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ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE WINTERING PIPING PLOVER

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prepared for:

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EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the proposed critical habitat designation for the wintering population of the federally listed *Charadrius melodus* (piping plover). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service (Service).

2. On June 12, 2006, the Service published a proposed amendment to the critical habitat designation for the wintering piping plover for units in North Carolina. The Service then proposed a further revision to include additional areas not originally proposed. This revised proposed critical habitat designation encompasses approximately 2,043 acres in North Carolina. The proposed critical habitat is divided into four units: 1,827 acres of Cape Hatteras National Seashore, 137 acres of Pea Island National Wildlife Refuge, and 78 acres of state-owned lands.

3. The proposed amendment to critical habitat re-designating the four units was prompted by *Cape Hatteras Access Preservation Alliance v. US Department of the Interior*. In this case, the court found that the previous economic analysis failed to consider the effect of possible beach closures on off-road vehicle (ORV) use and potential administrative costs to the National Park Service (NPS) resulting from section 7 consultation. The current analysis focuses on these two sources of economic impacts, and the incremental impacts that could result if additional beach closures are undertaken to protect plover critical habitat. The analysis also considers potential impacts on other activities that could occur as a result of this designation.

4. The key findings highlighted below and Exhibits ES-1 and ES-3 summarize the quantitative results of this analysis. As noted in the key findings, there is uncertainty regarding the potential impacts of this designation on ORV use, since decisions regarding closures or other management actions have not been made to date. This analysis presents potential impacts on ORV use both in terms of social welfare (i.e. consumer surplus) values and trip expenditures. Potential impacts are estimated to range from $0 to $11.9 million in lost consumer surplus and $0 to $20.2 million in lost trip expenditures, using a real rate of seven percent over the next 20 years, with an additional $190,000 to $476,000 in administrative costs. This large range in forecast impacts is the result of uncertainty in the impact of the designation on NPS management decisions and in the response of ORV users to changes in management.

KEY FINDINGS

Total Future Impacts: Discounted, high-end forecast impacts are estimated to include about $8.0 to $11.9 million in lost consumer surplus and $13.4 to $20.2 million in lost trip expenditures, using a real rate of seven percent over the 20 year analysis. Using a real rate of three percent, high-end discounted forecast impacts include about $11.5 to $17.1 million in lost consumer surplus and $19.4 to $29.1 million in lost trip expenditures over this same time period. Forecast impacts are almost entirely made up of potential economic impacts associated with lost ORV opportunities. In the low-end cost scenario, there are no required project modifications associated with the designation, only administrative costs (about $101,000 (discounted at seven percent) over 20 years). Lost consumer surplus and lost trip expenditures are distinct measures of economic impacts, and thus are not additive. It is important to note that NPS currently anticipates ORV access to the beach will not be affected by the designation of critical habitat.

Affected Activities:

- ORV Use: This analysis considers the potential economic impacts on ORV use in Cape Hatteras National Seashore that could result from the designation of critical habitat. The analysis does not estimate any impacts on ORV use in Pea Island National Wildlife refuge and state-owned lands because these areas do not currently allow ORV access. In other areas, there is uncertainty regarding the potential impact of the designation of critical habitat for the wintering piping plover on ORV use because decisions have not been made regarding closures and other management actions. Given these uncertainties, this analysis presents two possible scenarios of future impacts resulting from wintering piping plover conservation activities:

  (1) A high-end estimate that describes the incremental impacts that could result from additional beach closures undertaken to protect plover critical habitat. This analysis assumes that incremental impacts would result from NPS closing additional areas of the beach beyond those that would be closed under current NPS management (i.e., in the absence of designation). It assumes that a percentage of all trips to these additional designated areas within Cape Hatteras National Seashore could be lost. Specifically, these lost trips result in two types of economic impacts:
    - Based on an estimated range of annual ORV visits, lost consumer surplus is estimated at $11.2 million to $16.8 million (2006 dollars, discounted at three percent) or $8.0 to $11.6 million (2006 dollars, discounted at seven percent); and
    - Based on an estimated range of annual ORV visits, lost trip expenditures are estimated at $19.4 to $29.1 million (2006 dollars, discounted at three percent), or $13.4 to $20.2 million (2006 dollars, discounted at seven percent).

  (2) A low-end estimate that assumes no trips will be lost be under a scenario in which: (a) NPS does not implement additional closures in response to the designation, (b) the additional closures that are implemented do not result in decreased level of visitation, or (c) NPS' offsetting management efforts effectively mitigate the impact of additional closures on the quality of ORV activities on the beach (i.e., ORV users do not perceive a significant loss in recreational opportunity). It is important to note that NPS currently anticipates ORV access to the beach will not be affected by the designation of critical habitat. Under this scenario, no economic impacts to ORV users are forecast.

- Administrative Costs: Administrative costs for Fish and Wildlife Service consultation with the National Park Service are estimated at $141,000 to $354,000 (2006 dollars, discounted at three percent), or $101,000 to $252,000 (2006 dollars, discounted at seven percent), under either scenario.

Unit with Greatest Impacts: The unit with the greatest projected impacts is NC-2 Cape Hatteras Point, forecast to be $0 to $4.6 million (discounted at seven percent) in lost consumer surplus (or about 40 percent of total forecast impacts) and $0 to $8.0 million in lost trip expenditures (also about 40 percent of total forecast impacts). About 26 percent of total forecast impacts are associated with Unit NC-4 Hatteras Inlet while Units NC-5 and NC-1 account for approximately 20 and 14 percent of total potential impacts respectively. These rankings are not impacted by the discount rate selected.

5. Using a real rate of three percent, discounted future potential impacts are estimated at $0 to $17.1 million in lost consumer surplus and $0 to $29.1 million in lost trip expenditures (or annualized values of $0 to $1,159,000 in lost consumer surplus and $0 to $1,957,000 in lost trip expenditures). Administrative costs discounted at three percent are forecast at $141,000 to $354,000.[1]

6. Total visitation to Cape Hatteras National Seashore is expected to generate approximately $1.1 billion (undiscounted) in trip expenditures and $653 million in consumer surplus in 2008. At the high-end, lost trip expenditures and lost consumer surplus resulting from the designation of critical habitat are forecast to represent approximately 0.1 to 0.2 percent of the economic value generated through all visitation to the Seashore.

7. This analysis addresses how management actions that may be undertaken to protect plover habitat from the potential impacts of ORV use may affect the value of these areas to ORV users and the regional economy. A primary management tool employed for plover conservation is the implementation of closures of certain portions of beach. However, closing portions of the beach can reduce the opportunities for recreational activity, such as ORV use. Reducing the area of beach available for ORV activity could result in a number of behavioral responses from ORV users, such as visiting substitute beaches, recreating in another location on the same beach (thereby increasing congestion), or choosing not to engage in ORV activities. These types of behavioral responses are described further in Section 2 of this analysis.

8. The large range of potential forecast impacts in this report reflects two major uncertainties: 1) how NPS will manage beach access differently because of the critical habitat designation (e.g., whether any additional closures will be implemented); and 2) whether any management activities, such as closures, will affect visitation levels or quality of visits for ORV users. Given these uncertainties, this analysis presents two scenarios to capture the potential range of impacts:

    (1) A high-end estimate that describes the potential incremental impacts of additional beach closures. This scenario assumes that additional closures will result in decreased trips to this area (i.e., closures in addition to those in place under current NPS management). To forecast lost trips, the analysis first forecasts trips that would occur over the next 20 years in the absence of the designation, and then forecasts the percentage of those trips that could be lost due to the designation. The percentage of trips that are lost is assumed to be a function of the percentage of visitors to whom ORV use is important, the timing of visitation, and the proportion of the area that could be closed to ORV activity. This assumption is considered reasonable in this case because Cape Hatteras is a unique site for recreation with no readily available substitute sites, and the areas

[1] Guidance provided by OMB on discounting over time specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, Feb. 3, 2003.)

proposed for critical habitat are the more frequently visited ORV use areas.

(2) A low-end estimate that assumes that no trips will be lost either because NPS does not implement additional closures in response to the designation, or because the closures do not result in decreased level of visitation or quality of ORV activities on the beach (i.e., ORV users do not perceive a significant loss in recreational opportunity). It is important to note that NPS currently anticipates ORV access to the beach will not be affected by the designation of critical habitat; under this scenario, there are no lost trips in the future. According to the Fish and Wildlife Service, "it is highly unlikely that the Service would recommend any additional closures associated with wintering plover critical habitat."[2] NPS states that "all closures, their size and configuration are unlikely to be affected by the critical habitat designation. Visitors will continue to be allowed to drive on the beach in order to access other forms of recreation."[3]

For purposes of the executive summary, potential impacts associated with the low-bound estimate are presented as the "low" estimate and costs associated with the high-bound estimate are presented as the "high" estimate. The range presented in the high estimate reflects a range in potential number of ORV visits. The estimated impacts associated with each scenario are detailed in Section 2.

9. Exhibit ES-2 ranks the units proposed for critical habitat designation in order of magnitude of potential impacts using the highest number of potential ORV visits under the high end estimate. For more detailed information regarding present value impacts by activity in each unit, see Exhibit ES-3.

[2] Written communication from the Service, Atlanta Regional Office, January 26, 2007.

[3] Written communication from Mike Murray, Park Superintendent, Cape Hatteras National Seashore, January 19, 2007.

EXHIBIT ES-1 SUMMARY OF POTENTIAL FUTURE IMPACTS (2007-2026)

CATEGORY	PRESENT VALUE, 3%		PRESENT VALUE, 7%	
	LOW	HIGH	LOW	HIGH
Consumer Surplus and Other Opportunity Costs				
Total Economic Impacts	$141,000	$11,533,000 - $17,122,000	$101,000	$7,991,000 - $11,860,000
Annualized Impacts	$13,000	$764,000 - $1,159,000	$18,000	$749,000 - $985,000
Trip Expenditures				
Total Economic Impacts	$0	$19,406,000 - $29,109,000	$0	$13,435,000 - $20,152,000
Annualized Impacts	$0	$1,304,000 - $1,957,000	$0	$1,268,000 - $1,632,000

Note: The range of high-end impacts represents a range in the number of estimated ORV visits.

EXHIBIT ES-2 UNITS RANKED BY LEVEL OF POTENTIAL IMPACT (HIGH END)

UNIT	PRESENT VALUE, 3%				PRESENT VALUE, 7%			
	CONSUMER SURPLUS		TRIP EXPENDITURES		CONSUMER SURPLUS		TRIP EXPENDITURES	
	IMPACTS	PERCENT OF TOTAL	IMPACTS	PERCENT OF TOTAL	IMPACTS	PERCENT OF TOTAL	IMPACTS	PERCENT OF TOTAL
NC-2	$6,701,000	40%	$11,633,000	40%	$4,639,000	40%	$8,053,000	40%
NC-4	$4,310,000	26%	$7,482,000	26%	$2,984,000	26%	$5,180,000	26%
NC-5	$3,372,000	20%	$5,854,000	20%	$2,335,000	20%	$4,053,000	20%
NC-1	$2,385,000	14%	$4,140,000	14%	$1,651,000	14%	$2,866,000	14%
Total	**$16,768,000**	**100%**	**$29,109,000**	**100%**	**$11,609,000**	**100%**	**$20,152,000**	**100%**

Note: Totals do not reflect administrative costs associated with multiple units. Totals may not sum due to rounding.

EXHIBIT ES-3 SUMMARY OF POTENTIAL FUTURE IMPACTS BY UNIT AND ACTIVITY IN PROPOSED CRITICAL HABITAT, 2007-2026

UNIT	PRESENT VALUE, 3%		PRESENT VALUE, 7%	
	LOW	HIGH	LOW	HIGH
ORV USE				
Consumer Surplus				
NC-1	$0	$1,590,000 - $2,385,000	$0	$1,101,000 - $1,651,000
NC-2	$0	$4,467,000 - $6,701,000	$0	$3,093,000 - $4,639,000
NC-4	$0	$2,873,000 - $4,310,000	$0	$1,989,000 - $2,984,000
NC-5	$0	$2,248,000 - $3,372,000	$0	$1,556,000 - $2,335,000
Multiple[1]	$0	$0	$0	$0
Total	**$0**	**$11,179,000 - $16,768,000**	**$0**	**$7,739,000 - $11,609,000**
Trip Expenditures				
NC-1	$0	$2,760,000 - $4,140,000	$0	$1,911,000 - $2,866,000
NC-2	$0	$7,755,000 - $11,633,000	$0	$5,369,000 - $8,053,000
NC-4	$0	$4,988,000 - $7,482,000	$0	$3,453,000 - $5,180,000
NC-5	$0	$3,903,000 - $5,854,000	$0	$2,702,000 - $4,053,000
Multiple[1]	$0	$0	$0	$0
Total	**$0**	**$19,406,000 - $29,109,000**	**$0**	**$13,435,000 - $20,152,000**
ADMINISTRATIVE COSTS				
Multiple Units[1]	$141,000	$354,000	$101,000	$252,000
Total	**$141,000**	**$354,000**	**$101,000**	**$252,000**

Notes:

[1] Costs in the "Multiple" category are comprised of administrative expenses from consultations that address multiple units.

[2] Totals may not sum due to rounding.

[3] The range of high-end impacts represents a range in the number of estimated ORV visits.

CHAPTER 1 | FRAMEWORK FOR ANALYSIS

10. The purpose of this report is to estimate the economic impact of actions taken to protect the wintering population of the federally listed *Charadrius melodus* (piping plover), within areas proposed for designation. It attempts to quantify the economic effects associated with the proposed designation of critical habitat. It does so by taking into account the cost of conservation-related measures that are likely to be associated with future economic activities that may adversely affect plover habitat within the amendment boundaries. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.[4] 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).[5]

11. This chapter provides background information on the species and the proposed amendment. Next, it describes the regulatory alternatives considered by the Service. Then, it describes the approach to estimating incremental impacts and lays out the scope of the analysis. Information sources relied upon are summarized in the next section. The chapter concludes with a description of the organization of the remainder of this report.

1.1 BACKGROUND

12. On December 11, 1985, the Service published the final rule listing the piping plover as endangered in the Great Lakes watershed and threatened elsewhere in its range. Critical habitat was subsequently designated for the wintering population along the southern Atlantic and Gulf coasts.[6]

13. In February 2003, the Cape Hatteras Access Preservation Alliance filed a lawsuit challenging the designation of critical habitat for four North Carolina units, NC-1, NC-2, NC-4, and NC-5. Through the subsequent decision in *Cape Hatteras Preservation Alliance v. Department of the Interior,* critical habitat for these units was vacated and remanded to the Service for review in November 2004.

14. This ruling stated that the economic analysis should consider economic impacts resulting from possible closures of the beach to off-road vehicle (ORV) use as well as administrative costs resulting from section 7 consultation between the Service and NPS.

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[4] 16 U.S.C. §1533(b)(2)

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

[6] For a description of this species and the primary constituent elements that are essential to its conservation, see the Final Rule at 66 FR 36038-63143.

The current analysis focuses on these two sources of economic impacts, and the incremental impacts that could result from additional beach closures undertaken to protect plover critical habitat within Cape Hatteras National Seashore.[7]

15. The Service first proposed to re-designate these units in June 2006, and subsequently revised the proposal to include additional areas, including Pea Island National Wildlife Refuge and state-owned islands. The Service now identifies 2,043 acres in Dare and Hyde counties as potential critical habitat for the wintering piping plover. This proposed critical habitat is divided into four units; including 1,827 acres of Cape Hatteras National Seashore, 137 acres of Pea Island National Wildlife Refuge, and 78 acres of state-owned lands. Exhibit 1-1 summarizes landownership and acreage by unit. For a map showing the location of each unit, see Appendix B.

EXHIBIT 1-1 LAND OWNERSHIP BY UNIT (ACRES)

UNIT	OWNER	ACRES
Unit NC-1 Oregon Inlet	Federal	422
	State	64
Unit NC-2 Cape Hatteras Point	Federal	646
Unit NC-4 Hatteras Inlet	Federal	396
	State	15
Unit NC-5 Ocracoke Island	Federal	502
	Total	**2,043**

Note: Table may not sum due to rounding.

1.2 REGULATORY ALTERNATIVES

16. Executive Order 12866 directs Federal Agencies to evaluate regulatory alternatives. The Service identifies four units, or areas of proposed critical habitat. The potential impacts of designating all four units are estimated in this report. An alternative to the proposed rule is to only designate a portion of the units. Section 4(b)(2) of the Act allows the Service to exclude areas proposed for designation based on economic impact and other relevant impact. Consideration of impacts at a unit level may result in alternate combinations of proposed habitat that may or may not ultimately be designated as critical habitat. As a result, the impacts of designating multiple combinations of proposed habitat are also available to the Service through this economic analysis.

1.3 APPROACH TO ESTIMATING ECONOMIC IMPACTS

17. This economic analysis considers economic efficiency effects that may result from activities to protect the wintering piping plover and its habitat (hereinafter referred to collectively as "conservation activities"). Economic efficiency effects generally reflect

[7] At this time, NPS is not undertaking any other activities on which it expects to be required to consult in the future. Other than recreational activities, NPS also does not know of any projects or activities such as US Army Corps of Engineers dredging that could potentially be affected by critical habitat. Personal communication, Thayer Broili, National Park Service, Cape Hatteras National Seashore, February 1, 2007.

"opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if activities that can take place on a parcel of land are 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 conservation activities.

1.3.1 EFFICIENCY EFFECTS

18. At the guidance of the Office of Management and Budget (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 wintering 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.[8]

19. 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 US 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 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.

20. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, a designation that precludes 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. This analysis measures both compliance costs to Federal agencies and welfare losses to recreators.

[8] 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.

CALCULATING PRESENT VALUE AND ANNUALIZED IMPACTS

For each land use activity, this analysis compares economic impacts incurred in different time periods in present value terms. The present value represents the value of a payment or stream of payments in common dollar terms. That is, it is the sum of a series of past or future cash flows expressed in today's dollars. Translation of economic impacts of past or future costs to present value terms requires the following: a) past or projected future costs of wintering piping plover conservation activities; and b) the specific years in which these impacts have been or are expected to be incurred. With these data, the present value of the past or future stream of impacts (PV_c) of wintering piping plover conservation efforts from year t to T is measured in 2007 dollars according to the following standard formula:[a]

$$PV_c = \sum_{t}^{T} \frac{C_t}{(1+r)^{t-2007}}$$

C_t = cost of piping plover conservation efforts in year t

r = discount rate[bP]

Impacts of conservation efforts for each activity in each unit are also expressed as annualized values. Annualized values are calculated to provide comparison of impacts across activities with varying forecast periods (T). For this analysis, however, all activities employ a forecast period of 20 years, 2007 through 2026. Annualized impacts of future plover conservation activities (APV_c) are calculated by the following standard formula:

$$APV_c = PV_c \left[\frac{r}{1-(1+r)^{-(N)}} \right]$$

N = number of years in the forecast period (in this analysis, 20 years)

[a] To derive the present value of past conservation activities for this analysis, t is 1998 and T is 2006; to derive the present value of future conservation efforts, t is 2007 and T is 2026.
[b] To discount and annualize costs, guidance provided by the OMB specifies the use of a real rate of seven percent. In addition, OMB recommends sensitivity analysis using other discount rates such as three percent, which some economists believe better reflects the social rate of time preference. (U.S. Office of Management and Budget, Circular A-4, September 17, 2003 and U.S. Office of Management and Budget, "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 *Federal Register* 5492, February 3, 2003.)

1.3.2 DISTRIBUTIONAL AND REGIONAL ECONOMIC EFFECTS

21. 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.[9] 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.

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

22. This analysis also considers how small entities, including small businesses, organizations, and governments, as defined by the Regulatory Flexibility Act, might be affected by future conservation activities for the wintering piping plover.[10] In addition, in response to Executive Order 13211 "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation activities on the energy industry and its customers.[11]

1.4 DEFINING THE BASELINE

23. In its guidelines on preparing economic analysis, developed in accordance with the recommendations set forth in Executive Order 12866 ("Regulatory Planning and Review"), OMB directs Federal agencies to measure impacts against a baseline. OMB states, "[t]his baseline should be the best assessment of the way the world would look absent the proposed action."[12] When viewed in this way, the economic impacts of critical habitat designation involve evaluating the "without critical habitat" baseline versus the "with critical habitat" scenario. Impacts of designation equal the difference, or increment, between these two scenarios.

24. In its November 2004 decision vacating and remanding critical habitat for units NC-1, NC-2, NC-4, and NC-5, the United States District Court for the District of Columbia states, "[w]hile the Tenth Circuit is correct that the ESA requires some economic analysis, it is wrong when it holds the baseline approach violates the language of the statute…With respect for the judges who found the Tenth Circuit opinion 'well-reasoned,' this Court… finds the Tenth Circuit's rejection of the baseline approach ill

[9] 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.

[10] 5 U.S.C. § 601 *et seq*.

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

[12] OMB, *Circular A-4*, September 17, 2003, p. 15.

advised. The baseline approach is a reasonable method for assessing the actual costs of a particular critical habitat designation."[13]

25. In light of this direction from the court, this analysis attempts to measure the incremental impact of critical habitat designation associated with ORV activity, which is considered a threat to the species and habitat. There is uncertainty regarding the potential impacts of this designation on ORV use, since decisions regarding closures or other management actions have not been made to date. Therefore, as discussed in detail in Section 2, this analysis forecasts economic impacts of critical habitat designation to ORV activities under two scenarios:

- A high-end estimate that describes the incremental impacts that could result from additional beach closures undertaken to protect plover critical habitat. This analysis assumes that incremental impacts would result from NPS closing additional areas of the beach beyond those that would be closed under current NPS management (i.e., in the absence of designation). It assumes that a percentage of all trips to these additional designated areas within Cape Hatteras National Seashore could be lost; and
- A low-end estimate that assumes no trips will be lost because: (a) NPS does not implement additional closures in response to the designation, (b) the additional closures that are implemented do not result in decreased level of visitation, or (c) NPS' offsetting management efforts effectively mitigate the impact of additional closures on the quality of ORV activities on the beach (i.e., ORV users do not perceive a significant loss in recreational opportunity). It is important to note that NPS currently anticipates ORV access to the beach will not be affected by the designation of critical habitat.

These scenarios define the range of incremental costs that may result from the designation of critical habitat, depending on the Service's and the U.S. National Park Service's future implementation of the regulation.

1.5 BENEFITS

26. Under Executive Order 12866, OMB directs Federal agencies to provide an assessment of both the social costs and benefits of proposed regulatory actions.[14] 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.[15]

27. 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

[13] *Cape Hatteras Access Preservation Alliance* v. *U.S. Department of Interior* (344 F. Supp. 2d 108 (D.D.C. 2004)).

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

[15] 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.

literature has documented that social welfare benefits can result from the conservation and recovery of endangered and threatened species. In its guidance for implementing Executive Order 12866, OMB acknowledges that it may not be feasible to monetize, or even quantify, the benefits of environmental regulations due to either an absence of defensible, relevant studies or a lack of resources on the implementing agency's part to conduct new research.[16] *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.*

28. 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.

29. 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. 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. In this case, some ancillary benefits may accrue to non-ORV users. A discussion of these benefits is included in Section 2.

1.6 ANALYTIC TIME FRAME

30. 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. This analysis forecasts future economic impacts on activities from 2007 to 2026, and estimates administrative costs from 1985 (year of the species' final listing) to 2026. Forecasts of economic conditions and other factors beyond the next 20 years would be speculative.

1.7 INFORMATION SOURCES

31. The primary sources of information for this report were communications with and data provided by personnel from the Service and Federal action agencies. Specifically, the analysis relies on data collected in communication with personnel from the following entities:

[16] Ibid.

- The Fish and Wildlife Service; and
- The National Park Service.

32. In addition, this analysis relies on the Service's section 7 consultation records, public comments, and published sources. The reference section at the end of this document provides a full list of information sources.

1.8 STRUCTURE OF THE REPORT

33. The remainder of this report is organized as follows:

- Section 2: Economic Impacts on Recreational Activities;
- Section 3: Economic Impacts on Other Activities;
- Section 4: Administrative Costs;
- References;
- Appendix A: Impacts on Small Entities and Energy Use;
- Appendix B: Map of Proposed Critical Habitat;
- Appendix C: Undiscounted Stream of Impacts by Activity.

CHAPTER 2 | ECONOMIC IMPACTS ON RECREATIONAL ACTIVITIES

34. This section describes past and potential future impacts of wintering piping plover conservation activities associated with recreation on the Cape Hatteras National Seashore. Specifically, this analysis discusses potential incremental impacts on recreational activities such as off-road vehicle (ORV) use and recreational fishing that could result from the closure of additional beach areas beyond those closed under current NPS management. It is important to note that there is uncertainty regarding the potential impacts of this critical habitat designation on ORV use, since decisions regarding closures or other management action have not been made.

35. This section is divided into two parts: (1) background information on Cape Hatteras National Seashore, its current and proposed management for piping plover, and how these management efforts may affect recreational opportunity; and (2) the methods and results of an analysis of potential economic impacts of management efforts that may be undertaken in response to the designation of critical habitat for the plover.

2.1 SUMMARY OF ECONOMIC IMPACTS

36. This analysis does not estimate any past impacts on ORV activity resulting from wintering piping plover conservation activities. Current management in Cape Hatteras National Seashore allows for ORV access throughout the park except for areas closed for human safety or species protection reasons. Given that these closures change frequently and may be used to protect a variety of species, this analysis does not attribute the impacts of past closures to critical habitat designation for the piping plover.

37. As discussed below, future impacts depend on a wide range of closure-specific factors; as a result, generating a single best estimate would require a model of changes in behavior in response to closures. Such a model does not exist at this time. Instead, this analysis bounds the likely range of impacts according to two scenarios:

    (1) The high bound estimate describes incremental impacts assuming additional areas are subject to closure to ORV use due to critical habitat designation (i.e., closures in addition to those that would occur under current NPS management, i.e., in the absence of designation). This scenario further assumes that these closures will impact the quality or number of ORV trips to the Seashore. This analysis first identifies those areas that may be subject to additional closures because of critical habitat designation. It then forecasts seasonal ORV trips to these areas over the next twenty years and assumes that these trips will be lost, resulting in lost regional expenditures and reductions in consumer surplus. This assumption is considered reasonable in this case because Cape Hatteras is

a unique site for recreation with no readily available substitute sites, and the areas proposed for critical habitat are the more frequently visited ORV use areas.

(2) A low-end estimate that assumes no trips will be lost because: (a) NPS does not implement additional closures in response to the designation, (b) the additional closures that are implemented do not result in a decline in visitation, or (c) NPS' offsetting management efforts effectively mitigate the impact of additional closures on the quality of ORV activities on the beach (i.e., ORV users do not perceive a significant loss in recreational opportunity). It is important to note that NPS currently anticipates ORV access to the beach will not be affected by the designation of critical habitat. Under this scenario, no economic impacts to ORV users are forecast.

38. Potential economic impacts are presented both in terms of trip expenditures lost from the regional economy and welfare losses to ORV users. These impacts are presented in Exhibit 2-1. Under the low bound estimate, no economic impacts associated with ORV activities are forecast. Under the high bound scenario, present value lost expenditures are estimated at $13.4 to $20.2 million (2006 dollars, discounted at seven percent) while present value welfare losses are estimated to be $7.7 to $11.6 million (2006 dollars, discounted at seven percent).

EXHIBIT 2-1 HIGH BOUND ESTIMATE: FUTURE ECONOMIC IMPACTS ASSOCIATED WITH A PARTIAL LOSS OF TRIPS (2007-2026)

UNIT	TOTAL WELFARE VALUE		TOTAL TRIP EXPENDITURES	
	PRESENT VALUE (DISCOUNTED AT 7%)		PRESENT VALUE (DISCOUNTED AT 7%)	
	LOW	HIGH	LOW	HIGH
NC-1 Oregon Inlet	$1,101,000	$1,651,000	$1,911,000	$2,866,000
NC-2 Cape Hatteras Point	$3,093,000	$4,639,000	$5,369,000	$8,053,000
NC-4 Hatteras Inlet	$1,989,000	$2,984,000	$3,453,000	$5,180,000
NC-5 Ocracoke Island	$1,556,000	$2,335,000	$2,702,000	$4,053,000
Total	**$7,739,000**	**$11,609,000**	**$13,435,000**	**$20,152,000**

Notes:
Table may not sum due to rounding.
The range of impacts reflects a range in the number of estimated ORV visits.

2.2 BACKGROUND

39. Located in North Carolina's Outer Banks, Cape Hatteras National Seashore encompasses approximately 24,470 acres with an additional 5,880 acres forming Pea Island National Wildlife Refuge. Between 2001 and 2005, the Seashore received between 2.2 and 2.9 million visitors per year.[17] The most popular recreational activities for the park include recreational fishing, swimming, and sunbathing. While beach (or ORV) driving is not necessarily the primary reason for visiting the park, ORVs are the primary means of access to other forms of recreation (e.g., fishing, swimming, sunbathing, etc.) for many visitors to the park (see Exhibit 2-2).

EXHIBIT 2-2 PROFILE OF ACTIVITY PARTICIPATION BY NUMBER OF PARTICIPANTS WITHIN A SURVEYED SAMPLE AT CAPE HATTERAS NATIONAL SEASHORE

ACTIVITY	PRIMARY PURPOSE	RANK	PARTICIPATED	RANK
Recreational Fishing	385	1	720	4
Sunbathing	112	2	731	3
Swimming	94	3	757	2
Beach Driving	66	4	783	1
Camping	43	5	180	13
Visiting Lighthouses	26	6	521	7
Surfing	18	7	143	14
Wind-Surfing	14	8	36	20
Walking for Enjoyment	14	8	677	5
Shell Collecting	7	10	608	6
Bird Watching	6	11	316	10
Bicycling	4	12	187	12
Tournament Fishing	4	12	29	21
Jogging/Walking for Exercise	3	14	439	8
Kayaking/Canoeing	3	14	118	15
Picnicking	2	16	323	9
Other	2	16	51	19
Walking the Dog	1	18	197	11
Attending Special Events	1	18	87	16
Motor Boating	1	18	79	17
Sailing	1	18	17	22
Attending Nature/ Environmental Programs	0	24	75	18
Commercial Fishing	0	23	11	23
Hunting	0	22	5	24

Source: Hans Vogelsong, Cape Hatteras National Seashore Visitor Use Study, August 2003.

[17] National Park Service Park Use Statistics Office, Visitation Statistics, available at: http://www2.nature.nps.gov/stats/

40. According to a recent visitor use study, the units proposed for critical habitat (Oregon Inlet, Cape Hatteras Point, Hatteras Inlet, and Ocracoke Island) are among the top five most popular ORV use areas in the park. Unit NC-2 (Cape Hatteras Point) had the most ORV use within the park while Unit NC-1 (Oregon Inlet) is the second most popular ORV area.[18] While allowing for a ranking of these units in terms of popularity, best available data do not provide more specific estimates of the magnitude of visitation at each unit.

2.2.1 CURRENT ORV MANAGEMENT

41. Critical habitat includes approximately 137 acres owned by the Service and approximately 78 acres owned by the state. The 137 acres owned by the Service are part of the Pea Island National Wildlife Refuge. Currently the area is managed "to protect and conserve migratory birds and other wildlife resources through the protection of wetlands," and ORV use on the beach is prohibited. [19] The state-owned lands are managed by the state's Wildlife Resources Commission. Like the refuge lands, the state-owned areas are also managed specifically for waterbirds, and beach access is similarly restricted.[20] Because current management does not allow ORV access in these areas, this analysis does not forecast any loss in ORV trips associated with these areas.

42. The rest of the designation is managed by the National Park Service as part of Cape Hatteras National Seashore. The Seashore provides migration, wintering, nesting, and breeding habitat for a wide variety of federally listed species as well as other state and park listed sensitive species, including the piping plover, the American oystercatcher, Wilson's plover, several species of sea turtle, and the seabeach amaranth (a plant). Management for these protected species and their habitat is currently subject to pending litigation, and may change in the future.

2.2.1.1 Interim Protected Species Management Strategy

43. Originally, NPS proposed to manage the park under the Interim Protected Species Management Strategy (Strategy).[21] The Service completed a formal consultation and issued a biological opinion on the Strategy in August 2006.[22] The Strategy was intended both to ensure proper species management and to provide for adequate use of the seashore's recreational resources until such time as NPS finalizes a long-term ORV management plan. The development of the ORV management plan was prompted by

[18] Hans Vogelsong, Cape Hatteras National Visitor Use Study, August 2003.

[19] Service, *Pea Island National Wildlife Refuge: Comprehensive Conservation Plan*, September 2006. Accessed at: http://library.fws.gov/CCPS/peaisland_final.pdf.

[20] North Carolina Wildlife Resources Commission, *North Carolina Inland Fishing, Hunting, and Trapping Regulation Digest,* Effective July 2007. Accessed at: http://www.wildlife.state.nc.us/pg02_Regs/2007_08_Regulations_Digest.pdf

[21] Cape Hatteras National Seashore, Interim Protected Species Management Strategy/Environmental Assessment, January 2006.

[22] Cape Hatteras National Seashore, Interim Protected Species Management Strategy/Environmental Assessment, January 2006.

increased use of the park and the need for NPS to meet its obligations to protect federally listed species under the Endangered Species Act.

44. ORVs were managed under a Cape Hatteras National Seashore Superintendent's Order and the Strategy. Under the Strategy, NPS planned to undertake various management actions for the piping plover, including seasonal closures for the breeding population, year-round closures of important foraging and roosting sites, continued predator removal, additional recreation use restrictions, and public outreach.[23] Costs of enacting the Strategy to the NPS were primarily associated with meeting staffing needs and additional materials and supplies needs (see Exhibit 2-3). Because these costs were associated with a wide variety of species and still would be implemented absent the designation of critical habitat for the wintering population of the piping plover, this analysis does not attribute these costs to the designation of critical habitat.

EXHIBIT 2-3 ESTIMATE OF ADDITIONAL COSTS TO NPS OF IMPLEMENTING THE STRATEGY

ACTION	ASSUMPTION	ADDITIONAL ANNUAL IMPACTS	
Natural Resource Management	6 full-time staff, no additional funding required. Part-time staff increased from 4 seasonal personnel and 5 Student Conservation Association interns to 16 seasonal positions. All current available funds used for full-time positions, part-time positions would require new funding.	Staff	$221,000
		Materials	$57,000
		Subtotal	**$277,000**
Interpretation	Duties of existing staff would be reprogrammed to meet all interpretive needs. Additional materials and supplies required.	**Subtotal**	**$11,000**
Law Enforcement	Duties of existing 16 staff positions would be reprogrammed to meet all law enforcement needs.	**Subtotal**	**$0**
		Total Additional Costs	**$288,000**

Source: Cape Hatteras National Seashore, Interim Protected Species Management Strategy/Environmental Assessment, January 2006.
Note: Table may not sum due to rounding.

45. North Carolina is unique in that it is the only state where the piping plover's breeding and wintering ranges overlap and the birds are present year-round. Therefore, NPS manages for both the breeding and the wintering populations of the piping plover. It is important to distinguish between management for these two distinct populations, in that the Strategy proposed separate seasonal closures to protect pre-nesting and breeding areas (for the breeding population) and year-round closures to protect foraging and roosting areas (for the wintering population).

46. To protect breeding habitat, the NPS proposed to close breeding areas with symbolic fencing beginning in April of each year. Expansion of closure areas could occur based on unfledged chick movement, with nest buffers between 600 and 3,000 feet depending on bird behavior. Closures would be removed in July if the closures were not occupied

[23] *Ibid.*

during the breeding season. If the areas are utilized by the plovers, then closures and buffers would be removed once all of the chicks have fledged or been lost. Some suitable interior habitat at Cape Point and the spits would be closed year-round to provide for resting and foraging.

47. NPS does not anticipate that breeding closures under the Strategy would constrain ORV activities or the ability of ORV users to access fishing, swimming, or sunbathing sites.[24] According to NPS, loss of access will be minimized to the extent possible by the use of pedestrian and ORV access corridors, alternate routes, and bypasses around closures where feasible.[25]

48. Breeding closures and year-round foraging and roosting closures proposed under the Strategy overlap critical habitat to an extent; however, in general, closures are smaller than designated critical habitat areas. NPS does not anticipate changing its management due to the designation of critical habitat. That is, it does not anticipate either significantly enlarging these breeding closures or maintaining the breeding closures during the wintering season because of the designation of critical habitat, nor does it anticipate enlarging the year-round foraging and roosting habitat closures because of the designation of critical habitat.[26]

2.2.1.2 Consent Decree in *Defenders of Wildlife v. National Park Service*

49. On October 18, 2007, Defenders of Wildlife and the National Audubon Society sued National Park Service alleging deficiencies in the Strategy. On April 30, 2008, a consent decree was signed to resolve the litigation, modifying management of the park.[27]

50. Management under the consent decree is generally similar to management under the Strategy, stating that "the Selected Alternative of the Interim Strategy ('Interim Strategy'), as described in the Finding of No Significant Impact ("FONSI") approved July 13, 2007, shall remain in full force and effect, except as modified by the following provisions of this Consent Decree." [28]

51. These modifications include specifically defined pre-nesting closures for the 2008 breeding seasons. Future pre-nesting closures should "incorporate to the maximum extent possible the areas delineated in the 2008 pre-nesting closure maps." [29] It also requires NPS to establish buffers for observed breeding behavior of between 50 and 1000 meters for piping plovers. Nonessential ORVs are prohibited within the buffer areas.

[24] Personal communication with Mark Hardgrove, et al., Cape Hatteras National Seashore, August 22, 2006.

[25] Written communication from Mike Murray, Park Superintendent, Cape Hatteras National Seashore, January 19, 2007.

[26] Written communication from Mike Murray, Park Superintendent, Cape Hatteras National Seashore, January 19, 2007.

[27] Consent Decree in *Defenders of Wildlife v. National Park Service* (2:07-CV-45-BO).

[28] Consent Decree in *Defenders of Wildlife v. National Park Service* (2:07-CV-45-BO).

[29] Consent Decree in *Defenders of Wildlife v. National Park Service* (2:07-CV-45-BO).

2.2.1.3 H.R. 6233/S. 3113

52. Two congressional bills (HR 6233 and S 3113) designed to overturn the consent decree were introduced on June 11, 2008. Each bill proposes to re-instate the Strategy in place of the consent decree. Currently, the bills are in committee.[30]

2.2.1.4 Summary

53. Due to the legal and legislative factors discussed above, the future direction and nature of ORV management and management for protected species at Cape Hatteras National Seashore is uncertain. NPS has stated that it does not anticipate changing its management due to the designation of critical habitat for the plover. Local user groups, however, are concerned that the designation of critical habitat will lead to an outright ban on ORV use within Cape Hatteras National Seashore, thereby curtailing their participation in activities such as shelling and fishing. They report that previous restrictions on ORV use caused by overgrown vegetation, storm events, or closures to protect natural resources have already limited the amount of beach available for recreation. Local groups also fear that more closures will impact the local economy by reducing visitation to the area.[31]

54. This analysis considers the economic impacts that would result from closures in addition to those that would take place under current ORV restrictions.

2.2.2 APPROACH TO ESTIMATION

55. This analysis quantifies the potential impacts of plover management activities on ORV use within the proposed critical habitat. Future management activities resulting in access restrictions or restrictions on the types of activities taking place may diminish the quality of the recreational experience or reduce recreational opportunities for ORV users.

56. The economic value of a natural resource, such as a beach, "resides in the contributions that the ecosystem functions and services make to human well-being."[32] Public policy that changes the services provided by a natural resource, whether a positive or a negative change, results in a change in the value of the system. This change is measured in terms of the change of individuals' well-being (also referred to as "welfare").

57. The magnitude of the effect of a public policy that alters the services provided by natural resources depends on people's preferences for varying bundles of goods and services and the availability of substitute services. Regarding preferences, economists assume that "a bundle with a larger quantity of an element will be preferred to a bundle with a smaller quantity of that element, other things being equal."[33] In other words, access to more

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[30] HR 6233 and S 3113. Accessed at: http://www.govtrack.us/congress/billtext.xpd?bill=h110-6233.

[31] Mary Goodloe-Murphy, "Habitat, beach access get look," *Coastland Times,* August 13, 2006; Outer Banks Preservation Association, "Specific Issues: Permanent ORV Use and Management Plan," accessed at: http://www.obpa.net/index.php?option=com_content&task=view&id=14&Itemid=29&phpshop=46b43149ad057c478e9d47691a05a51d on October 6, 2006.

[32] Freeman, A. Myrick, *The Measurement of Environmental and Resource Values: Theory and Methods* (2nd ed.), Resources for the Future Press: Washington, DC, 2003, p. 7.

[33] Freeman, A. Myrick, "Economic Valuation: What and Why," in *A Primer on Nonmarket Valuation*, Patricia A. Champ, Kevin J. Boyle, and Thomas C. Brown (Eds.), Kluwer Academic Publishers: Dordrecht, Netherlands, 2003, p. 11.

beach is preferable to less beach, and therefore more highly valued, all other things being equal. Economists also assume that it is possible to increase the quantity of another service or good sufficiently to make the individual indifferent between two bundles.[34] If substitute goods or services are readily available to compensate for the reduction in services resulting from a public policy, then the change in value of the natural resource may be small or immeasurable.

58. This analysis seeks to describe how plover habitat management activities affect the types of services provided by beaches in the proposed critical habitat area. Closures may affect beach visitation by either reducing the availability of certain sections of the beach for recreation (changing the quality and quantity of beach opportunity provided), or increasing the density of visitors in unrestricted sections of the beach.

59. Ideally, this analysis would employ an economic model of recreators' preferences for different beach locations and activities to predict how beach visitation and enjoyment might change as a result of plover habitat management activities. For example, as a result of additional closures on the beach, ORV users may decide to visit a second-best location on that beach, visit a less-preferred beach, or decide not to take a beach trip at all. The welfare loss associated with each option, measured in terms of a decrease in consumer surplus, will vary depending on the recreator's value of his first choice beach experience and alternatives.[35] In the absence of such a model, this analysis applied assumptions about both the likely management activities, and response of ORV users by applying best available information regarding site characteristics and past visitation patterns.

60. For this analysis, the high-end impact scenario values lost ORV trips in the proposed critical habitat area, as opposed to increased crowding of open areas or the decision of ORV users to visit substitute sites. This effectively assumes that some ORV users are completely deterred from engaging in ORV activities because of critical habitat-related closures. This assumption is considered reasonable for generating a high-end impact estimate in this case because Cape Hatteras is a unique site for recreation with no readily available substitute sites, and the areas proposed for critical habitat are the more frequently visited ORV use areas.

61. This analysis applies information from a survey of beach users at this site regarding the percentage of visitors that are likely to visit the site less frequently or would stop visiting completely if ORVs were not allowed on the beach. This percentage (61.4 percent) is then applied as an estimate of the visitors whose behavior may change (i.e., cease visiting the beach) in the event of additional closures.[36]

62. In addition to lost welfare values, the occurrence of fewer beach-related trips will result in reductions in recreation-related expenditures in the local community. This analysis

[34] Ibid., p. 11.

[35] DeShazo, J.R. Memorandum provided to Industrial Economics, Inc. The Effects of Closing a Portion of a Recreational Site on Visitation and Social Welfare: A Literature Review.

[36] This percentage is derived from combining the percentage of visitors that are likely to visit the site less frequently (32.4 percent) and the percentage of visitors that would stop visiting completely (29 percent) if ORVs were not allowed on the beach. Best available data do not allow for estimation of the change in visitation rate for those 32.4 percent that would visit less frequently; therefore, the analysis presents a range of possible impacts.

therefore provides information on the potential reduction in regional spending associated with decreased visitation to critical habitat areas.

63. Because it is uncertain whether the NPS will implement additional closures, this analysis also provides a low-end estimate of impacts. If no critical habitat-related closures are implemented, no economic impacts are expected. Further, even in the case that additional ORV closures occur because of the designation, the NPS Strategy describes efforts to provide alternate routes and corridors around the closure areas to minimize the effect of the closures on ORV users. In the case that additional closures are not implemented, or the closures do not result in any real or perceived restrictions on beach access, no changes in consumer welfare or regional expenditures are expected. Thus, this analysis estimates a low-end impact of zero.

64. The following section describes the specific methods and data employed to estimate the impacts of potential beach closures resulting from critical habitat designation.

2.3 FUTURE ECONOMIC IMPACTS ON ORV USE IN CAPE HATTERAS NATIONAL SEASHORE

2.3.1 METHODOLOGY

65. To forecast potential economic impacts on ORV use, this analysis estimates the number of ORV trips potentially impacted by the designation of critical habitat and the value associated with these trips. Because the number of ORV trips is assumed to be related to the level of park visitation, this analysis develops a projection of total park visitation over the next twenty years, and the associated percentage of park visitors that engage in ORV recreation. Then it determines the impact of proposed ORV closures on visitation by estimating the percentage of trips that may be lost. This is done by:

(1) Developing an estimate of ORVs per acre within the park for both the winter and summer season;

(2) Estimating the additional acreage that may be subject to closure (i.e., the difference between current closures and proposed critical habitat) for both winter and summer;

(3) Applying the ORV per acre estimate to this additional acreage to develop an estimate of the number of ORV trips to each area; and

(4) Assuming that 61.4 percent of these ORVs trips will be lost.

Finally, to estimate the economic value of these lost trips, this analysis develops a welfare value and a trip expenditure value for each lost trip to the park. These steps are further detailed below and outlined in Chart 2-1.

CHART 2-1. FLOW CHART OF ESTIMATION METHODOLOGY

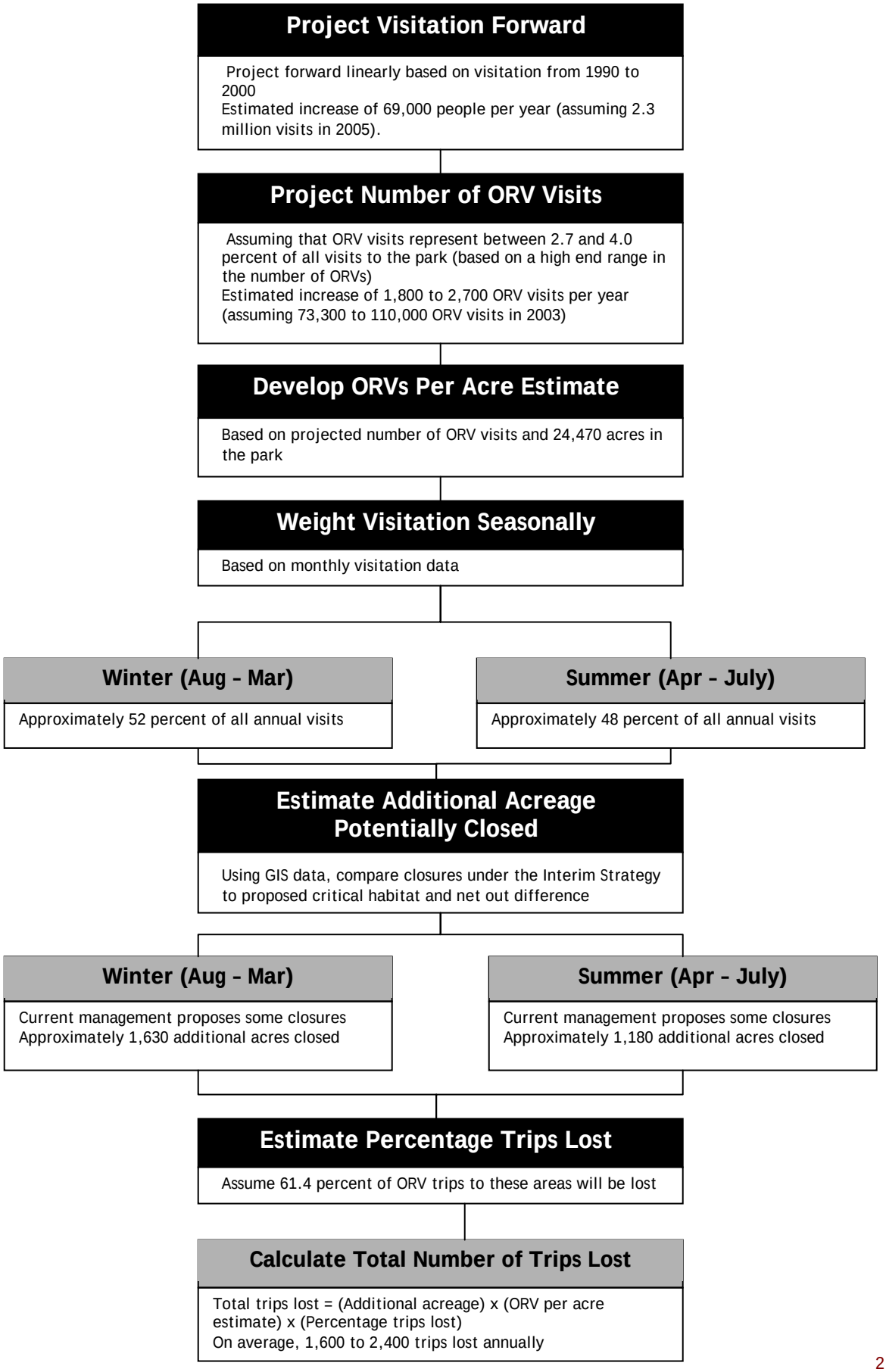
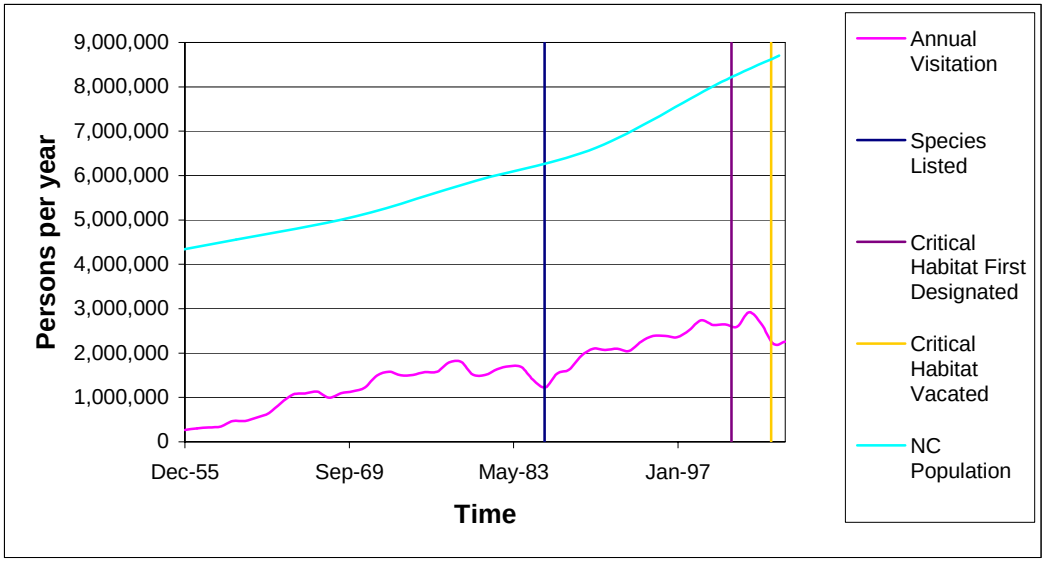


EXHIBIT 2-4 TRENDS IN ANNUAL VISITATION AT CAPE HATTERAS NATIONAL SEASHORE AS COMPARED TO THE POPULATION OF NORTH CAROLINA



Source: National Park Service Park Use Statistics Office, Visitation Statistics, available at: http://www2.nature.nps.gov/stats/; US Census, North Carolina: Population of Counties by Decennial Census: 1900 to 1990, available at: http://www.census.gov/population/cencounts/nc190090.txt.

2.3.1.1 Projecting Park Visitation

66. Participation in recreational activities such as visiting a national park is influenced by a number of factors including population, demographic, and economic trends. For Cape Hatteras National Seashore, visitation also may be influenced by the weather, in particular the number and severity of storm events such as hurricanes. In addition, regulatory activity such as the listing of a species as threatened or endangered or the designation of critical habitat may affect visitation.

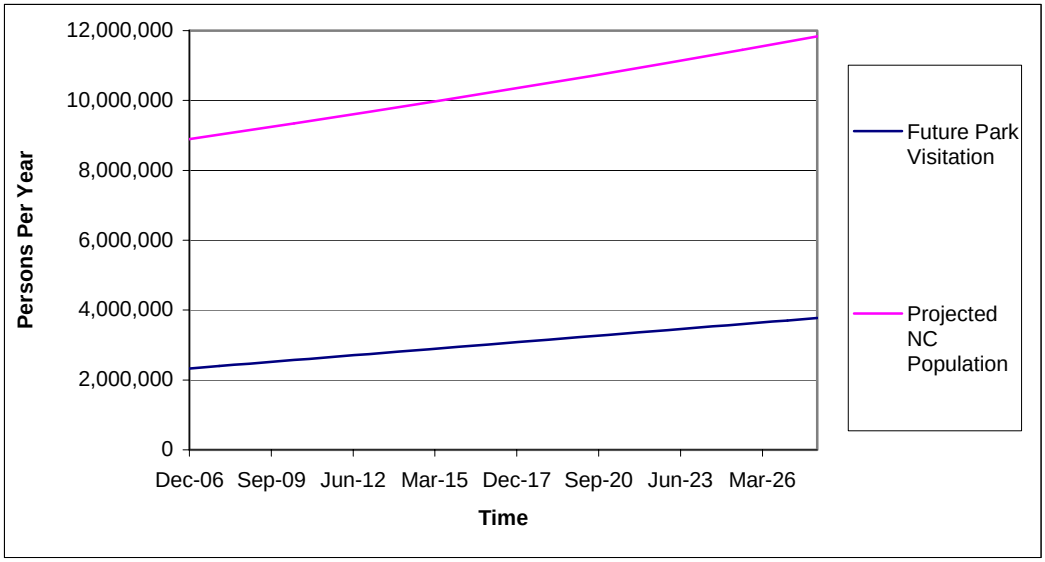
67. The number of visitors to Cape Hatteras National Seashore has been increasing steadily since the opening of the park in 1953 (see Exhibit 2-4). After the listing of the species in 1985, visitation continued to increase, reaching a high point in 2002. Since 2002, visitation has declined from 2.9 million to 2.2 million annual visitors. This decline in visitation may be a result of Hurricanes Isabel, Alex, and Charlie, which made landfall on the North Carolina coast in 2003 and 2004. Between 2004 and 2005, the park experienced a slight increase in visitation of approximately 52,000 visitors.

68. This analysis projects visitation forward linearly using the slope of annual visitation for the ten years prior to the first designation of critical habitat (1990-2000). Using a period prior to the first designation of critical habitat prevents possible impacts on visitation resulting from that designation from being incorporated into the analysis, thus allowing the analysis to focus on the incremental impacts of future critical habitat on visitation. Incidentally, from 1990 to 2000, the slope of North Carolina's population growth curve is approximately the same as its projected rate of growth of population for 2005 through 2030. Assuming that the trend in participation in recreation at the Seashore (i.e. visits to

the park) is directly correlated to statewide population trends, park visitation should have approximately the same slope from 2005 to 2030 as it did from 1990 to 2000.

69. Applying this assumption, visitation to the Seashore is projected to increase by approximately 69,000 visitors per year over the next twenty years (see Exhibit 2-5). Thus, total visitation to Cape Hatteras National Seashore is expected to generate approximately $1.1 billion (undiscounted) in trip expenditures and $653 million in consumer surplus in 2008. Note that this forecast in future visitation to the Seashore reflect past patterns; in reality, visitation will be driven by many factors (e.g., the economy, demographic shifts, the weather, etc.), all of which are difficult to forecast relative to the baseline period.

EXHIBIT 2-5 PROJECTED PARK VISITATION (2006-2027)



Source: US Census Bureau, Interim Projections of the Total Population for the United States and States: April 1, 2000 to July 1, 2030, available at: http://www.census.gov/population/projections/SummaryTabA1.pdf.

70. This analysis projects ORV visitation forward based on a current annual estimate of 73,256 to 110,288 ORV trips to the Seashore obtained from a study of visitor use at Cape Hatteras National Seashore.[37] This estimate has been criticized because: (1) it is based on a series of brief, on-site counts of ORVs rather than daily totals obtained from on-site observation throughout the entire day; and (2) it is not based on a "probability sample" of visitors (i.e., a sample in which each visitor has an equal probability of being selected to respond to the survey).[38] To address these criticisms:

(1) The brief, on-site counts will provide reasonable estimates of the number of ORV visits if all ORV visitors spend the entire day at the beach. If

[37] Hans Vogelsong, Cape Hatteras National Visitor Use Study, August 2003.

[38] See public comments of James C. Luizer on the Interim Protected Species Management Strategy, undated; public comments of William D. Neal, Senior Partner, SDR Consulting, January 8, 2008.

visits tend to be shorter than a day, then these brief counts will likely miss a portion of the ORV visitors. In particular, ORV visitors will not be counted if their entire visit occurs either before or after the survey personnel arrive on site. This will lead to an underestimate of the total number of ORVs. It would be difficult to adjust the estimates from this survey to address this issue, as the degree of potential bias would depend on many unknown factors, including the distribution of ORV trip lengths, arrival/departure times, and the times selected for the on-site counts. While this analysis acknowledges that Vogelsong's approach may underestimate ORV visitation, these are the currently the best available data, the biases in the results obtained using these data are well understood and described herein.

(2) The Vogelsong report does not provide a detailed description of the sampling approach and estimation methodology. Lacking this, this analysis assumes that a probability sample was not used. However, it does appear that Vogelsong sampled on a reasonably large number of days (both weekdays and weekends) well distributed through the year, and that the sampling covered the major beach areas used by ORVs. While probability sampling is clearly preferable for this type of study, this analysis expects that the Vogelsong study is sufficiently representative for use in our analysis.

71. The Vogelsong study also underwent peer review, which concluded that the study did not "appear to provide a sound scientific basis for estimating ORV use at CAHA [Cape Hatteras National Seashore]."[39] However, if the data were to be used, the peer review recommended that "a matrix of estimates of total park visitation and ORV use should be presented to reflect the imprecise nature of these estimates as generated from the data collected in the Vogelsong study… Providing a matrix or range of estimates would provide a basis for identifying upper-bound and lower-bound estimates of the social, environmental and economic impacts of park visitation and ORV use at CAHA."[40]

72. While acknowledging the potential weaknesses in the Vogelsong study, this analysis assumes that this study provides the best estimate of ORV visits currently available.[41] As recommended in the peer review, this analysis presents a range of estimates of ORV use, and recognizes that, due to the sampling approach used in the study, these ORV estimates should probably be considered a lower bound estimate of ORV use at the Seashore.

73. ORVs represent approximately 2.7 to 4.0 percent of all visitors to the park;[42] therefore, the number of ORVs visiting the park is expected to increase by between 1,800 and 2,700

[39] See Jim Gramann, *Summary of Review Comments on Two Reports Analyzing ORV Use at Cape Hatteras National Seashore*, 2008.

[40] Jim Gramann, *Summary of Review Comments on Two Reports Analyzing ORV Use at Cape Hatteras National Seashore,* 2008.

[41] Over the 2006 Memorial Day weekend, NPS performed a one-time fly-over of the park that counted 3,000 ORVs on the beach. See public comment of Patricia Doen, American Sportfishing Association, July 26, 2007. However, a one-time count on a holiday weekend does not provide sufficient information to estimate annual average visitation.

[42] See Hans Vogelsong, Cape Hatteras National Visitor Use Study, August 2003. Vogelsong estimates 73,526 to 110,288 ORVs used the beach between 2001 and 2002 when the park received an average of 2,758,392 visitors.

per year absent the designation of critical habitat. The value of trip expenditures associated with ORV visitation to the park between 2007 and 2026 is estimated to be $752 million to $1.1 billion (undiscounted) in trip expenditures, or approximately 6.7 to 9.7 percent of the value of total visitation.

2.3.1.2 Effects of Closures on Visitor Behavior

74. The development of a site-specific estimate of the likely impact of closures on ORV use would require a model that predicts visitor behavior given changes in use restrictions. Such a model does not exist for this site. In addition, the future impacts of these closures are subject to the following uncertainties:

- **Breeding bird behavior.** The extent of breeding closures will change annually depending on when birds arrive at Cape Hatteras, where they choose to nest, how far unfledged chicks roam, and when birds depart the park. The changing size and location of closures makes it difficult to determine how many acres will be closed annually.
- **Foraging and roosting habitats.** The extent of year-round foraging and roosting habitat closures will change annually depending on the frequency with which these habitats are created or destroyed due to natural processes (e.g., hurricanes and storms) and where these habitats occur in relation to bird occurrence. The changing size and location of foraging and roosting closures make it difficult to determine how many acres will be closed annually.
- **Natural events.** Hurricanes and tropical storms affect the extent of beach available for recreators. During a storm, beach width may be lost or ORV routes destroyed, thus affecting ORV use.
- **Availability of ORV access routes.** NPS plans to provide ORV corridors around proposed closures as well as alternate and bypass routes as necessary. The design and location of these routes will change depending on the extent of closures, bird behavior, and natural events.
- **Behavior of ORV users.** The availability of access routes may allow ORV use to continue at unaffected rate due to NPS efforts to provide alternate access routes, or the availability of substitute sites for ORV use. However, even with alternate access routes, some ORV users may choose not to participate in ORV recreation in the region.
- **Outcome of pending litigation.** As discussed in Section 2.2.2, there is currently ongoing litigation regarding ORV management at the Seashore. While a consent decree has been signed, legislation has been proposed to overturn the consent decree. Therefore, future ORV management at Cape Hatteras National Seashore is highly uncertain.

75. As a result, this analysis bounds the possible effects by assuming that, in the low-end scenario, no trips will be lost because: (a) NPS does not implement additional closures in response to the designation, (b) the additional closures that are implemented do not result in decreased level of visitation, or (c) NPS' offsetting management efforts effectively

mitigate the impact of additional closures on the quality of ORV activities on the beach (i.e., ORV users do not perceive a significant loss in recreational opportunity). It is important to note that NPS currently anticipates ORV access to the beach will not be affected by the designation of critical habitat.

76. For the high-end scenario, this analysis assumes that closures will result in a reduction in visitation according to the following assumptions:

- **Future closures under the Strategy will occur in similar areas.** Breeding and foraging and roosting habitat closures under the Strategy are based on past observations of bird behavior, bird activity, and bird use. It is therefore assumed that future breeding closures and foraging and roosting habitat closures will occur in approximately the same areas as current closures.
- **Visitation is dependent on the total area available for recreation.** In the absence of a site-specific model, this analysis assumes that visitation is a function of the area available for recreation. Therefore, reducing the area available for recreation by constructing closures would reduce visitation to the beaches. Specifically, this analysis assumes that the reduction in visitation is directly proportional to the percentage reduction in area available for recreation. This analysis also assumes that closures under the Strategy would be made absent the designation of critical habitat. It therefore estimates incremental impacts associated with the additional area that may be subject to closure under critical habitat (i.e. the difference in area between breeding bird or foraging and roosting closures proposed under the Strategy and the critical habitat area).
  - For the months of April through July when current breeding closures are in place, this difference in area is approximately 1,180 acres or 4.8 percent of total park area (see Exhibit 2-6). For these months, this analysis estimates impacts associated with closing that additional 1,180 acres.
  - For the months of August through March when current foraging and roosting closures are in place, this difference in area is approximately 1,630 acres or 5.8 percent of total park are (see Exhibit 2-6). For these months, this analysis estimates impacts associated with closing that additional 1,630 acres.

EXHIBIT 2-6 ADDITIONAL ACREAGE SUBJECT TO CLOSURE

UNITS	CRITICAL HABITAT ACREAGE	ADDITIONAL AREA SUBJECT TO CLOSURE (APR - JUL)	ADDITIONAL AREA SUBJECT TO CLOSURE (AUG - MAR)
Unit 1	485	176	224
Unit 2	646	543	585
Unit 4	411	328	396
Unit 5	502	133	424
Total	**2,043**	**1,180**	**1,628**

Note: Table may not sum due to rounding.

- **Visitation will continue to vary seasonally.** Park visitation varies from month to month with the greatest number of visits usually occurring during the summer months. To estimate the appropriate number of trips potentially impacted in a given month, this analysis weights visitation seasonally. According to monthly park visitation data from 1990 to 2000, approximately 48 percent of annual trips to the park take place between April and July.[43] This analysis thus assigns 48 percent of projected future annual trips to the April through July period, and the remaining 52 percent to the rest of the year.
- **Percentage of visitors that will not visit the park if additional closures are implemented.** In the absence of a model to predict ORV user behavior, this analysis estimates a percentage of trips likely to be lost based on visitor preferences expressed in a study of visitors to Cape Hatteras. The study reported that approximately 61.4 percent of visitors to the park would visit less often or stop visiting completely if ORVs were not allowed on the beach.[44] Cape Hatteras is a unique site for recreation for which substitute sites are not readily available. Thus it is reasonable to assume that most visitors to the park will continue to visit even if ORV access is restricted.

Thus for the high-bound estimate, this analysis first weights visitation, assigning 48 percent of annual trips to the period from April to July and 52 percent to the remaining months. Then, from April to July, it assumes that 61.4 percent of the trips taking place during that period to approximately 1,180 acres of the park will be lost. From August through March, an estimated 61.4 percent of the trips on approximately 1,630 acres of the park will be lost.

77. It is possible that closures may result in a slight increase in visitation by some recreators that would offset decreased ORV visitation.[45] For example, visitors may participate more frequently in recreational activities such as sunbathing if fewer ORVs are present on the beach. The Vogelsong study estimates that approximately 9.0 percent of visitors to areas potentially subject to ORV closures would visit more often if these closures were implemented, compared to a possible loss of 61.4 percent of ORV trips to closed areas. The average per-person consumer surplus value per day of beach recreation is approximately $31 ($2006).[46] However, in the absence of a site-specific model to predict how non-ORV users will react to possible closures, it is not possible to determine the

[43] National Park Service Park Use Statistics Office, Visitation Statistics, available at: http://www2.nature.nps.gov/stats/. Visitation statistics are available by first clicking "Visitation," then "Visitation Databases," then "Park by Month 1979-2005," and selecting Cape Hatteras National Seashore.

[44] Hans Vogelsong, Cape Hatteras National Visitor Use Study, August 2003.

[45] See, for example, Hans Vogelsong, Cape Hatteras National Visitor Use Study, August 2003, where 9 percent of visitors report that they would visit more often if ORVs were not allowed on the beach. However, this percentage cannot be meaningfully applied without knowing the increased rate at which these recreators would visit the park and how they would react to increased crowding of available open areas.

[46] Lew, Daniel K. and Douglas M. Larson, "Valuing Recreation and Amenities at San Diego County Beaches," *Coastal Management* 33:71-86, 2005.

possible magnitude of this increase in trips. That is, it is not possible to estimate: (1) the number of additional trips this 9.0 percent of non-ORV visitors may take in any given year, (2) possible offsetting reductions in consumer surplus resulting from increased crowding in open areas of the beach, or (3) the effects of increased crowding on overall visitation rates. Analysis of past visitation data does not provide any noticeable trends in visitation related to past management actions; annual and monthly variations in visitation are more likely due to factors such as weather and economic trends.[47]

2.3.1.3 Trip Expenditures and Welfare Values

78. This analysis presents economic impacts both in terms of consumer surplus (welfare) values, and in terms of trip expenditures. Consumer surplus values for a user day of recreation represent the maximum amount that users would be willing to pay above and beyond the current costs of the activity to participate in the activity. By participating in ORV activities at Cape Hatteras, users are able to accrue consumer surplus. The total surplus provided to all users of areas proposed for critical habitat is one measure of the economic value of this area, and thus one measure of the efficiency loss that might result from closure of the critical habitat areas to ORV use. Trip expenditures measure the total amount of money a visitor spends on a trip to Cape Hatteras. These expenditures provide information on the regional economic contribution and small business impacts of ORV use.

79. To estimate trip expenditures, this analysis applies the results of a visitor use study for Cape Hatteras National Seashore. The values were derived from a mail-back survey requesting respondents estimate how much money they spent while visiting the Outer Banks. On average, trip expenditures were estimated at approximately $460 (see Exhibit 2-7).[48]

[47] In the past, NPS has not observed significant trends in visitation related to past management closures. At this time, NPS does not anticipate substantially increased visitation to the park due to potential closures. Personal communication with Thayer Broili, Chief of Resource Management, Cape Hatteras National Seashore, National Park Service, April 2, 2007.

[48] The Vogelsong study states that these expenditures are per visitor per trip. However, comparison to other studies of beach trip expenditures indicate that the estimated values may be high, see, for example, King, P. and M.J. Potepan, The Economic Value of California Beaches, Public Research Institute, San Francisco State University, May 1997, which estimates day trip expenditures at $66.25 and overnight trips at $293.95. It is more likely that the values in the Vogelsong study capture family expenditures; therefore, this analysis assumes that these expenditures are per ORV.

EXHIBIT 2-7 AVERAGE DAILY EXPENDITURE FOR A VISIT TO THE CAPE HATTERAS NATIONAL SEASHORE

TYPE OF EXPENDITURE	AVERAGE DAILY EXPENDITURE ($2006)
Admission Fees	$3.62
Food and Beverage (includes restaurants, taverns, groceries, etc.)	$95.72
Shopping (includes clothing, personal items, souvenirs, etc.)	$48.80
Lodging (includes hotels, motels, B&Bs, etc.)	$161.07
Transportation (includes parking fees, gasoline, etc.)	$29.39
Entertainment and recreation	$24.59
All other expenses	$99.31
Total	**$462.51**

Source: Hans Vogelsong, Cape Hatteras National Visitor Use Study, August 2003.

80. According to the visitor use study, this $463 expenditure estimate represents expenditures per person per day. However, it seems unlikely that an individual would spend approximately $95 per day on food, meaning that a family of four would spend upwards of $380 per day on food. It seems more likely that heads of household responded to the survey with household expenditures. Thus, this analysis applies the $460 trip expenditure value on a per ORV, as opposed to per individual, basis. With an average of 2.5 people per ORV, this equates to expenditures of approximately $180 per person per day.[49]

81. It is possible that these estimated daily expenditures, while an average of visitor responses, are skewed more heavily toward expenditures on summer trips. Expenditures on winter trips are likely to be lower for various reasons such as off-season hotel rates, etc. To the extent that summer expenditures are overrepresented in the responses, this average may be an overestimate for winter trip expenditures.

82. To identify an appropriate per-trip welfare value for an ORV trip, the economic literature was reviewed for relevant valuation studies. Because beach driving at Cape Hatteras is a means of accessing other forms of recreation, particularly recreational fishing, the average welfare value used considers the value of both a day of ORV driving and a day of recreational fishing. This analysis focused on recreational fishing as the primary recreational activity accessed by ORV and potentially impacted by critical habitat because:

- In the Vogelsong study, visitors reporting angling and beach driving as their primary park activities reported the most favorable attitudes toward ORV use. Visitors whose primary activities were swimming, sunbathing,

[49] Several public comments provided anecdotal information regarding their trip expenditures. Some commenters noted that they spent between $8,000 and $15,000 annually on trips to Cape Hatteras, while another commenter stated that they spent approximately $2,000 to $2,400 for a one-week trip. Assuming expenditures of $465 per day, a seven day trip would have expenditures of $3,255. If five trips are taken per year, this amounts to approximately $16,275 per year, suggesting that the $465 estimate of daily expenditures is reasonably in line with these comments. Public comments of Kevin Ryan, June 12, 2007; public comments of Eddie Lentz, July 30, 2007; public comments of Stuart S Vines, June 26, 2007.

camping, etc. reported less favorable attitudes toward ORV use, suggesting that these forms of recreation are not as reliant on ORVs.

- Proposed critical habitat areas are generally located at the ends of the islands which are more desirable to anglers. More substitute sites are available for general beach activities such as sunbathing, swimming, and camping than for angling.
- These angling areas generally are located more than a mile from beach access points (such as parking lots), necessitating the use of an ORV to access them.

83. Because the per day average value of ORV driving is small relative to the average value of a recreational fishing day, this analysis assume the average values of ORV driving in these studies do not fully encompass the value of associated recreational fishing. The values of these two activities are therefore added to estimate the total value of a trip that incorporates both activities. Exhibit 2-8 highlights the existing studies, and the associated values used to arrive at an average per trip consumer surplus value of about $266.

EXHIBIT 2-8 SUMMARY OF RECREATIONAL WELFARE VALUES

AUTHORS	STUDY LOCATION	VALUE ESTIMATE ($2006)
ORV/Beach Driving		
Englin et al. (2003)[1]	North Carolina	$15.09
		$97.04
Jakus (2003)	Utah	$56.07
		$64.69
IEc (2002)	Texas	$38.24
	Driving Day Average	**$54.23**
Recreational Fishing		
McConnell et al. (1993)	East Coast	$236.62
McConnell et al. (1994)	East Coast	$187.78
	Angler Day Average	**$212.20**
	Total Welfare Value	**$266.43[2]**

Notes:

[1] Assuming that a trip is one day long.

[2] The $266.43 value is applied to the number of ORV visits, which can represent multiple individuals. Thus, the surplus per person is lower.

Source: Englin, Jeffrey, Thomas Homes, and Rebecca Neill, *Alternative Systems of Semi-logarithmic Incomplete Demand Equations: Modeling Recreational Off-Highway Vehicle Site Demand,* Western Regional Research Publication, 2003; Jakus, Paul, *Estimating the Economic Value of All-Terrain Vehicle Recreation in Utah,* Department of Economics, Utah State University, September 2003; IEc, *Padre Island National Seashore Visitor Day Values*, 2002; McConnell, K., Q. Weninger, and I. Strand, *Testing the Validity of Contingent Valuation by Combining Referendum Responses with Observed Behavior*, 1993; McConnell, K.E. Strand, and I.E. Strand, *The Economic Value of Mid and South Atlantic Sportfishing,* 1994.

2.3.2 HIGH-END ESTIMATE

84. In order to estimate the incremental effects of critical habitat designation, this analysis estimates the additional area that may be subject to closure under critical habitat and a percentage of trips to that area that may be lost as a result of the additional closures (1,180 acres closed from April to July and 1,630 closed from August to March) as described above. This results in between 61,900 and 92,800 lost ORV trips over the next twenty years.

85. Applying trip expenditure and welfare values described above and using a real rate of seven percent, the value of these lost trips over twenty years are estimated to be $7.7 to $11.6 million in lost consumer surplus and $13.4 to $20.2 million in trip expenditures, or annualized values of $731,000 to $940,000 in lost consumer surplus and $1.3 to $1.6 million in lost trip expenditures.

EXHIBIT 2-9 LOSS IN TRIP EXPENDITURES AND WELFARE VALUE BASED ON A PARTIAL LOSS OF TRIPS (2007-2026)

UNIT	TOTAL NUMBER OF LOST TRIPS[1]		TOTAL LOST WELFARE VALUE (DISCOUNTED AT 7%)[2]		TOTAL LOST EXPENDITURES (DISCOUNTED AT 7%)[3]	
	LOW	LOW	HIGH	HIGH	LOW	HIGH
NC-1 Oregon Inlet	9,500	14,200	$1,101,000	$1,651,000	$1,911,000	$2,866,000
NC-2 Cape Hatteras Point	24,300	36,500	$3,093,000	$4,639,000	$5,369,000	$8,053,000
NC-4 Hatteras Inlet	14,800	22,200	$1,989,000	$2,984,000	$3,453,000	$5,180,000
NC-5 Ocracoke Island	13,300	19,900	$1,556,000	$2,335,000	$2,702,000	$4,053,000
Total	**61,900**	**92,800**	**$7,739,000**	**$11,609,000**	**$13,435,000**	**$20,152,000**

Notes:
[1] Assumes that 61.4 percent of ORV trips to additional closed areas will be lost.
[2] Based on an average welfare value of $266.43 per day.
[3] Based on an estimated $462.51 in daily expenditures per ORV.

2.3.3 LOW-END ESTIMATE

86. For the low-end estimate, this analysis assumes that no trips will be lost. According to the Fish and Wildlife Service, based on current management strategies at Cape Hatteras, "it is highly unlikely that the Service would recommend any additional closures associated with wintering piping plover critical habitat given that the NPS will be protecting the essential resources that are needed during the wintering months."[50] NPS states that "all closure, and their size and configuration are unlikely to be affected by the critical habitat designation. Visitors will continue to be allowed to drive on the beach in order to access other forms of recreation."[51] Therefore, assuming either no additional beach closures are implemented with the designation of critical habitat, or any additional closures do not result in any real or perceived constraints on the level or quality of ORV recreation, the low-end estimate of economic impacts associated with critical habitat designation is zero.

[50] Written communication from the Service, Atlanta Regional Office, January 26, 2007.

[51] Written communication from Mike Murray, Park Superintendent, Cape Hatteras National Seashore, January 19, 2007.

CHAPTER 3 | ECONOMIC IMPACTS ON OTHER ACTIVITIES

87. This chapter considers incremental economic impacts of critical habitat designation for the wintering piping plover on activities other than recreation that may take place within the areas proposed for critical habitat. These activities may include dredging as well as bridge repair and construction.

3.1 DREDGING

88. According to NPS' 2006 Interim Species Management Strategy, the U.S. Army Corps of Engineers (USACE) periodically undertakes maintenance dredging to the Oregon Inlet Channel between Bodie and Hatteras Islands. During dredging, a section of shoreline on the southern end of Bodie Island is temporarily closed.

89. Dredging activities may impact the plover if the disposal of dredging spoils occurs on beaches where plovers are nesting or foraging. That said, the Service believes that these dredging spoils are usually reworked by wave action and are thus are unlikely to negatively affect critical habitat over the longer term. In addition, dredged sand may provide valuable habitat for related species such as terns, Wilson's plover, and seabeach amaranth.[52] NPS also does not believe that this dredging activity will be affected by the designation of critical habitat.[53]

90. There may be an increased rate of section 7 consultation for these dredging projects following critical habitat designation. Administrative costs associated with these consultations are estimated in Chapter 4 of this report.

3.2 TRANSPORTATION ACTIVITIES

91. The North Carolina Department of Transportation (NCDOT) and the Federal Highway Administration currently plan to replace Bonner Bridge, which spans Oregon Inlet. The draft Environmental Impact Statement considers two replacement bridge corridors; bridge replacement is scheduled to be completed by 2010.[54]

92. The bridge itself is located outside of proposed critical habitat areas, and the Service does not currently anticipate that any impacts on critical habitat will result from the bridge

[52] Industrial Economics, *Economic Analysis of Critical Habitat Designation for Piping Plover: Wintering Habitat*, April 2001.

[53] Personal communication, Thayer Broili, National Park Service, Cape Hatteras National Seashore, February 1, 2007.

[54] Cape Hatteras National Seashore, Interim Protected Species Management Strategy/Environmental Assessment, January 2006.

replacement project.[55] No other transportation projects are currently anticipated in critical habitat areas.

3.3 OTHER ACTIVITIES

93. Other activities taking place within Cape Hatteras National Seashore that may impact the species are currently managed under the 2006 Interim Species Management Strategy. These activities may include surveying and monitoring, vegetation removal, research, and other management activities. Therefore, this analysis does not estimate any incremental impacts on these activities resulting from critical habitat.

[55] Written communication from the Service, Raleigh Field Office, December 14, 2007.

CHAPTER 4 | ADMINISTRATIVE COSTS

94. This chapter presents estimates of future administrative costs associated with the areas proposed as critical habitat under the amendment for the wintering piping plover. Included are administrative costs of actions taken by the NPS under Section 7 of the Act. First, this section estimates the costs of consultations and technical assistance efforts. Next, the section forecasts the number of technical assistance efforts and consultations likely to result from activities in the areas designated in the amendment. Based on this analysis, estimates of past and future administrative costs are derived.

4.1 ESTIMATED COSTS OF CONSULTATIONS AND TECHNICAL ASSISTANCE

95. Estimates of the cost of an individual consultation and technical assistance request were developed from a review and analysis of historical section 7 files from a number of Service field offices around the country conducted in 2002. These files addressed consultations conducted for both listings and critical habitat designations. Cost figures were based on an average level of effort of low, medium, or high complexity, multiplied by the appropriate labor rates for staff from the Service and other Federal agencies.

96. The administrative costs estimates presented in this section take into consideration the level of effect of the Service, the Action agency, and the applicant, as well as the varying complexity of the consultation or the technical assistance request. Costs associated with these consultations include the administrative costs associated with conducting the consultations, such as the costs of time spent in meetings, preparing letters, and the development of a biological opinion. Exhibit 4-1 provides a summary of the estimated administrative costs of consultations and technical assistance requests.

EXHIBIT 4-1 ESTIMATED ADMINISTRATIVE COSTS OF CONSULTATION AND TECHNICAL ASSISTANCE EFFORTS (PER EFFORT)

CONSULTATION TYPE	SERVICE	ACTION AGENCY	THIRD PARTY	BIOLOGICAL ASSESSMENT
Technical Assistance	$260-$680	N/A	$600-$1,500	N/A
Informal Consultation	$1,000-$3,100	$1,300-$3,900	$1,200-$2,900	$0-$4,000
Formal Consultation	$3,100-$6,100	$3,900-$6,500	$2,900-$4,100	$4,000-$5,600

Source: IEc analysis based on data from the Federal Government Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from several Service field offices across the country. Confirmed by local Action agencies.
Note: Low and high estimates primarily reflect variations in staff wages and time involvement by staff.

4.2 SUMMARY OF PAST ADMINSTRATIVE COSTS

97. Since the listing of the species in 1985, the Service has formally consulted once with the NPS regarding its Interim Protected Species Management Strategy. This analysis assumes that NPS has also undertaken some technical assistance efforts and informal consultations in the past.[56] For example, following Hurricane Ophelia, NPS consulted informally on restoring access.

98. In addition, the Service also performed an intra-Service consultation on the Pea Island National Wildlife Refuge Comprehensive Conservation Plan, as well as consultations with the Army Corps of Engineers (USACE) on sand disposal operations within the Refuge.[57]

99. As shown in Exhibit 4-2, past administrative costs are estimated at $154,000 to $384,000. Administrative costs resulting from past formal consultations are estimated to have been between $85,900 and $137,800 while informal consultations and technical assistance requests are estimated to have cost between $67,800 and $246,500 since the listing of the species.

4.3 SUMMARY OF FUTURE ADMINISTRATIVE COSTS

100. This analysis assumes that the rate of consultation will increase slightly after the designation of critical habitat. NPS will be required to consult on any activity likely to adversely affect the wintering piping plover or its habitat that was not evaluated in the Interim Protected Species Management Strategy. For example, if re-establishing access after a major storm event is likely to adversely modify habitat, the NPS would be required to consult.[58] NPS also may need to consult on its future ORV management plan. At this time, NPS is not undertaking any other activities on which it expects to be required to consult in the future.[59]

101. The Service plans to continue to consult with USACE on future sand disposal operations. In addition, it plans to consult with the Federal Highways Administration on the replacement of Bonner Bridge. At this time, this project is not expected to affect proposed critical habitat;[60] therefore, this analysis does not include administrative costs associated with this project.

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[56] The exact number of informal consultations and technical assistance requests is unknown. To estimate the number of informal consultations, a ratio of informal consultations to formal consultations of 2.4 to 1 was used. To estimate the number of technical assistance requests, a ratio of technical assistance requests to formal consultations of 3 to 1 was used. These ratios were based on information provided by the Service for previous analyses.

[57] Written communication with the Service, Raleigh Field Office, Service, December 14, 2007.

[58] Written communication with the Service, Raleigh Field Office, August 23, 2006.

[59] Personal communication, Thayer Broili, National Park Service, Cape Hatteras National Seashore, February 1, 2007.

[60] Written communication with the Service, Raleigh Field Office, Service, December 14, 2007.

102. As shown in Exhibit 4-2, future administrative costs are estimated at $101,000 to $252,000, assuming a seven percent discount rate over twenty years, or $18,000 to $45,000 annually (discounted at seven percent). This analysis does not attribute these costs to any specific unit because location of consultation will likely be park-wide (in the case of the ORV management plan) or determined by unpredictable events such as major storms.

4.4 CAVEATS

103. The number of consultations and technical assistance efforts to be undertaken in the future for activities within a given unit is highly uncertain. The frequency of such efforts will be related to the level of economic activity, the presence of management plans that obviate the need for consultation, natural events such as hurricanes, and the extent to which economic activity overlaps with critical habitat. To the extent that this analysis over or underestimates the number of these efforts in the future, estimated costs will be over or understated.

EXHIBIT 4-2 ADMINISTRATIVE COSTS FOR THE PARK SERVICE

UNIT	TYPE OF CONSULT	PAST COSTS (1985-2006) (DISCOUNTED AT 7%)			FUTURE COSTS (2007-2026) (DISCOUNTED AT 7%)		
		TOTAL	TOTAL COSTS (LOW)	TOTAL COSTS (HIGH)	TOTAL	TOTAL COSTS (LOW)	TOTAL COSTS (HIGH)
All Units	Formals	6	$45,500	$73,000	7	$56,300	$90,400
	Informals	14	$27,500	$109,200	18	$34,000	$135,200
	Technical Assistance	18	$8,400	$21,400	22	$10,500	$26,500
	Total	**38**	**$81,400**	**$203,600**	**48**	**$100,800**	**$252,000**

NOTE: The number of past informal consultations and technical assistance requests is unknown. Based on discussions with the Service for other species, a ratio of technical assistance requests to formal consultations of 3 to 1 is assumed. A ratio of informal consultations to formal consultations of 2.4 to 1 is assumed. A ratio of future consultations to past consultation of 1.3 to 1 is assumed. Table may not sum due to rounding.

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5 U.S.C. §§601 *et seq*.

16 U.S.C. §1533(b)(2).

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APPENDIX A | SMALL BUSINESS AND ENERGY IMPACTS ANALYSES

104. This Appendix considers the extent to which the analytic results presented in the previous Sections reflect potential future impacts to small businesses and the energy industry. The small business analysis presented in this appendix is conducted pursuant to the RFA as amended by the SBREFA in 1996. Information was gathered from the Small Business Administration (SBA), U.S. Census Bureau, and the Risk Management Association (RMA). The energy analysis in Section A.2 is conducted pursuant to Executive Order No. 13211.

A.1 SBREFA ANALYSIS

105. In accordance with SBREFA, when a Federal agency publishes a notice of rulemaking for any proposed or final rule, it must make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). No regulatory flexibility analysis is required, however, 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.

106. To assist in this process, the following represents a screening level analysis of the potential for wintering piping plover conservation activities to affect small entities. This analysis is based on the estimated impacts associated with the proposed rulemaking as described in Sections 2 and 3 of this analysis. The analysis evaluates the potential for economic impacts related to two categories:

- Recreation, particularly ORV use; and
- Section 7 consultations undertaken by NPS.

107. Impacts of section 7 consultations are not anticipated to affect small entities, because the costs of consultation are borne by the action agency, in this case the NPS. The remainder of this section addresses the potential impacts to small entities that may result from economic impacts on recreation.

A.1.1 RECREATION AND ORV USE

108. This analysis estimates economic impacts associated with two possible scenarios of impacts on ORV user behavior. As described in Section 2, these scenarios are as follows:

(1) The high bound estimates that a percentage of ORV trips to designated areas (approximately 3,090 to 4,640 trips per year on average) would be lost; and

(2) The low bound estimate assumes that no trips will be lost.

109. The loss of these trips will impact local businesses that serve the area, because the lost trips would have generated visitor expenditures on a variety of items including food, lodging, shopping, transportation, entertainment, and recreation (see Exhibit 2-4). Depending on the number of trips lost, lost trip expenditures could range from $1.1 to $1.7 million annually. For the two counties containing areas proposed as critical habitat, approximately 803 businesses in affected industry sectors generate approximately $545.9 million in annual sales.[61] Exhibit A-1 summarizes these lost expenditures by industry sector.

110. Approximately 93 percent of businesses in affected industry sectors in both counties are small.[62] Assuming that all expenditures are lost only by small businesses and that these expenditures are distributed equally across all small businesses in both counties, each small business may experience a reduction in annual sales of between $661 and $6,494, depending on its industry (see Exhibit A-2). If the small business is generating annual sales just under the SBA small business threshold for its industry, this loss represents between 0.01 and 0.08 percent of its annual sales.

111. Assuming that each small business has annual sales just under its SBA industry small business threshold may underestimate lost expenditures as a percentage of annual sales. It is likely that most small businesses have annual sales well below the threshold. However, even if a business has annual sales below the small business threshold for its particular industry, it is probable that lost expenditures still are relatively small in comparison to annual sales. To test this, the analysis performed several sensitivity analyses. For example, if a small business has annual sales that are a tenth of its SBA small business threshold, potential losses still only represent between 0.10 and 0.85 percent of its annual sales. If a small business has annual sales equal to the average for its industry and county, potential losses represent between 0.11 and 1.30 percent of its annual sales (see Exhibit A-2).

[61] Note, over the next ten years, the net present value of tourism to the Outer Banks is estimated at $1.5 billion. See public comments of Holland & Knight, LLP, August 10, 2006.

[62] Several public comments stated that they believed that they believe the percentage of small businesses to be higher than 93 percent. They suggested instead that 99 percent of local businesses were small. See, for example, public comments of Joan Canipe, June 27, 2007.

EXHIBIT A-1 LOST TRIP EXPENDITURES AND NUMBER OF BUSINESSES BY NAICS CODE

NAICS CODE	ANNUAL LOST TRIP EXPENDITURES (HIGH BOUND)[1]		DARE COUNTY			HYDE COUNTY		
	LOW	HIGH	NUMBER	SALES	% SMALL	NUMBER	SALES	% SMALL
Food and Beverage								
445 - Food and beverage stores	$295,800	$444,100	87	$148,861,000	98%	16	$6,832,000	100%
722 - Food Services and drinking places			287	$129,647,000	87%	17	$7,419,000	88%
Shopping								
448 - Clothing and clothing accessory stores	$150,800	$226,400	104	$65,537,000	98%	7	Not available	100%
Lodging								
721 - Accommodation	$497,700	$747,400	119	$74,654,000	93%	25	$5,466,000	100%
Transportation								
447 - Gasoline stations	$90,800	$136,400	20	$71,894,000	85%	4	$3,513,000	100%
Entertainment and Recreation								
451 - Sporting goods, hobby, book, and music stores	$76,000	$114,100	109	$30,628,000	98%	8	$1,143,000	100%
Total	**$1,111,000**	**$1,668,400**	**726**	**$521,221,000**		**77**	**$24,373,000**	

Notes:
[1] Values based on trip expenditures identified in Exhibit 2-7 and on an average of 1,630 to 2,450 visits lost annually.
Source: Dialog search of File 516, Dun and Bradstreet, "Duns Market Identifiers," on October 16, 2006; US Census, Summary Statistics by 2002 NAICS, accessed at: http://www.census.gov/econ/census02/data/nc/NC000.HTM for Dare and Hyde Counties, NC.

EXHIBIT A-2 LOST EXPENDITURES PER SMALL BUSINESS

INDUSTRY	ANNUAL LOST EXPENDITURES PER SMALL BUSINESS[1]		LOST EXPENDITURES AS A PERCENTAGE OF ANNUAL SALES			
			ASSUMPTION ONE[2]		ASSUMPTION TWO[3]	
	LOW	HIGH	LOW	HIGH	LOW	HIGH
Food	$808	$1,213	0.11%	0.16%	0.01%	0.02%
Shopping	$1,383	$2,077	0.22%	0.33%	0.02%	0.03%
Lodging	$3,660	$5,495	0.87%	1.30%	0.06%	0.08%
Transportation	$4,325	$6,494	0.19%	0.29%	0.05%	0.08%
Entertainment	$661	$992	0.31%	0.47%	0.01%	0.02%

Notes:

[1] Assuming that all lost expenditures would have occurred at small businesses and that lost expenditures are distributed equally across all small businesses in both counties.

[2] Assuming that each small business has sales equal to the average for the industry across the two counties, calculated by dividing total annual sales by the number of businesses as presented in Exhibit A-1.

[2] Assuming that each small business has sales just under the small business threshold as defined by the Small Business Administration (SBA) for its respective industry.

112. The above analysis estimates the number of potentially affected small businesses based on county-level data. Several public comments suggested that economic impacts may be focused in a more limited geographic area, and suggested estimating number of small businesses reported for zip codes close to the proposed designation. One commenter provided a list of 370 small businesses in the following zip codes: 27915, 27920, 27936, 27943, 27960, 27968, 27972, 27982 (see Exhibit A-3). Of these 370 businesses, approximately 70 percent have sales of less than $499,999.[63] The precise areas where visitors spend money on goods and services are unknown; however, this analysis can test the sensitivity of its results to this alternative definition of the impact area.

113. Assuming an even distribution of potential lost trip expenditures under the high-bound scenario across these 370 businesses, each small business could experience a reduction in annual sales of between $3,000 and $4,500. Assuming $499,999 in annual sales for each business, this loss represents between 0.60 and 0.90 percent of annual sales.

EXHIBIT A-3 BUSINESSES BY ZIP CODE AND CITY

ZIP CODE	CITY	NUMBER OF BUSINESSES
27915	Avon	52
27920	Buxton	94
27936	Frisco	41
27943	Hatteras	69
27960	Ocracoke	75
27968	Rodanthe	28
27972	Salvo	6
27982	Waves	5
	Total	**370**

Source: Public comments of Paul Burch, June 10, 2008, which state that the data were obtained from Dun and Bradstreet.
Note: It is unclear which NAICS codes were used to develop these estimates. A search for all businesses with annual sales of less than $1 million indicated that there are nearly 700 businesses in all industries in these zip codes. It is likely that restricting a search by NAICS or SIC code would yield results closer to those presented above.

[63] Public comments of Paul Burch, June 10, 2008.

114. Several local businesses have stated that they have recently experienced reductions in income of between 30 and 50 percent due to recent closures pursuant to the consent decree.[64] This response in regional expenditures to area closures suggest that, if critical habitat results in additional closures, potential impacts to local businesses may be more severe than those estimated above. It is possible that closures have impacted the visitation of non-ORV users as well as ORV users, or that certain businesses located closer to the closures have experienced a greater proportion of impacts. That is, a business located a few feet from a closed area may experience greater share of total impacts compared to a business located farther away from closed areas. However, while these reductions in income may be related to recent beach closures, they also may be the result of factors unrelated to area closures. The impact of these other factors such as fuel prices or weather on local businesses has not been assessed.

A.2 POTENTIAL IMPACTS TO THE ENERGY INDUSTRY

115. 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."[65]

- 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.[66]

As none of these criteria is relevant to this analysis, energy-related impacts associated with conservation efforts within the potential critical habitat are not expected.

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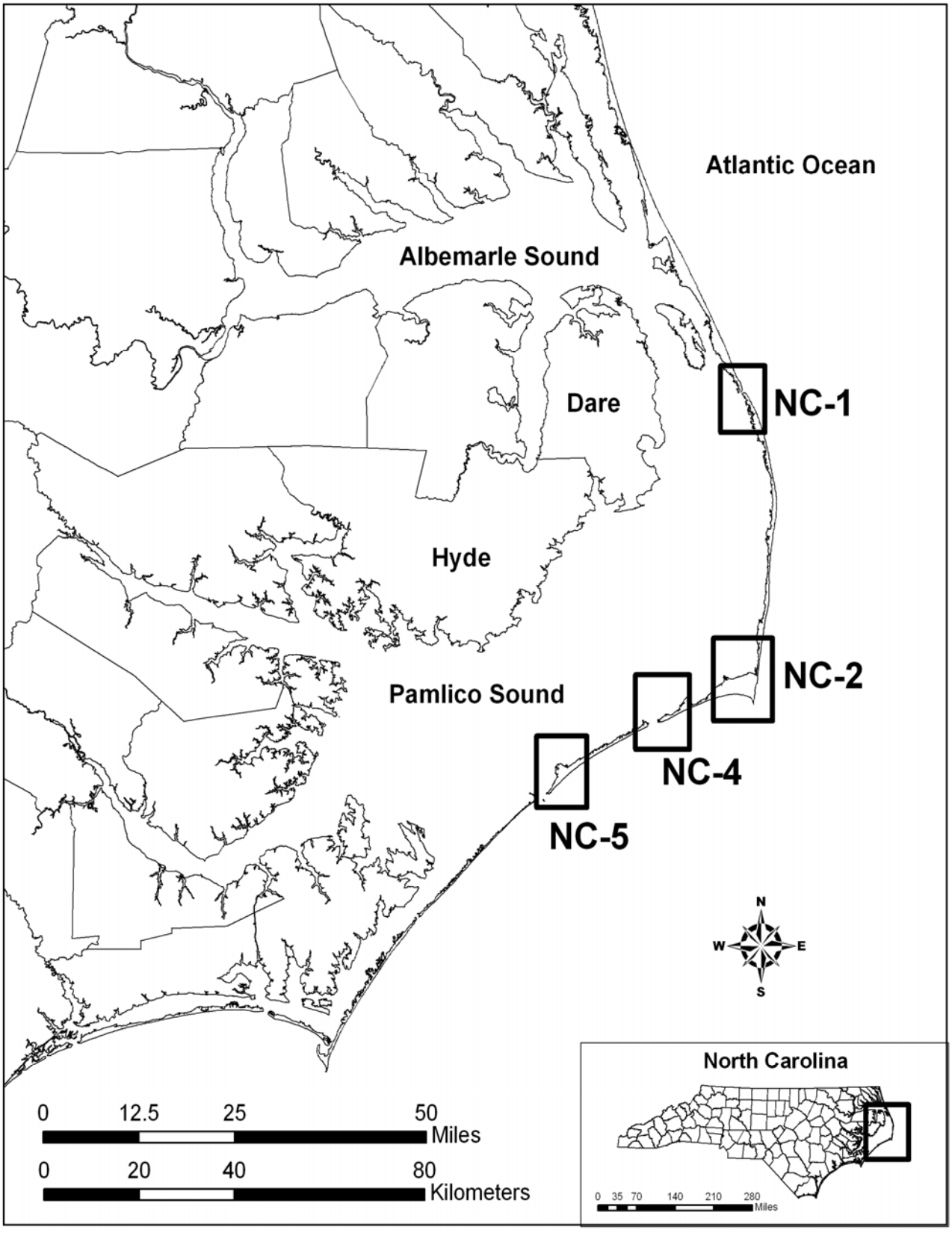
[64] See public comments of Russell Whiteheart, June 16, 2008.

[65] 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.

[66] Ibid.

APPENDIX B | MAP OF PROPOSED CRITICAL HABITAT

EXHIBIT B-1 MAP OF PROPOSED CRITICAL HABITAT



APPENDIX C | UNDISCOUNTED STREAM OF IMPACTS BY ACTIVITY

116. This appendix provides details of the undiscounted impacts by year for each unit by activity. These details are provided in accordance with OMB guidelines for developing benefit and cost estimates. OMB directs the analysis to: "include separate schedules of the monetized benefits and costs that show the type and timing of benefits and costs, and express the estimates in this table in constant, undiscounted dollars."[67] For this analysis, this applies to the cost estimates for future years. Circular A-4 directs that future estimates of value should be presented in undiscounted terms. This is an important way to clarify future costs. For example, if a program will cost $10,000 ten years in the future, that future cost estimate should be noted as such to clarify what the cost estimate is in that year.

[67] Office of Management and Budget, *Circular A-4*, September 17, 2003, p. 18). The reference to "constant" dollars indicates that the effects of general price level inflation (the tendency of all prices to increase over time) should be removed through the use of an inflation adjustment index. See footnote 1.

EXHIBIT C-1. HIGH-END UNDISCOUNTED ORV IMPACTS BY UNIT (CONSUMER SURPLUS)

YEAR	UNIT 1		UNIT 2		UNIT 4		UNIT 5	
YEAR	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Post-Designation Impacts								
2007	$85,874	$128,810	$241,310	$361,962	$155,201	$232,800	$121,442	$182,161
2008	$88,337	$132,504	$248,229	$372,340	$159,651	$239,475	$124,924	$187,384
2009	$90,799	$136,197	$255,148	$382,719	$164,101	$246,150	$128,406	$192,607
2010	$93,261	$139,891	$262,068	$393,098	$168,552	$252,825	$131,888	$197,830
2011	$95,724	$143,584	$268,987	$403,476	$173,002	$259,500	$135,370	$203,053
2012	$98,186	$147,278	$275,906	$413,855	$177,452	$266,176	$138,852	$208,277
2013	$100,648	$150,971	$282,825	$424,234	$181,902	$272,851	$142,334	$213,500
2014	$103,111	$154,665	$289,744	$434,613	$186,352	$279,526	$145,817	$218,723
2015	$105,573	$158,358	$296,664	$444,991	$190,802	$286,201	$149,299	$223,946
2016	$108,035	$162,051	$303,583	$455,370	$195,253	$292,876	$152,781	$229,169
2017	$110,498	$165,745	$310,502	$465,749	$199,703	$299,551	$156,263	$234,392
2018	$112,960	$169,438	$317,421	$476,127	$204,153	$306,227	$159,745	$239,616
2019	$115,422	$173,132	$324,340	$486,506	$208,603	$312,902	$163,227	$244,839
2020	$117,885	$176,825	$331,260	$496,885	$213,053	$319,577	$166,709	$250,062
2021	$120,347	$180,519	$338,179	$507,264	$217,503	$326,252	$170,192	$255,285
2022	$122,809	$184,212	$345,098	$517,642	$221,954	$332,927	$173,674	$260,508
2023	$125,271	$187,906	$352,017	$528,021	$226,404	$339,602	$177,156	$265,731
2024	$127,734	$191,599	$358,936	$538,400	$230,854	$346,278	$180,638	$270,955
2025	$130,196	$195,292	$365,856	$548,778	$235,304	$352,953	$184,120	$276,178
2026	$132,658	$198,986	$372,775	$559,157	$239,754	$359,628	$187,602	$281,401

EXHIBIT C-2. HIGH-END UNDISCOUNTED ORV IMPACTS BY UNIT (TRIP EXPENDITURES)

YEAR	UNIT 1		UNIT 2		UNIT 4		UNIT 5	
YEAR	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
Post-Designation Impacts								
2007	$149,076	$223,611	$418,908	$628,356	$269,425	$404,134	$210,819	$316,226
2008	$153,350	$230,023	$430,919	$646,373	$277,150	$415,722	$216,864	$325,293
2009	$157,625	$236,435	$442,931	$664,390	$284,876	$427,310	$222,909	$334,360
2010	$161,899	$242,847	$454,942	$682,407	$292,601	$438,898	$228,954	$343,428
2011	$166,174	$249,258	$466,954	$700,424	$300,326	$450,486	$234,999	$352,495
2012	$170,448	$255,670	$478,965	$718,441	$308,052	$462,073	$241,044	$361,562
2013	$174,723	$262,082	$490,977	$736,458	$315,777	$473,661	$247,089	$370,630
2014	$178,997	$268,493	$502,988	$754,476	$323,502	$485,249	$253,134	$379,697
2015	$183,272	$274,905	$515,000	$772,493	$331,228	$496,837	$259,179	$388,764
2016	$187,546	$281,317	$527,011	$790,510	$338,953	$508,425	$265,223	$397,832
2017	$191,821	$287,729	$539,023	$808,527	$346,679	$520,013	$271,268	$406,899
2018	$196,095	$294,140	$551,034	$826,544	$354,404	$531,601	$277,313	$415,966
2019	$200,370	$300,552	$563,046	$844,561	$362,129	$543,189	$283,358	$425,033
2020	$204,644	$306,964	$575,058	$862,579	$369,855	$554,777	$289,403	$434,101
2021	$208,919	$313,375	$587,069	$880,596	$377,580	$566,365	$295,448	$443,168
2022	$213,193	$319,787	$599,081	$898,613	$385,305	$577,953	$301,493	$452,235
2023	$217,468	$326,199	$611,092	$916,630	$393,031	$589,541	$307,538	$461,303
2024	$221,742	$332,611	$623,104	$934,647	$400,756	$601,129	$313,583	$470,370
2025	$226,017	$339,022	$635,115	$952,664	$408,481	$612,716	$319,628	$479,437
2026	$230,291	$345,434	$647,127	$970,681	$416,207	$624,304	$325,673	$488,505