\$23,100	\$33,700	\$2,490	\$2,490	\$559,000	\$4,720,000
2014	\$532,000	\$4,680,000	\$784	\$566	\$28,100	\$38,700	\$2,490	\$2,490	\$564,000	\$4,720,000
2015	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2016	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2017	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2018	\$532,000	\$4,680,000	\$784	\$566	\$23,100	\$33,700	\$2,490	\$2,490	\$559,000	\$4,720,000
2019	\$532,000	\$4,680,000	\$784	\$566	\$28,100	\$38,700	\$2,490	\$2,490	\$564,000	\$4,720,000
2020	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2021	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2022	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2023	\$532,000	\$4,680,000	\$784	\$566	\$23,100	\$33,700	\$2,490	\$2,490	\$559,000	\$4,720,000
2024	\$532,000	\$4,680,000	\$784	\$566	\$28,100	\$38,700	\$2,490	\$2,490	\$564,000	\$4,720,000
2025	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2026	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000
2027	\$532,000	\$4,680,000	\$784	\$566	\$18,100	\$28,700	\$2,490	\$2,490	\$554,000	\$4,710,000