

January 2011

Benefit-Cost Analysis of Proposed ORV Use Regulations in Cape Hatteras National Seashore

Prepared for

National Park Service
Environmental Quality Division
Academy Place
PO Box 25287
Denver, CO 80225

Prepared by

Carol Mansfield
Ross Loomis
Fern Braun
RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709

RTI Project Number 0211898.001.002

Contents

Section	Page
1 Introduction	1-1
1.1 Current ORV Regulations and Background.....	1-1
1.2 Proposed Regulations	1-2
1.2.1 No-Action Alternatives.....	1-2
1.2.3 Action Alternatives.....	1-3
2 Baseline Description of Beach Use in and around Cape Hatteras National Seashore	2-1
2.1 The Cape Hatteras Area.....	2-1
2.1.1 Cape Hatteras National Seashore.....	2-1
2.1.2 Other Parks on the Outer Banks and on the North Carolina Coast	2-5
2.2 ORV Routes and Areas	2-5
2.3 Visitation Data.....	2-5
2.3.1 Historical Visitation Trends.....	2-5
2.3.2 Distribution of Visitors and ORV Use.....	2-6
2.3.3 Visitation under No-Action Alternatives A and B	2-8
2.4 Alternative Locations for Beach Driving.....	2-11
2.5 Economic Activity in the Surrounding Communities	2-11
2.5.1 Socioeconomic Resources	2-11
2.5.2 Demographics	2-12
2.5.3 Employment.....	2-19
2.5.4 Unemployment.....	2-24
2.5.5 Tourism Contributions to the Economy	2-24
2.5.6 Housing.....	2-26

3	Benefit-Cost Analysis of the Alternatives	3-1
3.1	Conceptual Basis for Benefit-Cost Analysis of Off-Road Vehicle Regulations in National Parks	3-1
3.1.1	Conceptual Basis for Benefit-Cost Analysis	3-1
3.1.2	Identifying Relevant Benefits and Costs	3-4
3.2	Results for the Seashore	3-5
3.2.1	Affected Groups	3-5
3.2.2	Scenarios	3-7
3.2.3	Benefits to Visitors and the General Public	3-9
3.2.4	Benefits to Businesses	3-200
3.2.5	Costs to Visitors	3-200
3.2.6	Costs to Businesses	3-255
3.2.7	Costs to NPS	3-266
3.3	Summary	3-322
4	Small Entity Impact Analysis	4-1
4.1	Identifying Small Entities	4-1
4.2	Certification	4-2
	References	R-1

Figures

Number		Page
2-1	Visitation in Cape Hatteras National Seashore (1998–2008)	2-6
2-2	Monthly Recreational Visitation, 2007 and 2008	2-10
2-3	Recreational Visitation by Month	2-10
2-4	2000 Population Density by Block Group	2-13
2-5	Percentage of Residents Born in North Carolina by Block Group, 2000	2-16
2-6	1999 Per Capita Income by Block Group	2-18
2-7	Percentage of Population below the Poverty Line by Block Group, 2000.....	2-20
2-8	Change in Employment by Zip Code	2-21
2-9	Difference in Unemployment Rate from 2004–2006 Monthly Average	2-25
2-10	Percentage of Housing Units Vacant for Seasonal, Recreational, or Occasional Use by Block Group, 2000	2-27
3-1	Interrelationship Among Market, Environmental, and Household Systems and Social Welfare	3-2

Tables

Number		Page
2-1	Recreational Fishing in North Carolina, by Residents and Nonresidents (2006)	2-2
2-2	Number of Coastal Recreational Fishing Licenses Sold by North Carolina County of Sale (location where license sales agent resides), Excluding Blanket Coastal Recreational Fishing Licenses, by Calendar Year	2-3
2-3	Away-From-Home Wildlife Watching in North Carolina, by Resident and Nonresident	2-4
2-4	Estimates and Confidence Intervals for Clusters of Ramps (April to November 2009)	2-8
2-5	Population Statistics	2-14
2-6	Employment By Sector, 2000.....	2-17
2-7	Environmental Justice Statistics, 2000	2-19
2-8	Nonemployers by Industry, 2007	2-23
2-9	Employment Characteristics, 2009	2-25
2-10	Estimated Domestic Travel Expenditures (\$2008 Millions)	2-26
2-11	Housing Unit Statistics, 2000	2-26
2-12	Change in Housing Units	2-28
3-1	Affected Groups and Possible Changes in Welfare.....	3-6
3-2	Impacts of Alternatives on Visitor Experience.....	3-12
3-3	Estimates of WTP for a Beach Day	3-14
3-4	Impacts of Alternatives on Nonuse Value and Federally Threatened and Endangered Species (Piping Plover, Sea Turtles, and Seabeach Amaranth)	3-15
3-5	Vehicle Access Ramp Use and Beach Closures to ORVs for Selected Ramps in 2009 under Alternative B.....	3-244
3-6	Estimated Change in Producer Surplus for Alternative A .	3-2727

3-7	Estimated Incremental Change in Producer Surplus for Alternatives B, C, E, and F Relative to Alternative A Mid Estimate (in millions of dollars)	3-2828
3-8	Estimated Incremental Change in Producer Surplus for Alternative D Relative to Alternative A Mid Estimate (in millions of dollars)	3-2929
3-9	Estimated Incremental Change in Producer Surplus for Alternative D Relative to Alternative B Mid Estimate (in millions of dollars)	30
3-10	Qualitative Impacts of Alternatives C, E, and F Relative to Alternative B.....	3-311
3-11	Incremental Costs to NPS of the Action Alternatives Relative to the No Action Alternatives	3-322
3-12	Qualitative Ranking of Action Alternatives Relative to No-Action Alternatives for Benefit and Cost Categories from Highest to Lowest	3-333

1

Introduction

This report describes the results of the benefit-cost analysis of the proposed regulation for regulating off-road vehicle (ORV) use in Cape Hatteras National Seashore (the Seashore). For the proposed change in regulation, the National Park Service (NPS) is required to conduct a benefit-cost analysis of the proposed regulation and an analysis of the impact of the regulation on small businesses under the Regulatory Flexibility Act (RFA) of 1980. Following a description of the current and proposed regulations, this report presents baseline information about the Seashore and the current state of ORV activity. From this baseline, an economic impact analysis for the local economy and a benefit-cost analysis of the new regulation were developed as well as an analysis of the impact of the new regulation on small businesses.

1.1 CURRENT ORV REGULATIONS AND BACKGROUND

Late in 1952 agreement was reached on the final boundaries of the Seashore area and in December 1952 the state-owned lands in the Seashore were transferred to the United States. In January 1953, NPS Director Wirth recommended that Secretary of the Interior Oscar L. Chapman approve an order, consistent with Section 4 of the Act of August 17, 1937, directing that certain lands on the Outer Banks of North Carolina be “administered, protected, and developed by the National Park Service for national seashore recreational purposes for the benefit and enjoyment of the people.” This order, dated January 12, 1953, marked the formal establishment of the Seashore (NPS 2007). Since the 1970’s, ORVs have been managed under various plans but these plans have never been

finalized and published as rules. Throughout the last few decades, use of vehicles in the Seashore has increased. The regulations governing NPS require a special regulation to authorize driving on the beach (Executive Orders 11644 and 11989 and 36 CFR 4.10).

As a first step toward instituting a special regulation to manage ORV use, NPS issued the Interim Protected Species Management Strategy (Interim Strategy) in 2006 to manage ORV use while NPS developed a long-term plan. NPS was sued over the Interim Strategy in 2007. The parties negotiated the consent decree, which went into effect in April 2008. The consent decree provides more protection for breeding birds and nesting turtles with larger required buffers around nests and a prohibition on night driving between 10:00 pm and 6:00 am.

As part of the consent decree, the court set a deadline of April 1, 2011, for the promulgation of a final special regulation. NPS has been developing a set of proposed alternatives for management of ORVs in the Seashore. In March 2010, the Agency published a Draft Environmental Impact Statement (DEIS) that included two no-action alternatives (the Interim Strategy and the consent decree) and four action alternatives. After a period of public comment and review, the Final EIS (FEIS, NPS 2010) was published in November 2010. In the FEIS, Alternative F, the preferred alternative described below, was revised.

1.2 PROPOSED REGULATIONS

1.2.1 No-Action Alternatives

NPS has developed two no-action alternatives. The FEIS (NPS 2010) describes these alternatives as follows:

Alternative A—No Action: Continuation of Management under the Interim Protected Species Management Strategy. Under this no-action alternative, management of ORV use and access at the Seashore would be a continuation of management based on the Interim Strategy and the Superintendent's Compendium 2007, as well as elements from the 1978 draft interim ORV management plan that were incorporated in Superintendent's Order 7. The Interim Strategy provides direction on the how, when, and where closures and buffers for federally listed species are established and the size of buffers/closures. Buffer

sizes for nonlisted species allow some degree of flexibility and management discretion. There would be no restriction on night driving or carrying capacity established under Alternative A and an ORV permit would not be required. All the ocean and inlet shoreline and existing soundside routes would be designated as a ORV route or area and would be open 24 hours a day year-round, but subject to temporary resource closures, seasonal ORV closures in front of the villages, and temporary ORV safety closures.

Alternative B—No Action: Continuation of Terms of the Consent Decree Signed April 30, 2008, and Amended June 4, 2009.

Under Alternative B, management of ORV use would follow the terms described under Alternative A, except as modified by the provisions of the consent decree, as amended. Modifications in the consent decree include earlier and more frequent monitoring at key nesting areas and larger, nondiscretionary resource protection buffers when breeding activity is observed. These modifications would result in earlier, larger, and longer-lasting ORV and pedestrian closures than Alternative A.

Alternative B would also prohibit night driving from 10:00 p.m. to 6:00 a.m. May 1 through September 15 and would allow night driving with a permit from September 16 through November 15. No carrying capacity would be established or ORV use permit required under Alternative B, except for the night-driving permit from September 16 through November 15.

1.2.3 Action Alternatives

NPS developed four action alternatives. The action alternatives are described in the FEIS (NPS 2010) as follows:

Elements that are common to all action alternatives include the following:

- ORV routes and areas would be officially designated in accordance with the Executive Orders.
- Year-round ORV routes and areas would be designated only in locations without sensitive resources or high pedestrian use.
- Year-round vehicle free areas (VFAs) would be designated.
- “Desired Future Conditions” would be established, as well as a system for periodic review and adaptive management initiatives.

- Night-driving restrictions would be in effect from May 1 through November 15, which corresponds with turtle nesting season.
- ORV permits would be required and would involve a fee and education requirement.
- Overcrowding would be addressed using various methods for establishing carrying capacity.
- New vehicular access points and/or new or expanded parking areas would be identified.
- Commercial fishing vehicles would be exempted from some ORV restrictions, when not in conflict with resource protection.

Alternative C—Seasonal Management. Alternative C would provide visitors to the Seashore with a degree of predictability regarding areas available for ORV use, as well as vehicle-free areas, based largely on the seasonal resource and visitor use characteristics of various areas in the Seashore. Both seasonal and year-round ORV routes would be established, although most areas would have a seasonal focus. Species Management Areas and village beaches would be closed to ORV use from March 15 through October 14. Pedestrians would be able to access some Species Management Areas depending on specific shorebird breeding activity. Most of the seasonal ORV areas would be open to ORVs from October 15 through March 14. Seasonal night-driving restrictions would be established between the hours of 7:00 p.m. and 7:00 a.m. from May 1 through November 15. An ORV carrying capacity would be established using a maximum number of vehicles per mile of beach area.

Alternative D—Increased Predictability and Simplified Management. Alternative D is the Environmentally Preferable Alternative. Under Alternative D, visitors to the Seashore would have the maximum amount of predictability regarding areas available for ORV use and vehicle-free areas (VFA) for pedestrian use. Restrictions would be applied to larger areas over longer periods of time to minimize changes in designated ORV and VFAs over the course of the year. To provide predictability under this alternative, only year-round ORV routes would be designated. Year-round VFAs would include all of the Species Management Areas and village beaches. Species Management Areas would be closed to pedestrian use during the breeding season. Seasonal night-driving restrictions would

be established between the hours of 7:00 p.m. and 7:00 a.m. from May 1 through November 15. An ORV carrying capacity would be addressed solely by the use of vehicle stacking limits (one vehicle deep).

Alternative E—Variable Access and Maximum Management.

Alternative E would provide use areas for all types of visitors to the Seashore with a wide variety of access for both ORV and pedestrian users, but often with controls or restrictions in place to limit impacts on sensitive resources. Interdunal road and ramp access would be improved, and more pedestrian access would be provided through substantial additions to parking capacity at various key locations that lend themselves to walking on the beach. This alternative would close the Species Management Areas to ORV use from March 15 through August 31, except that two spits and Cape Point would have initial ORV access corridors during the breeding season, with increased species monitoring in those areas. These ORV access corridors would close when breeding activity is observed. North Ocracoke Spit would be designated as a VFA year-round under Alternative E, and village beaches would be closed to ORV use between April 1 and October 31. A seasonal night-driving restriction would be established from 10:00 p.m. to 6:00 a.m. during turtle nesting season, although areas with low densities of turtle nests could open to night driving from September 16 through November 15. This alternative would offer a park-and-stay overnight option for ORVs at some spits and Cape Point during the turtle nesting season. Self-contained vehicle camping would be allowed during the off-season at designated Seashore campgrounds under the terms of a permit. Alternative E would provide enhanced options for pedestrian access to Bodie Island Spit and South Point Ocracoke by promoting water taxi service when those areas are closed to ORVs.

Alternative F—NPS Preferred Alternative.

The NPS considered a variety of concepts and measures that either originated during the negotiated rulemaking process from members of the negotiated rulemaking advisory committee (Committee) or were discussed during Committee, subcommittee, or work group sessions. Although the Committee as a whole did not reach a consensus on a recommended alternative, in creating this action alternative the NPS made management judgments as to which combination of concepts and measures would make an effective overall ORV

management strategy. This alternative is designed to provide visitors to the Seashore with a wide variety of access opportunities for both ORV and pedestrian users. Alternative F would provide a reasonably balanced approach to designating ORV routes and vehicle-free areas (VFAs) and providing for the protection of park resources. To support access to both VFAs and designated ORV routes, alternative F would involve the establishment of new parking areas, pedestrian access trails, ORV ramps, and improvements and additions to the interdunal road system. From September 15 to November 15, ORV routes with no turtle nests remaining would reopen for night ORV use, subject to terms and conditions of the ORV permit. Alternative F would provide for an alternative transportation study and would encourage the establishment of a beach shuttle or water taxi.

2

Baseline Description of Beach Use in and around Cape Hatteras National Seashore

Cape Hatteras is the nation's first national seashore. Consisting of more than 30,000 acres distributed along approximately 67 miles of shoreline, the Seashore is part of a dynamic barrier island system. It is located within Dare and Hyde Counties in North Carolina.

Section 2 describes the Seashore and the surrounding area, information about visitors, information about the population of Dare and Hyde counties, and information about the economy of the region. Much of the text in this section is taken from the FEIS (NPS 2010).

2.1 THE CAPE HATTERAS AREA

The Outer Banks offer some of the best beaches in the U.S., and beach-related tourism drives the economy of the area. Local residents also receive significant recreational benefits from the area's natural assets. In addition to the Seashore, the area includes Jockey's Ridge State Park and Pea Island National Wildlife Refuge.

2.1.1 Cape Hatteras National Seashore

The Seashore serves as a popular recreation destination with more than 2.1 million visitors in 2008 (NPS, 2008), showing an 8-fold increase in visitation since 1955 (NPS, 2007). Seashore visitors participate in a variety of recreational activities, including beach recreation (sunbathing, swimming, shell collecting), fishing (surf and boat), hiking, hunting, motorized

boating, nonmotorized boating (sailing, kayaking, canoeing), nature study, photography, off-road vehicle use (beach driving), shellfishing, sightseeing, watersports (surfing, windsurfing, kiteboarding), and wildlife viewing. Seashore visitors use ORVs for traveling to and from swimming, fishing, and surfing areas and for pleasure driving. Two categories of outdoor recreation pertinent to the assessment of alternative management plans, recreational fishing and bird watching, are discussed further below using data from the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (FHWAR).

North Carolina is the sixth most popular state for fishing, with an estimated 1.3 million residents and nonresidents participating in 2006 (U.S. Department of the Interior et al., 2008). Recreational fishing is a significant part of North Carolina's economy, attracting spending from both local and out-of-state anglers. Approximately 519,000 anglers in North Carolina engaged in saltwater fishing in 2006 (Table 2-1). Expenditures from fishing trips totaled an estimated \$692,977,000 in 2006, with \$450,313,000 coming from saltwater anglers. Although only 40 percent of anglers reported participating in saltwater fishing, nearly 65 percent of all trip-related expenditures went toward this activity.

Table 2-1. Recreational Fishing in North Carolina, by Residents and Nonresidents (2006)

	Resident	Nonresident	Total
Total participants	868,000	395,000	1,263,000
Percent of total participants	69%	31%	100%
Saltwater	253,000	266,000	519,000
Percent of total saltwater participants	49%	51%	100%
Total trip-related expenditures	\$395,296,000	\$297,681,000	\$692,977,000
Average trip-related expenditures per participant	\$456	\$753	\$549

Source: U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2008. "2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation." <http://www.census.gov/prod/www/abs/fishing.html>.

Nonresident angler expenditures are important to regional economic impacts, because they represent an addition to area wealth rather than a change in the mix of spending by residents. Nonresidents make up only 31 percent of all anglers

in North Carolina but comprise 51 percent of saltwater anglers. Nonresidents, who often must pay greater lodging and transportation fees, spend an average of 65 percent more than residents for trip-related expenditures over all types of fishing.

Dare and Hyde counties sold 40 percent of coastal recreational fishing licenses within the eight coastal counties in North Carolina and 18 percent of all coastal recreational fishing licenses in 2008. Dare County ranks first among all North Carolina counties in coastal recreational fishing license sales (Table 2-2).

Table 2-2. Number of Coastal Recreational Fishing Licenses Sold by North Carolina County of Sale (location where license sales agent resides), Excluding Blanket Coastal Recreational Fishing Licenses, by Calendar Year

County	2007	2008
Dare	93,225	82,635
Hyde	6,322	5,358
Brunswick	38,721	33,303
Carteret	46,813	38,456
Currituck	2,660	2,435
New Hanover	34,556	28,558
Onslow	16,098	15,185
Pender	17,462	14,733
Total	469,521	411,886

Source: North Carolina Marine Fisheries, North Carolina Wildlife Resources Commission. 2009. "Coastal Recreational Fishing License Sales Update." http://www.ncfisheries.net/CRFL/downloads/CRFLSalesReportMay_31_2009.pdf.

Among all states, North Carolina ranks nineteenth for number of wildlife watchers, with 2,641,000 participants in 2006.

Wildlife watching is classified as activities for which wildlife watching is the primary purpose and does not include trips to zoos or museums or accidental observation of wildlife. Wildlife watchers may be feeding, photographing, or observing wildlife.

Approximately 15 percent of wildlife watchers in North Carolina were nonresidents in 2006.

Away-from-home wildlife watching is defined as wildlife observation occurring at least 1 mile from home. Table 2-3 presents information about away-from-home wildlife watching in North Carolina. In 2006, among away-from-home wildlife watchers in North Carolina, approximately 56 percent are

nonresidents. Away-from-home bird watchers made up 620,000 or 90 percent of all away-from-home wildlife watchers. Of these, 50 percent reported watching “other water birds.” This category includes shorebirds, cranes, herons, and all other water birds not classified as waterfowl and serves as the best representation of birds on Cape Hatteras. Among wildlife watchers observing “other water birds,” nonresidents made up 69 percent of participants. Thus, wildlife watching for birds like those on Cape Hatteras is far more likely to be enjoyed by nonresidents than other wildlife watching.

Table 2-3. Away-From-Home Wildlife Watching in North Carolina, by Resident and Nonresident

	Resident	Nonresident	Total
Total away-from-home participants	300,000	386,000	686,000
Percentage of total participants	44%	56%	100%
Total away-from-home birders	284,000	336,000	620,000
Total birders	46%	54%	100%
Away-from-home “other water bird” observers	95,000	215,000	310,000
Percentage of “other water bird” observers	31%	69%	100%
Total trip-related expenditures	\$84,245,000	\$162,662,000	\$246,906,000
Average trip-related expenditure per participant	\$281	\$421	\$360

Source: U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2008. “2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.” <http://www.census.gov/prod/www/abs/fishing.html>.

Wildlife watchers in North Carolina spent a total of \$246,906,000 in trip-related costs in 2006. This number includes food, lodging, transportation, rented equipment, and guide or permit fees, but not expenditures on purchased equipment. Away-from-home resident wildlife watchers spent an average of \$281 per person per trip, while nonresident participants spent \$421. Although separate expenditure data for other water bird watchers were not available, other water birds such as shorebirds are more likely to attract out-of-state wildlife watchers, who then spend on average 50 percent more than resident wildlife watchers.

2.1.2 Other Parks on the Outer Banks and on the North Carolina Coast

In addition to the Seashore, the Outer Banks are home to Jockey's Ridge State Park (Park), located in Nags Head. Jockey's Ridge is the tallest naturally formed sand dune system on the East Coast. The Park provides opportunities for hiking, hang-gliding, sand-boarding in the dunes or kayaking, windsurfing, and swimming in the Roanoke Sound.

Located on the north end of Hatteras Island is the Pea Island National Wildlife Refuge, a 5,834 land acre and 25,700 water acre preserve established in 1937. Visitors to Pea Island can hike, fish, kayak, or watch wildlife.

Cape Lookout National Seashore, authorized in 1966, is located south of Cape Hatteras National Seashore. Activities in the 56-mile long seashore include the Cape Lookout lighthouse, fishing, bird or wild horse watching, waterfowl hunting, camping, swimming, boating, and shelling.

Like Cape Hatteras, Cape Lookout allows driving on the beach. However, Cape Lookout can only be reached by ferry and visitation is much lower than at Cape Hatteras.

2.2 ORV ROUTES AND AREAS

As discussed in Section 1, ORVs are currently managed under the Consent Decree (see Section 1.1.2).

2.3 VISITATION DATA

Many different factors cause visitation to vary across years, so a single year may not provide a reliable estimate of average future visitation. Because each no-action alternative has been in place for a limited amount of time, we do not have a long history with which to estimate average visitation. ORV use in the Seashore was managed under Alternative A, the Interim Strategy, in 2007 and the beginning of 2008, and under the Consent Decree since April 30, 2008. As a result, we use data from other sources to assess visitation under the no-action alternatives.

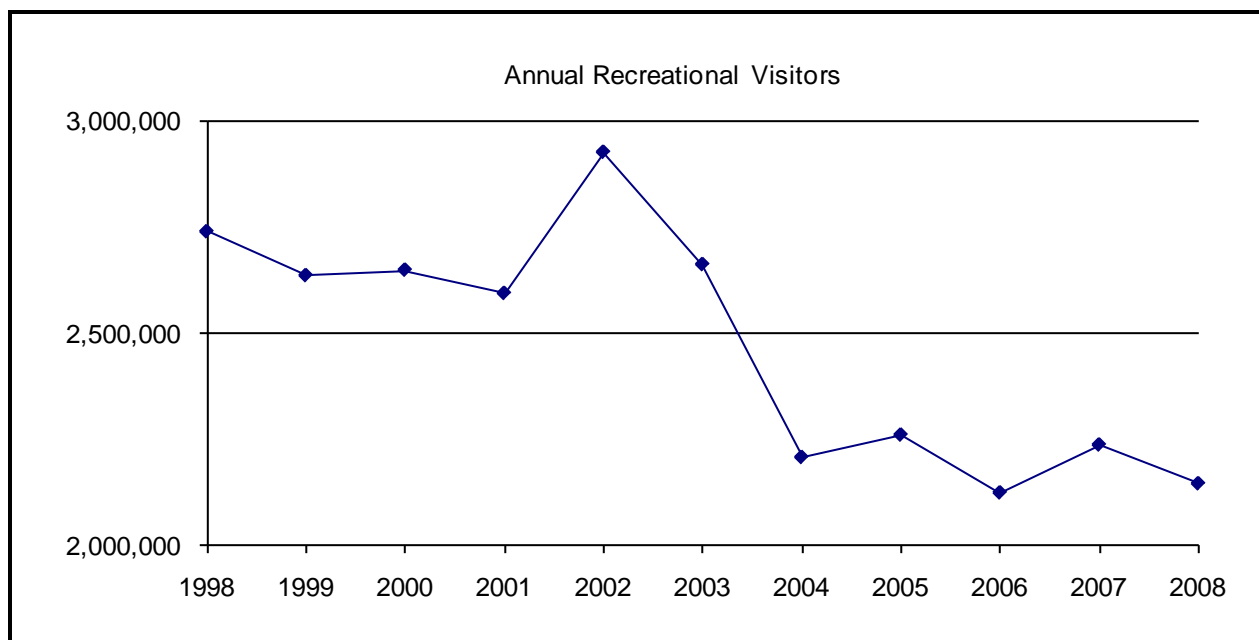
2.3.1 Historical Visitation Trends

The Seashore does not have a defined entry point where the number of visitors can be counted. Instead, NPS constructs recreational visitor estimates using counts from several

sources, including a highway counter on Highway 12 at Whalebone Junction that counts traffic heading south toward the Seashore, the number of registered hunters, aircraft at Ocracoke and Hatteras islands, vehicles arriving by ferry to Ocracoke from the mainland (Swans Quarter and Cedar Island), and the number of overnight boats. In 2009, the Whalebone Junction traffic counter accounted for 90 percent of the total visitation. The Seashore also reports the number of visitors in the Seashore campgrounds, in visitor centers, and at the lighthouse; however, these values are not included in the recreational visitor counts.

Visitation at the Seashore, as represented by the official visitation statistics, averaged 2,470,411 from 1998 to 2008 from a high of 2,923,894 in 2002 to a low of 2,125,005 in 2006. Figure 2-1 graphs visitation at the Seashore over the 10-year period. Total visitation was 2,282,543 in 2009.

Figure 2-1. Visitation in Cape Hatteras National Seashore (1998–2008)



Source: <http://www.nature.nps.gov/stats/park.cfm?parkid=171>

2.3.2 Distribution of Visitors and ORV Use

Previous attempts to quantify the number of vehicles have not generated reliable data. To provide data for this study, NPS contracted with RTI International to undertake a count of vehicles using the beach access ramps in the Seashore. Between April 2009 and March 2010, RTI counted vehicles at a

random sample of ramps to estimate the total ORV trips taken on the beach.

Weeks for counting at ramps were sampled sequentially with probability proportional to size (the number of rental homes occupied by nonowners) and with minimum replacement. To include more than one 3-day counting trip over the low season, December through March, the sample was stratified into low season (December through March) and shoulder/high seasons (April through November).

The data collected through the survey yielded an estimate of 344,999 vehicle trips on the beach in the Seashore between April and November 2009 with a 95 percent confidence interval ranges from 285,696 vehicle trips to 405,302 vehicle trips. The estimate of passengers is 768,948 passengers with a 95 percent confidence interval of 625,928 passengers to 911,968 passengers. SUDANN software, developed by RTI, was used to incorporate the sample weights into the estimate of the mean and 95 percent confidence interval.

Between December 2009 and March 2010, the estimate was 154,803 vehicle trips containing 225,656 passengers used the beach access ramps. The small sample size of counting trips during this season resulted in very large 95 percent confidence intervals around this number. The 95 percent confidence interval ranges between 0 vehicle trips to 392,594 vehicles and 0 passengers to 567,184 passengers.

Table 2-4 provides estimates and confidence intervals for groups of ramps. The ramps on Bodie Island, Ramps 2 and 4, account for approximately 23 percent of vehicle trips and passengers.

The numbers from the study apply to no-action Alternative B. The study was done in 2009 and 2010, when the Consent Decree was in place. It does not provide us information about the quantity of vehicle trips under no-action Alternative A.

Table 2-4. Estimates and Confidence Intervals for Clusters of Ramps (April to November 2009)

Ramps	Vehicle Trips			Passengers		
	Estimate	Lower Bound	Upper Bound	Estimate	Lower Bound	Upper Bound
2, 4	78,550	35,149	121,950	174,949	77,174	272,725
23, 27, 30	49,273	16,596	81,950	112,702	39,863	185,542
34, 38	48,778	13,214	84,341	103,171	30,092	176,250
43, 44, 45	51,277	11,277	91,277	117,030	17,262	216,797
49, 55	52,318	13,358	91,278	123,355	26,888	219,822
59, 67	20,447	4,356	36,538	45,152	9,824	80,480
68, 70, 72	44,358	14,090	74,625	92,588	29,933	155,243

2.3.3 Visitation under No-Action Alternatives A and B

Management of ORVs in the years 2007 and 2008 corresponded to the Interim Strategy and the Consent Decree, respectively. With only one year of experience under each management approach, it is difficult to separate the impact of the new management plan for ORVs from other impacts on visitation. Gas prices began increasing sharply in April 2008 just as the Consent Decree was put in place, and the high prices lasted through the summer. At the same time, the national and international economy worsened throughout 2008, and the decline accelerated in the fall of 2008 and into 2009.

Although we cannot say definitively that the Interim Strategy or the Consent Decree resulted in a specific level of visitation in 2007 or 2008, we can look at the data we have to see how various measures of visitation in the years 2007 and 2008 compare to the historical trend. Taking into account events that may have an impact on visitation, we can also forecast whether visitation might be much higher or much lower than what we observed in 2007 and 2008. Events might include hurricanes, special events on the Outer Banks, the economy, and how much of the beach was open for various activities. Over time, other factors will affect visitation such as available housing and motel space, ease of travel to and from the Outer Banks, the quality of the environment and the beaches, new recreation

activities, and the development or decline of other competing beach areas.

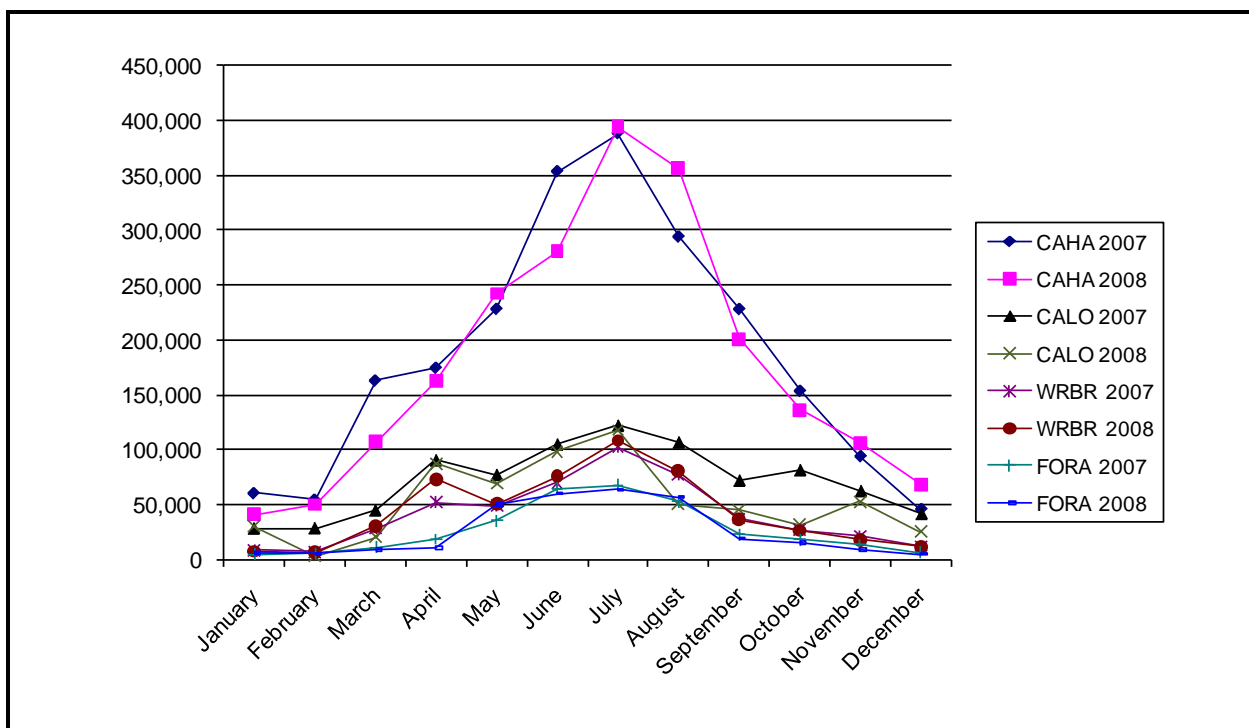
To create the range of visitation levels under baseline, we compared visitation in 2007 and 2008 to other parks and attractions and to historic trends. We also incorporated information from publically available sources on sales of different items and information from a survey of real estate companies on Hatteras Island about occupancy rates for rental housing. These comparisons provide a basis for our assumptions about baseline visitation.

Figure 2-2 provides a month-by-month breakdown of visitation for recreational visits in the Seashore for 2007 and 2008.¹ For comparison, we also report visitation at three other National Park Units: the Wright Brothers Memorial (WRBR) and Fort Raleigh (FORA) on the Outer Banks and Cape Lookout, which is the next island south of Ocracoke. Total visitation decreased from 2007 to 2008 for all sites excluding WRBR, where visitation increased by about 7 percent. Cape Lookout experienced the most drastic change, with visitation falling 27 percent. In FORA and the Seashore, the number of recreational visitors fell 3 percent and 4 percent, respectively.

Figure 2-3 compares monthly visitation at the Seashore in 2007 and 2008 to average monthly visitation between 1997 and 2005, before the Seashore implemented the Interim Strategy. Total visitation in 2007 and 2008 was lower than the average visitation from 1997 to 2005. Visitation fell the most from May to December, with late winter and early spring visitation rates remaining fairly constant. Total visitation decreased about 17 percent from the 1997 to 2005 average to 2008.

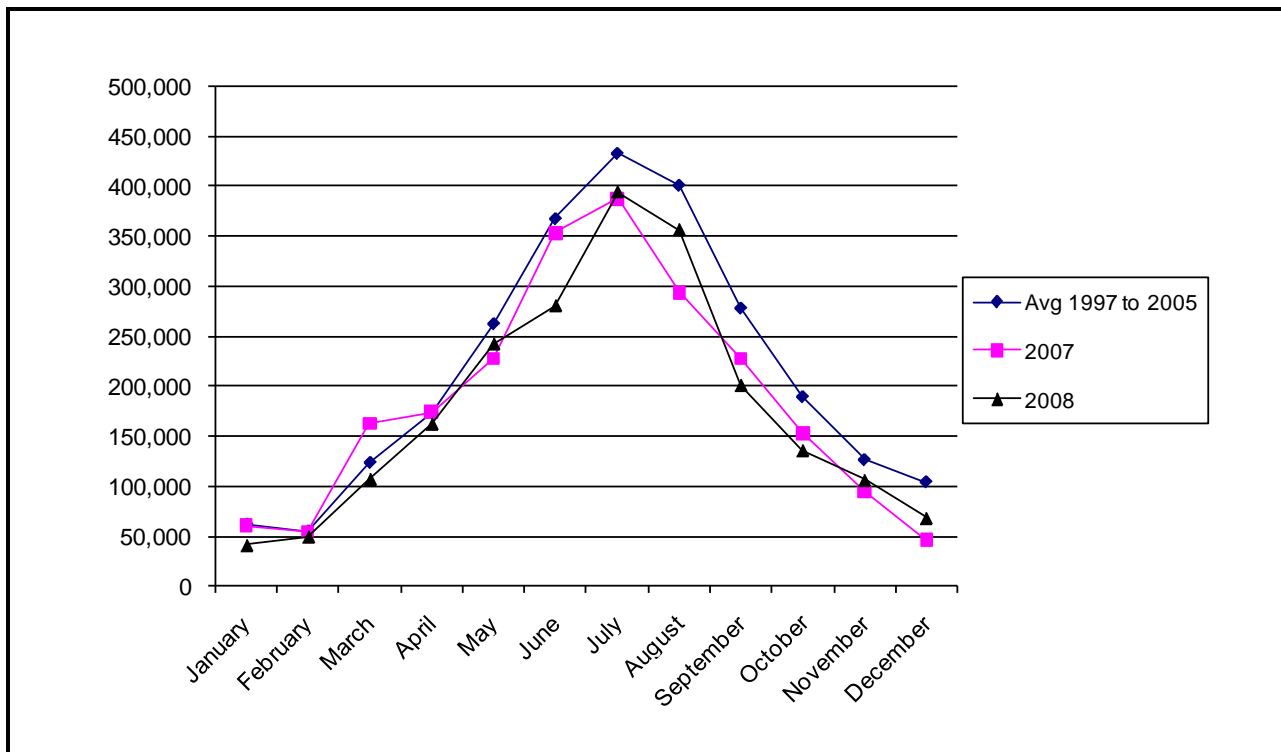
¹ A recreational visit is defined as the “entry of a person onto lands or waters administrated by NPS for recreational purposes” (NPS, 1999). Recreational visits do not include “nonrecreational” visits (defined as “through traffic, trades people with business in the park, and government personnel [including NPS employees] with business in the park”) (NPS, 1999).

Figure 2-2. Monthly Recreational Visitation, 2007 and 2008



Source: <http://www.nature.nps.gov/stats/park.cfm?parkid=171>

Figure 2-3. Recreational Visitation by Month



Source: <http://www.nature.nps.gov/stats/park.cfm?parkid=171>

2.4 ALTERNATIVE LOCATIONS FOR BEACH DRIVING

In addition to the Seashore, the North Carolina coast includes other beaches that offer beach driving opportunities.

The Cape Hatteras area has several alternative locations for beach driving. In Nags Head (with purchase of a permit) and Kill Devil Hills, beach driving is permitted from October through April. Year-round beach driving is allowed in Corolla north of Highway 12.

In addition to the Seashore, the North Carolina coast includes other beaches that offer beach driving opportunities. As mentioned above, beach driving is allowed on Cape Lookout. Further south, beach driving is allowed in select areas of the Crystal Coast with the purchase of a permit. Year-round beach driving is permitted in Atlantic Beach. During the off season, beach driving is permitted on Emerald Isle and in the Indian Beach/Salter Path area.

2.5 ECONOMIC ACTIVITY IN THE SURROUNDING COMMUNITIES

2.5.1 Socioeconomic Resources

This section describes the social and economic environment that potentially would be affected by the proposed alternatives. The social and economic environment of a region is characterized by its demographic composition, the structure and size of its economy, and the types and levels of public services available to its citizens.

The socioeconomic environment evaluated for this benefit cost analysis encompasses the Outer Banks portion of two counties in North Carolina—Dare and Hyde. Hatteras and Bodie islands are part of Dare County and Ocracoke Island is within Hyde County. This area contains 13 zip codes, 18 of the 19 block groups in Dare County, and 1 of the 4 block groups in Hyde County.²

The Outer Banks portion of Dare and Hyde counties (Figure 2-1) forms the economic region of influence (ROI) and defines the geographic area in which the predominant social and economic impacts from the proposed alternatives are likely to take place. The towns Ocracoke, Hatteras, Frisco, Avon,

² Census block groups generally contain between 300 and 3,000 people.

Buxton, Salvo, Waves, and Rodanthe will be most affected by the proposed actions because they are located within the Seashore. The largest towns within the ROI include Nags Head, Kill Devil Hills, and Kitty Hawk, which are located on Bodie Island north of the Seashore.

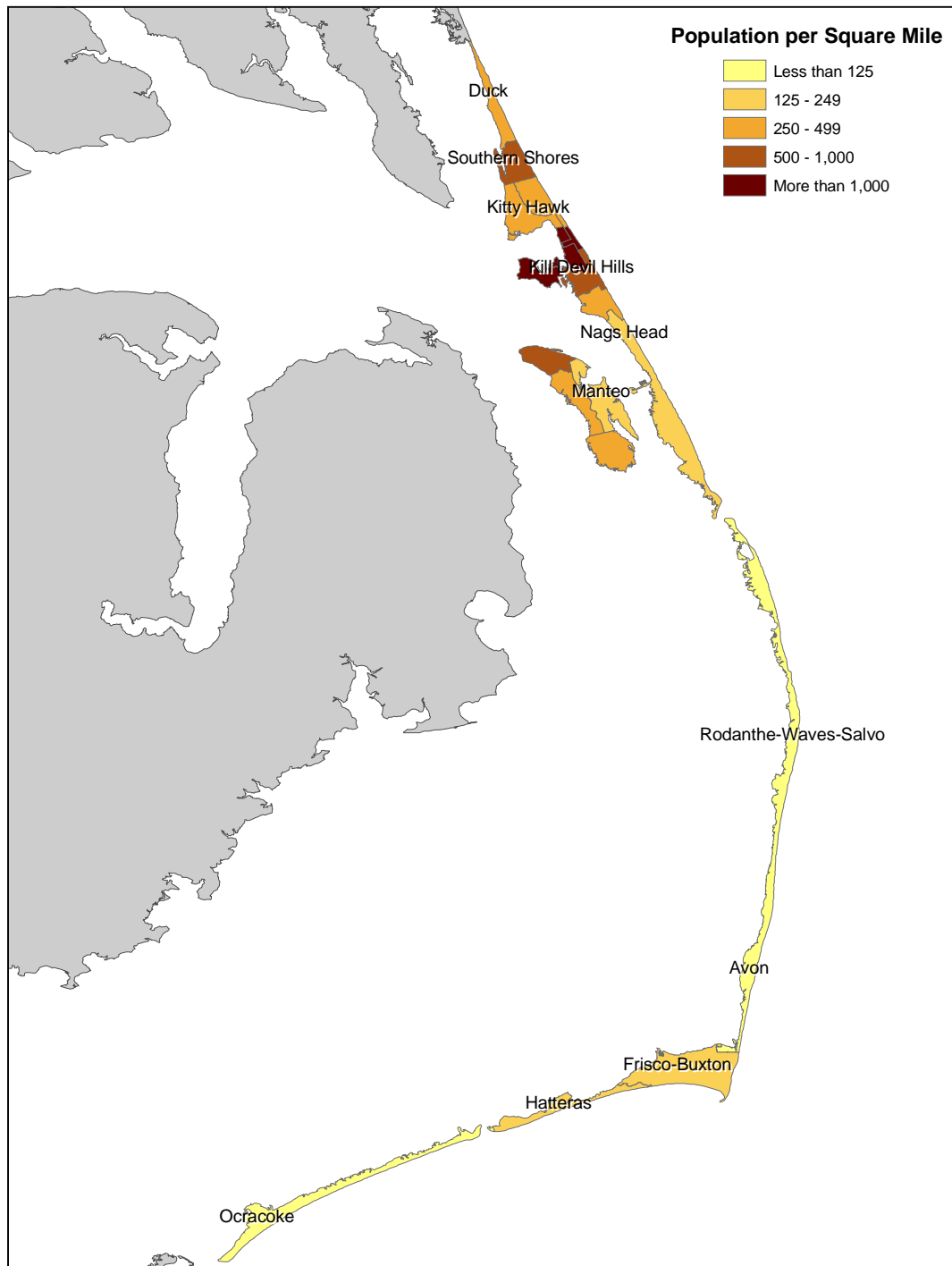
2.5.2 Demographics

The economic ROI is primarily rural in character, although portions of Dare County, especially in the north, are developed with large tracts of vacation homes and small businesses that support the area's robust tourism industry. Much of Dare County's permanent population also resides in this area, the most densely populated portion of the ROI (Figure 2-4). Note that data presented are often taken from the U.S. Census Bureau. The census places people according to "usual residence" guidelines, so people are counted where they live most of the year.

In recent years, population trends have differed substantially for Dare and Hyde counties. Table 2-5 provides population statistics for the state of North Carolina, Dare and Hyde counties and the Dare and Hyde county block groups located on the Outer Banks. Between 2000 and 2008, Dare County's population grew 12 percent, from 29,967 to 33,584. This is a slightly lower percentage change in population than the state of North Carolina as a whole. However, the portion of the state population occupying Dare County remained 0.4 percent. During this same time period, the population of Hyde County decreased by 11 percent, from 5,826 to 5,181 (U.S. Census Bureau, 2008c), lowering the portion of the state population occupying Hyde County from 0.07 percent to 0.06 percent. The Dare County block groups within the ROI account for 96 percent of Dare County's population, while the Hyde County block group represents only 13 percent of Hyde County's population (U.S. Census Bureau, 2000a).

According to population projections published by the North Carolina Office of State Budget and Management's State Demographics unit, the state and Hyde County population trends are expected to continue into the foreseeable future, while Dare County is projected to lose residents. By 2029, population in Dare County is projected to decrease to 26,053, a 13 percent reduction relative to 2000. The population of Hyde County is expected to fall further to 4,717, a 19 percent

Figure 2-4. 2000 Population Density by Block Group



Source: Environmental Systems Research Institute, Inc. 2002. "2000 Census Block Groups: NC." [CD-ROM]. ESRI Data & Maps 2002.

decrease relative to 2000 (Office of State Budget and Management North Carolina, 2009).

Table 2-5. Population Statistics

Geographic Area	2000 ^a	2007 ^b	2015 ^c	2029 ^c	Percentage Change, 2000–2007	Percentage Change, 2000–2029
North Carolina	8,049,313	9,222,414	10,429,282	12,769,797	15%	59%
Dare County	29,967	33,584	31,225	26,053	12%	–13%
Dare County block groups ^d	28,798	—	—	—	—	—
Hyde County	5,826	5,181	5,256	4,717	–11%	–19%
Hyde County block group ^e	730	—	—	—	—	—

Sources:

^aU.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; “Census 2000 Summary File 3 (SF3)—Sample Data” <http://factfinder.census.gov>. (December 5, 2008).

^bU.S. Census Bureau, Population Division. 2009. “Annual Estimates of Resident Population Change for Counties of North Carolina and County Rankings: April 1, 2000 to July 1, 2008 (CO-EST2008-POPCHG2000_2008-37).” <http://www.census.gov/popest/estimates.php>.

^cNorth Carolina Office of State Budget and Management. 2009. “Projected Annual County Population Totals.” http://www.osbm.state.nc.us/ncosbm/facts_and_figures/socioeconomic_data/population_estimates.shtm.

^dThe 18 Dare County block groups in the ROI.

^eThe one Hyde County block group in the ROI.

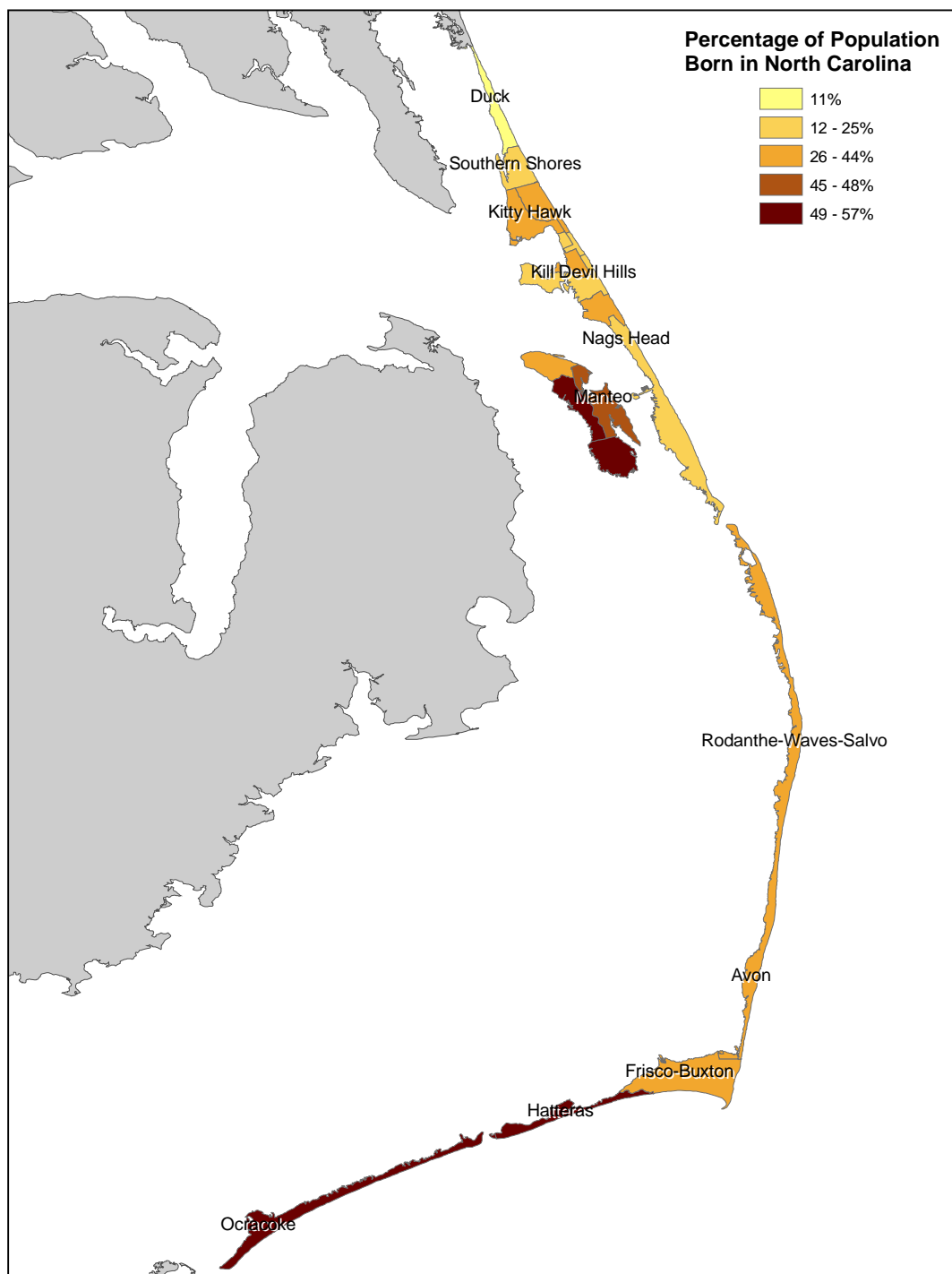
Demographic and economic trends during the last 3 decades have contributed to growing differences in the population characteristics and income levels in the different areas of the ROI. The rate of change is especially rapid in northern Dare County, where a smaller percentage of residents were born in North Carolina, shown in Figure 2-5.

In 1999, the areas within the ROI had a 13 percent greater per capita income than North Carolina as a whole and 6 percent greater than the country as a whole (Table 2-6). This distribution varies across the ROI. Ocracoke, southern Dare County, and portions of Roanoke Island all had a lower per capita income than the more densely populated block groups in the northern part of the ROI (Figure 2-6).

In 2000, the ROI had a minority population of only 6 percent of the total (Table 2-7). This is less than in North Carolina and the United States as a whole, which had 30 percent and 31 percent minority populations, respectively. The ROI also had a lower

percentage of individuals below the poverty level and a lower percentage of individuals without high school diplomas. The distribution of poverty rates by block groups is shown in Figure 2-7.

Figure 2-5. Percentage of Residents Born in North Carolina by Block Group, 2000



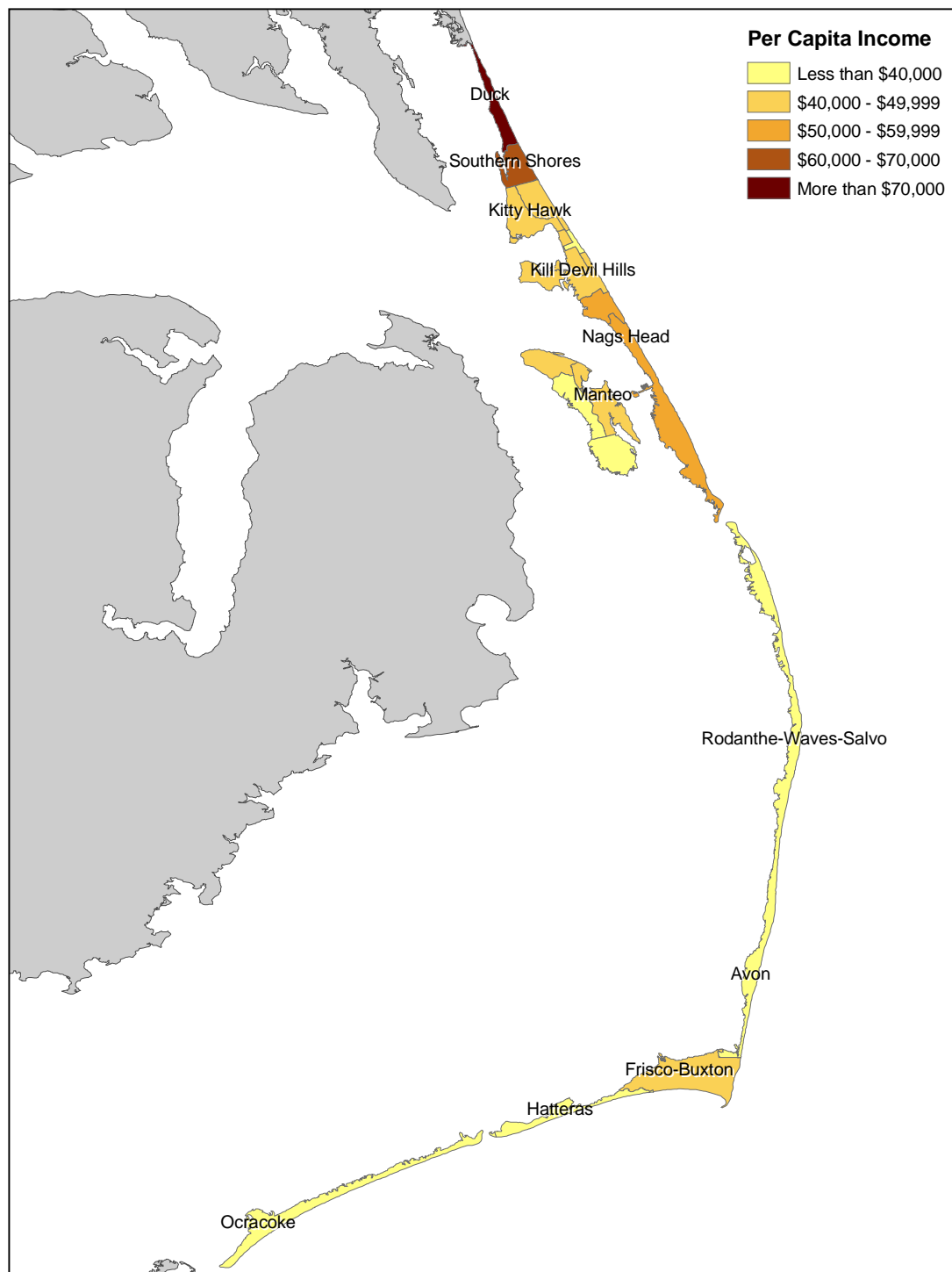
Source: U.S. Census Bureau 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

Table 2-6. Employment By Sector, 2000

Industry	Number of Employees	Percentage			Difference	
	ROI	ROI	NC	US	ROI-NC	ROI-US
Construction	2,102	14%	8%	7%	5%	7%
Accommodation and food services	1,857	12%	6%	6%	6%	6%
Real estate, rental and leasing	1,078	7%	2%	2%	5%	5%
Retail trade	2,296	15%	12%	12%	3%	3%
Agriculture, forestry, fishing and hunting	491	3%	1%	1%	2%	2%
Public administration	992	6%	4%	5%	2%	2%
Arts, entertainment, and recreation	453	3%	1%	2%	2%	1%
Utilities	162	1%	1%	1%	0%	0%
Management of companies and enterprises	0	0%	0%	0%	0%	0%
Other services (except public administration)	714	5%	5%	5%	0%	0%
Mining	4	0%	0%	0%	0%	0%
Administrative and support and waste management services	432	3%	3%	3%	0%	-1%
Information	379	2%	2%	3%	0%	-1%
Wholesale trade	414	3%	3%	4%	-1%	-1%
Professional, scientific, and technical services	688	4%	5%	6%	0%	-1%
Transportation and warehousing	365	2%	4%	4%	-1%	-2%
Educational services	986	6%	8%	9%	-2%	-2%
Finance and insurance	365	2%	4%	5%	-2%	-3%
Health care and social assistance	890	6%	11%	11%	-5%	-5%
Manufacturing	764	5%	20%	14%	-15%	-9%

Source: U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

Figure 2-6. 1999 Per Capita Income by Block Group



Source: U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

Table 2-7.
Environmental Justice
Statistics, 2000

Geographic Area	Per Capita Income	Percentage of Population		
		Minority	Below the Poverty Level	Without High School Diploma
United States	\$41,994	31%	12%	20%
North Carolina	\$39,184	30%	12%	22%
ROI	\$44,462	6%	8%	11%

Source: U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

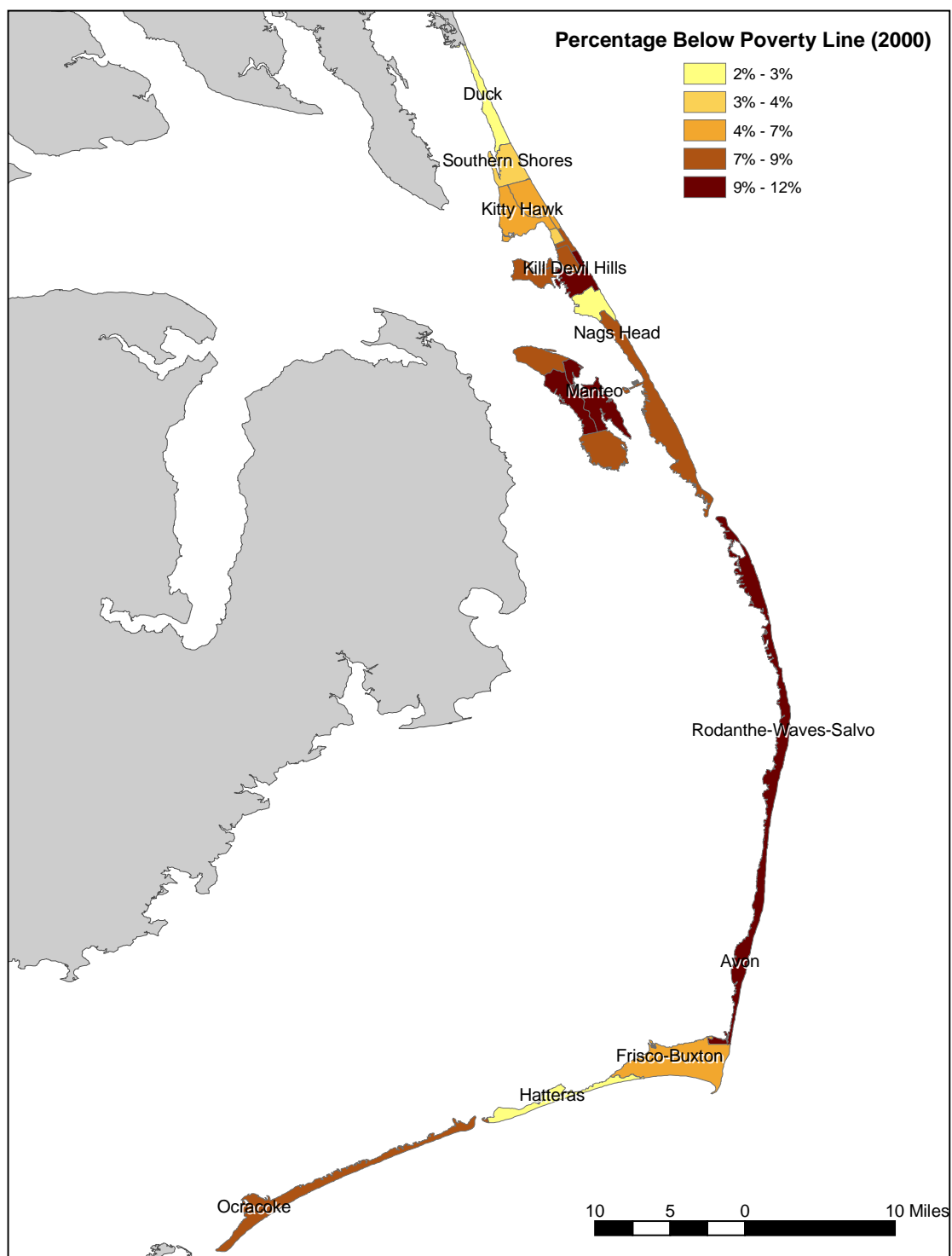
2.5.3 Employment

As noted above, with the exception of the northern portion of Dare County, the ROI is primarily rural. There are no military bases, major federal facilities, state prisons, commercial airports, or 4-year colleges in the ROI.

Within the ROI, much of the employment caters to tourists visiting the area. The sectors of construction; accommodation and food services; real estate, rental and leasing; and retail trade account for 47.52 percent of the total employment within the ROI and 49.98 percent within the Hatteras block groups in 2000. These sectors account for only 26.50 percent of employment in the United States as a whole (Table 2-6).

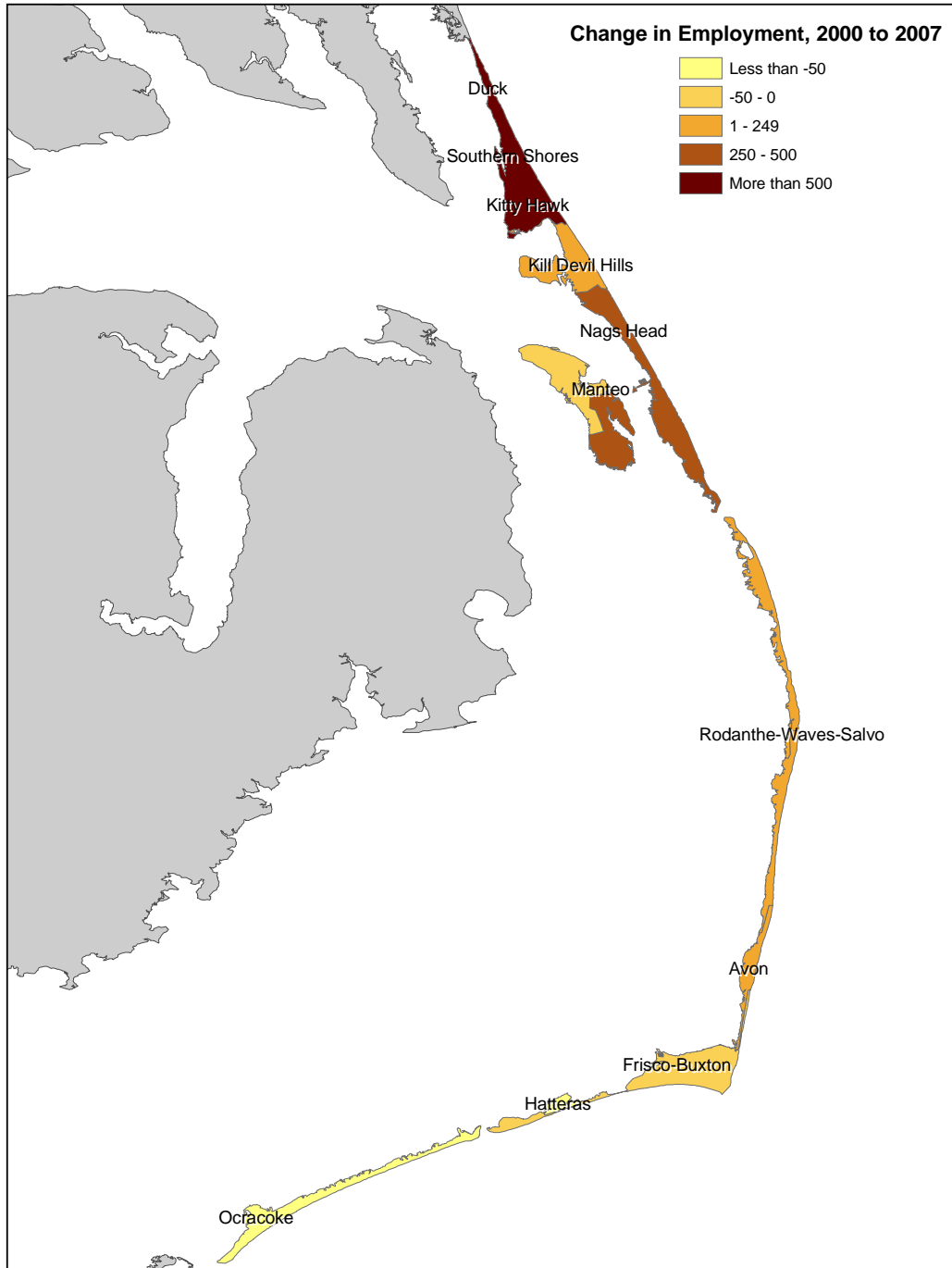
The majority of businesses within the ROI are located in the northern three zip codes in Dare County, encompassing the towns of Duck, Southern Shores, Kill Devil Hills, and Nags Head. This area accounts for 64.8 percent of establishments and 69.6 percent of employment within the ROI in 2007 and has seen robust employment growth since 2000. Other areas of the ROI have experienced smaller gains or reductions in employment (Figure 2-8). In 2007, Hatteras and Ocracoke islands contained 13.1 percent of the employees within the ROI. Small businesses are especially important within the ROI: 1,713 of 2,104 (81.42 percent) in the ROI operate with fewer than 10 employees in 2007, compared to 73.37 percent nationwide (U.S. Census Bureau, 2009b).

Figure 2-7. Percentage of Population below the Poverty Line by Block Group, 2000



Source: U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

Figure 2-8. Change in Employment by Zip Code



Sources: U.S. Census Bureau. 2002. "County Business Patterns: 2000, Zip Code Totals File."
http://www.census.gov/econ/cbp/download/00_data/index.htm.

U.S. Census Bureau. 2009a. "County Business Patterns: 2007, Zip Code Totals File."
http://www.census.gov/econ/cbp/download/07_data/index.htm.

In addition to these employees, Dare and Hyde counties had 5,764 of self-employed individuals in 2007. The construction; real estate, rental and leasing; and agriculture, forestry, fishing and hunting (of which 61 percent are commercial fishermen) industries comprised 49 percent of all nonemployers³ in the two counties (Table 2-8).

A survey of local businesses was also conducted (RTI International 2010a) to supplement the publicly available data. The survey included businesses in four primary industry categories for interviewing: recreational supplies, rental homes, lodging excluding rental homes, and commercial fishermen. The sample was divided between the Seashore villages (Ocracoke, Rodanthe, Waves, Salvo, Avon, Buxton, Hatteras, and Frisco) and three villages north of the Seashore (Nags Head, Kitty Hawk, and Kill Devil Hills). The majority of interviews were with the Seashore villages. To create the sampling frame (the list of businesses from which the sample will be drawn), NPS used a variety of resources. Lists of all businesses in the selected categories were compiled using the yellow pages, Web sites such as outerbanks.org, InfoUSA (a geocoded database of businesses, InfoUSA 2008), input from Seashore staff, input from members of the Regulatory Negotiation Committee, and public input. The lists were then manually filtered to determine whether each business fit the business category definition and if the business was still active. Duplicates and additional locations were excluded to ensure one entry per entity. The sample of commercial fishermen comes from a list of fishermen with a license to fish in the Seashore as of June 2, 2009, supplied by the Seashore. Only fishermen designated as captains were included in the sample (RTI International 2010a).

In the Seashore villages, 57 recreational supply businesses, 13 housing rental agencies, 64 lodging businesses excluding rental housing, and 55 commercial fishermen were identified. In the three villages north of the Seashore, 62 recreational supply businesses, 43 housing rental agencies, and 76 lodging businesses excluding rental housing were identified.

³ From <http://www.census.gov/econ/nonemployer/intro.htm>: "Nonemployers are typically self-employed individuals operating very small businesses, which may or may not be the owner's principal source of income...Data are primarily comprised of sole proprietorship businesses filing IRS Form 1040, Schedule C, although some of the data is derived from filers of partnership and corporation tax returns that report no paid employees."

Table 2-8. Nonemployers by Industry, 2007

Industry	Number of Nonemployers	Percentage			Difference	
	Dare and Hyde Counties	Dare & Hyde Counties	NC	U.S.	Counties, NC	Counties, U.S.
Agriculture, forestry, fishing, and hunting	667	12%	1%	1%	10%	10%
Construction	1,262	22%	16%	12%	6%	10%
Real estate and rental and leasing	912	16%	11%	11%	5%	5%
Administrative and support and waste management and remediation services	529	9%	10%	8%	-1%	1%
Accommodation and food services	109	2%	1%	1%	1%	0%
Utilities	3	0%	0%	0%	0%	0%
Manufacturing	>67	1%	2%	2%	0%	0%
Mining, quarrying, and oil and gas extraction	0	0%	0%	0%	0%	0%
Wholesale trade	72	1%	2%	2%	0%	-1%
Information	>37	1%	1%	1%	-1%	-1%
Educational services	80	1%	2%	2%	-1%	-1%
Arts, entertainment, and recreation	234	4%	4%	5%	0%	-1%
Finance and insurance	>99	2%	3%	4%	-1%	-2%
Other services (except public administration)	611	11%	15%	14%	-5%	-3%
Transportation and warehousing	>86	1%	4%	5%	-3%	-3%
Retail trade	309	5%	9%	9%	-4%	-4%
Health care and social assistance	195	3%	6%	8%	-3%	-5%
Professional, scientific, and technical services	461	8%	12%	14%	-4%	-6%
Total for all sectors	5,764	100%	100%	100%		

Among the businesses surveyed, 97 percent were small businesses. The overall response rate for the survey was 42

percent with a higher response rate for the Seashore villages and much lower for the businesses north of the Seashore.

2.5.4 Unemployment

In 2009, an average of 9.6 percent of the civilian labor force in Dare County was unemployed (2,179 individuals) and 8.3 percent in Hyde County (229 individuals) (Table 2-9). The unemployment rates for Dare and Hyde counties were lower than the unemployment rates in North Carolina as a whole in 2009. In April 2010, the North Carolina (seasonally unadjusted) unemployment rate was 10.1 percent, higher than Dare and Hyde counties (9.4 percent and 8.1 percent, respectively).

Within Dare County, establishments in construction, manufacturing, and retail trade industries accounted for the majority of private job losses from 2007 to 2008. Within retail trade, job losses in furniture and home furnishings stores, building material and garden equipment dealers, food and beverage stores, and health and personal care stores were partially offset by employment gains in clothing and clothing accessories stores; gasoline stations; and sporting goods, hobby, and musical instrument stores.

In the summer of 2009, unemployment rates in North Carolina and Dare and Hyde counties remained elevated relative to their 2004 to 2006 average. Figure 2-9 charts the difference between the monthly unemployment rate between January 2007 and January 2010 and the average unemployment rate between 2004 and 2006 for the same month. Between January 2007 and March 2007, the unemployment rate was lower than the 2004-2006 average. Unemployment in Dare increased more than the state of North Carolina as a whole in the winters of 2008/2009 and 2009/2010. In the summer of 2009, Dare County's unemployment rate was closer to the 2004-2006 average than the state of North Carolina. In the winter of 2009-2010, unemployment rates in Dare and Hyde counties increased relative to the 2004-2006 average for these months, reflecting the loss of non-seasonal employment in these counties.

2.5.5 Tourism Contributions to the Economy

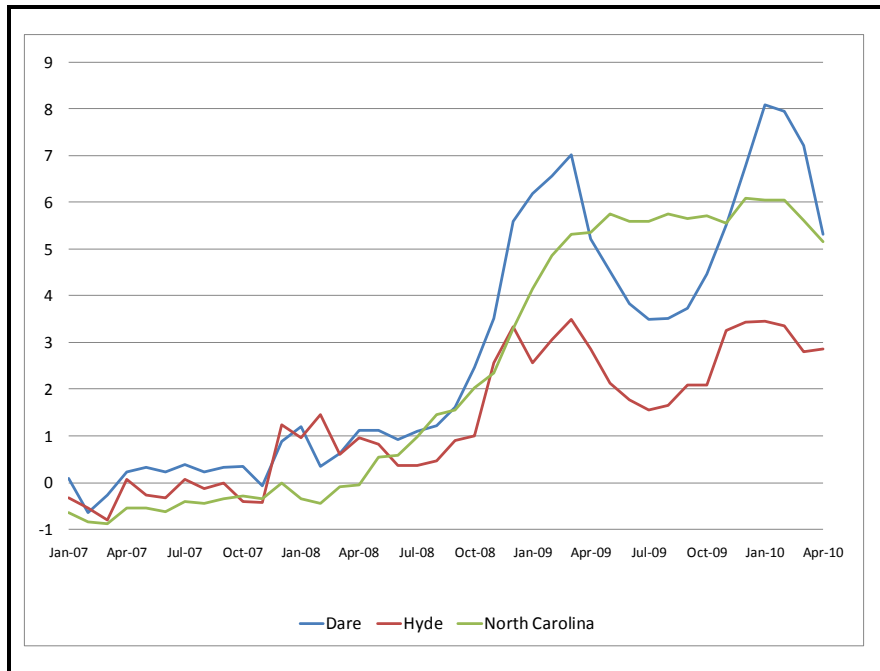
The economy of the ROI is largely driven by the region's tourist draw, mainly during the summer months. As estimated by the

Table 2-9. Employment Characteristics, 2009

	North Carolina	Dare County	Hyde County
Labor force	4,544,622	22,591	2,768
Employment	4,060,764	20,412	2,539
Unemployment	483,858	2,179	229
Unemployment rate	10.6%	9.6%	8.3%

Source: Bureau of Labor Statistics. 2010. "Local Area Unemployment Statistics." <http://www.bls.gov/lau>. (September 2, 2009).

Figure 2-9. Difference in Unemployment Rate from 2004–2006 Monthly Average



Source: Bureau of Labor Statistics. 2010. "Local Area Unemployment Statistics." <http://www.bls.gov/lau>. (June 29, 2009).

North Carolina Department of Commerce, travel expenditures in Dare County have increased faster than they have for the state as a whole (Table 2-10); however, travel expenditures in Hyde County have decreased since 2000. In 2008, Department of Commerce estimates that tourism was responsible for 11,250 jobs in Dare County and 370 jobs in Hyde County (Department of Commerce 2009).

Table 2-10. Estimated Domestic Travel Expenditures (\$2008 Millions)

Geographic Area	1991	2000	2008	2000 to 2008 CAGR*
North Carolina	\$11,092.58	\$15,089.89	\$16,864.60	1.6%
Dare County	\$377.40	\$624.14	\$777.41	3.2%
Hyde County	\$17.93	\$29.58	\$28.11	-0.7%

*Compound annual growth rate

Source: North Carolina Department of Commerce. 2009. "Economic Impact of Travel in North Carolina Based on Visitor Spending."
<http://www.nccommerce.com/en/TourismServices/PromoteTravelAndTourismIndustry/TourismResearch/visitorspending.htm>.

2.5.6 Housing

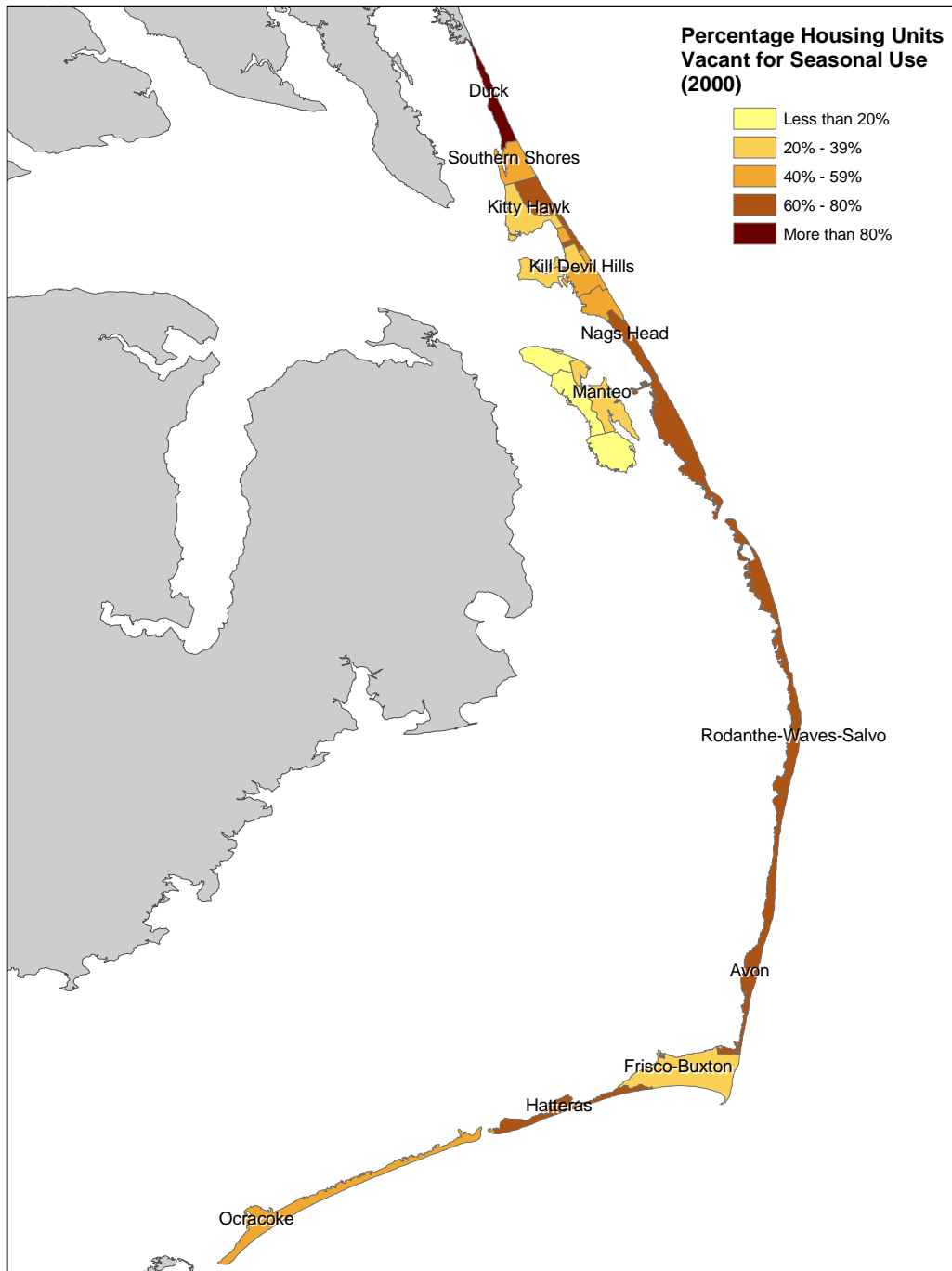
In 2000, the ROI had a total of 26,891 housing units, with 97 percent of these located in the Dare County block groups. The ROI's housing is roughly 54 percent urban and 46 percent rural; 100 percent of the urban housing units are located in Dare County block groups. Over 50 percent of the housing units in the ROI are for seasonal, recreational, or occasional use (Table 2-11). The distribution of vacant housing units for seasonal, recreational, or occasional use is shown in Figure 2-10. This is further evidence of the importance of tourism's contributions to the region's economy.

Table 2-11. Housing Unit Statistics, 2000

	United States	North Carolina	ROI
Total	115,904,641	3,523,944	26,891
Urban	89,966,555	2,080,729	14,578
% of total	78%	59%	54%
Occupied	105,480,101	3,132,013	12,588
Vacant	10,424,540	391,931	14,303
For seasonal, recreational, or occasional use	3,872,468	147,087	13,771
% of total	3%	4%	51%

Source: U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

Figure 2-10. Percentage of Housing Units Vacant for Seasonal, Recreational, or Occasional Use by Block Group, 2000



Source: U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data" <http://factfinder.census.gov>. (December 5, 2008).

Table 2-12. Change in Housing Units

Geographic Area	2000	2008	Percentage Change 2000–2008
United States	115,904,641	129,065,264	11%
North Carolina	3,523,944	4,201,378	19%
Dare County	26,671	32,749	21%
Hyde County	3,302	3,495	5%

Sources: U.S. Census Bureau, Population Division. 2009a. "HU-EST2008: State Housing Unit Estimates: April 1, 2000 to July 1, 2008." <http://www.census.gov/popest/housing/files/HU-EST2008.CSV>.

U.S. Census Bureau, Population Division. 2009b. "HU-EST2008-37: Housing Unit Estimates for Counties of North Carolina April 1/2000 to July 1/2008." <http://www.census.gov/popest/housing/files/HU-EST2008-37.CSV>.

Since 2000, Dare County has experienced a 21 percent increase in the number of housing units, relative to a 19 percent change statewide (Table 2-12). However, in October of 2008, Dare County had the fifth highest foreclosure rate of any county in North Carolina: one in every 679 housing units were in foreclosure (RealtyTrac.com, 2008).

3

Benefit-Cost Analysis of the Alternatives

In this section, NPS presents the benefits and costs associated with alternatives considered for managing ORVs in the Seashore relative to the two no-action baselines.

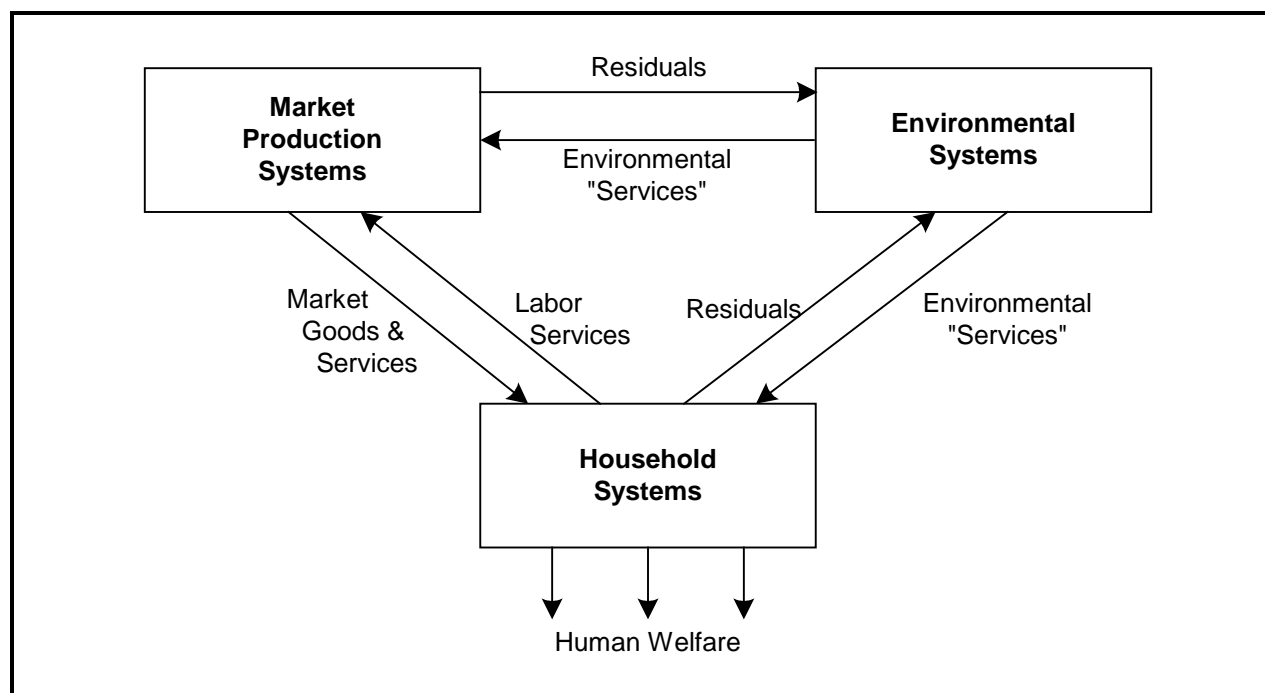
The purpose of benefit-cost analysis is to evaluate the social welfare implications of a proposed action—in this case the management of ORVs in the Seashore. It examines whether the reallocation of society's resources resulting from the action promotes efficiency. That is, the analysis assesses whether the action imposes costs on society (losses in social welfare) that are less than the benefits (gains in social welfare). Section 3.1 provides a conceptual framework for the benefit-cost analysis and a general discussion of the externalities associated with ORV use. Section 3.2 contains a specific discussion of the benefits and costs of the alternative management proposals for the Seashore relative to No-Action Alternatives A and B.

3.1 CONCEPTUAL BASIS FOR BENEFIT-COST ANALYSIS OF OFF-ROAD VEHICLE REGULATIONS IN NATIONAL PARKS

3.1.1 Conceptual Basis for Benefit-Cost Analysis

According to the conceptual underpinnings of benefit-cost analysis, all social welfare impacts ultimately accrue to individuals. This is represented in Figure 3-1, which depicts flows of goods, services, and residuals among three major systems: market production, household, and the environment. Because these systems are closely interconnected, actions taken to reduce releases of harmful residuals (e.g., chemicals or pollution) to the environment potentially will reverberate throughout all of these systems. Nevertheless, the impacts of

Figure 3-1. Interrelationship Among Market, Environmental, and Household Systems and Social Welfare



Under regulations that affect ORV access to the beaches, the most direct impact will be on visitors who use ORVs, whose recreational opportunities may be constrained by the restrictions.

these actions, both the costs and benefits, will ultimately be experienced as changes in well-being for households and individuals. As a result, identifying and measuring costs and benefits must focus on these changes in well-being.

The conceptual framework depicted in Figure 3-1, therefore, provides a basis for assessing the benefits and costs of regulating ORVs in national parks. Under regulations that affect ORV access to the beaches, the most direct impact will be on visitors who use ORVs, whose recreational opportunities may be constrained by the restrictions. This will result in welfare losses to these individuals. The regulations will likewise directly impact visitors who prefer an ORV-free experience. This will result in welfare gains to these individuals.

The concept of distorted primary markets is also important in analyzing the impact of the proposed ORV regulations. ORV use may generate negative externalities⁴ that affect other visitors

⁴ An externality is an impact (positive or negative) on anyone not party to a given economic transaction. An externality occurs when a decision causes costs or benefits to third party stakeholders, often, although not necessarily, from the use of a public good.

and Seashore resources. If ORVs do generate negative externalities, then the private cost of using an ORV on the beach (the cost to the individual driver, for example) will be lower than the social cost of ORV use (where the social cost of ORV use includes both the cost to the ORV user and the costs to others that result from the negative externalities associated with ORV use). Because ORV users do not have to pay the full social cost of using an ORV on the beach and instead only pay the lower, private cost, ORV use will be higher than the socially optimal use level. Measures of net consumer surplus to ORV users that do not account for the additional costs imposed on society by the negative externalities associated with ORV use will overstate the true net social welfare associated with the activity.

If individuals change their behavior in response to ORV management changes, these changes are likely to affect environmental systems and market systems. Reductions in the market demand for ORV visitor-related goods and services will have negative impacts for those who own or work for establishments supplying these services. Conversely if the restrictions bring new visitors to the Seashore, then businesses serving these visitors will gain. In addition, benefit-cost analysis focuses on the net impact of an action on society as a whole, not just one specific region. If visitors leave one area and visit another, then the businesses in the new area will benefit from increased business. These types of direct and indirect impacts are identified and evaluated as part of this benefit-cost analysis.

Estimating the monetary value of benefits and costs requires methods for expressing welfare changes in monetary terms. In certain instances, welfare changes are directly the result of monetary gains or losses and can, therefore, be thought of as being equivalent to these gains or losses. For example, under regulations restricting ORV use, welfare losses to shops that cater to ORV visitors due to reductions in demand for their services can be reasonably measured as their resulting net loss in income. A benefit-cost analysis measures the impact on businesses by the change in producer surplus. Producer surplus measures the difference between total revenue and variable costs. Businesses will gain or lose producer surplus depending on how their customers change their behavior in response to new ORV management.

Economists generally accept willingness to pay (WTP) as the conceptually correct measure for valuing changes in individuals' welfare. WTP represents the maximum amount of money that an individual would be willing to forgo to acquire a specified change.

In other instances, welfare changes are not directly associated with pecuniary gains or losses. Such "nonmarket" changes might include the welfare gains from improved habitat for threatened and endangered species in a Seashore, the diminished recreation experiences for ORV visitors or enhanced recreational experience for visitors who want an vehicle free experience. In these cases, a surrogate measure of gains or losses must be used; willingness to pay (WTP) is such a surrogate. Economists generally accept WTP as the conceptually correct measure for valuing changes in individuals' welfare. WTP represents the maximum amount of money that an individual would be willing to forgo to acquire a specified change. Thus, it is the monetary equivalent of the welfare gain from the change.

The welfare losses to individual consumers (ORV users) are measured by their loss in consumer surplus. Consumer surplus is measured as the difference between the total costs of a product or activity to the consumer and the total amount the individual would be willing to pay for that activity. Individuals gain consumer surplus if the cost of an activity decreases or the quality increases. Losses in consumer surplus come from the opposite impacts, including increases in the cost of the activity or decreases in the quality. If an individual can no longer participate in their first-choice activity because the cost is too high or access is restricted, the individual loses the entire consumer surplus associated with the trip.

The extent of the welfare loss to an individual depends crucially on the availability of substitute activities. The more substitutes an individual has for the activity, the lower their consumer surplus loss will be if that activity increases in cost or decreases in quality or if access is restricted. If many similar substitutes exist, then the individual can switch to a new activity or location with little impact on their overall utility. What constitutes a substitute varies across individuals based on their preferences, their location, and their income.

3.1.2 Identifying Relevant Benefits and Costs

To conduct the benefit-cost analysis, the relevant benefits and costs must be identified. This section discusses two economic concepts that are important for an analysis of the benefits and costs of the proposed ORV regulations: indirectly affected secondary markets and distorted primary markets. Often

consumers and producers may be indirectly affected by a policy. For example, regulations restricting ORV use in national parks may lead to decreased demand for ORV rentals or fishing supplies. Whether these indirect, or secondary, impacts should be included in the analysis depends on whether the change in demand or supply in the secondary market results in price changes (for details, see a benefit-cost analysis textbook such as Boardman et al. [1996]). In general when the policy change in the primary market (the market for trips to the Seashore) causes prices to change in the secondary markets (businesses that serve visitors to the Seashore), the net change in social welfare from the secondary market should be included in the benefit-cost analysis. If prices do not change in the secondary market, the revenue gains or losses should not be included in the benefit-cost analysis. Without more detailed information, NPS is unable to predict whether the proposed alternatives for ORV management will change the prices of goods or services purchased by ORV users. Thus, losses or gains to businesses that may be indirectly, but significantly, affected by the proposed alternatives are included in the benefit-cost analysis.

3.2 RESULTS FOR THE SEASHORE

Based on the approach and possible impacts outlined above, this section presents the results of the benefit-cost analysis for the Seashore. The section discusses the groups most directly affected by the proposed change in regulation and several scenarios for the possible levels of impacts. The benefits and costs accruing to these groups are then presented.

3.2.1 Affected Groups

Table 3-1 describes the possible welfare impacts of the action alternatives for seven groups within the population. The groups include:

1. Visitors to the Seashore who want to drive vehicles on the beach or who travel with other visitors who want to drive on the beach.
2. Visitors or potential visitors who want an ORV-free experience on the beach.
3. Visitors who want to walk on the beach.
4. The general public who may care about the Seashore and the natural environment of the Seashore, even if they do not visit.

Table 3-1. Affected Groups and Possible Changes in Welfare

Group	Current Activity	Change in Activity	Change in Welfare
1. Visitors who want to drive on the beach	Drive on beach in areas that would be open under proposed rule	None	Consumer surplus decreases if beaches are more crowded when other areas are closed to vehicles Consumer surplus increases if cost of lodging or supplies for trip decrease
Visitors who want to drive on the beach	Drive on beach in areas that would be closed under proposed rule	Drive on other parts of the Seashore	Consumer surplus decreases (not first-choice activity)
Visitors who want to drive on the beach	Drive on beach in areas that would be closed under proposed rule	Do not visit the Seashore	Consumer surplus decreases (not first-choice activity)
2. Visitors who want an experience without ORVs	Visit the Seashore in areas that would remain unchanged by the rule	None	No change in consumer surplus
Visitors who want an experience without ORVs	Visit the Seashore in areas that currently allow vehicles but would be closed to vehicles under the proposed rule	None	Consumer surplus increases if visitors prefer no vehicles and it does not change if visitors are indifferent
Visitors who want an experience without ORVs	Visit the Seashore in areas that currently do not allow vehicles but would be open to vehicles under the proposed rule	Visit other parts of the Seashore or do not visit the Seashore	Consumer surplus decreases (not first-choice activity)
Potential visitors who want an experience without ORVs	Currently visit other recreational sites because of current management of beach driving	Visit Seashore	Consumer surplus increases (can participate in new activity)
3. Visitors who want to walk on the beach	Visit the Seashore in areas that would remain unchanged by the rule	None	No change in consumer surplus
Visitors who want to walk on the beach	Visit areas that will be closed to ORVs under the rule	None	Consumer surplus increases if visitors prefer no vehicles and it does not change if visitors are indifferent

(continued)

Table 3-1. Affected Groups (continued)

Group	Current Activity	Change in Activity	Change in Welfare
Visitors who want to walk on the beach	Visit the Seashore in areas that would be closed to pedestrians by the rule	Walk in other parts of the Seashore or do not visit	Consumer surplus decreases (not first-choice activity)
4. General public	Not related to use of Seashore	None	Consumer surplus increases if new management benefits the Seashores' resources
5. Businesses that support visitors who want to drive on the beach	Conduct business with visitors	Less business if visitation changes	Producer surplus decreases (if visitor spending down)
Businesses that support visitors who do not want to drive on the beach	Conduct business with visitors	More business if visitation changes	Producer surplus increases (if visitor spending up)
6. Businesses in other locations	Conduct business with visitors	More business if visitors to the Seashore decide to visit other beaches	Producer surplus increases (if visitor spending up)
7. National Park Service (Federal taxpayers)	Use Agency resources for management	Increase or decrease need for management resources	Society's welfare will increase or decrease if resources are redirected from or to higher valued activities

5. Local businesses indirectly affected by changes in management of beach driving through changes in visitation patterns.
6. Businesses in other areas that may benefit if Seashore visitors decide to visit other beaches or vacation areas.
7. NPS, which will incur changes in the cost of managing the Seashore under the proposed rule.

For each group, Table 3-1 summarizes possible changes in activity and resulting changes in welfare, whether consumer surplus or producer surplus. Below the welfare changes are discussed in more detail.

3.2.2 Scenarios

Analysis of the changes in welfare to visitors, businesses, and the general public requires predicting the likely impact of the alternatives relative to the two no-action alternatives. Of course, forecasting the impact of any of the alternatives over

the next 10 years involves a great deal of uncertainty. The actual impacts will depend on how visitors change their visiting and spending patterns, bird and turtle nesting patterns, as well as factors unrelated to the alternatives such as severe weather and the national economy. To incorporate some of this uncertainty into the forecasts, high, medium and low impact scenarios were developed for each of the action alternatives.

Ideally, we would forecast visitation in terms of visitor days under baseline and each action alternative and use the forecast to derive the incremental change in visitation under each scenario. To calculate changes in consumer surplus, the incremental change in visitation for different types of visitors would then be multiplied by the appropriate WTP value to calculate total consumer surplus change.

Likewise, the incremental change in visitation under each action alternative would be multiplied by average spending for each type of visitor. The resulting estimates of change in revenue would be adjusted to calculate producer surplus.

Unfortunately, a single, robust source of visitation data does not exist for the Seashore to forecast baseline use. Instead, several sources of data were combined to create qualitative and, where possible, quantitative estimates of the incremental impacts of the action alternatives. The following sources of data were used to develop the scenarios used to estimate the possible range of benefits and costs associated with each alternative relative to each baseline.

- Official Seashore visitation statistics. NPS keeps official visitation statistics of the number of trips to the Seashore but not the number of visitor days spent at the Seashore. The official visitation statistics are derived from a traffic counter that counts cars heading south at Whalebone Junction, which is located north of the Seashore boundary, on Highway 12. The count of cars is adjusted using assumptions about the number of people in each vehicle and the percentage of the traffic that is local or otherwise not visitors. The number is supplemented with data on the number of ferry passengers leaving Cedar Island for Ocracoke and the number of passengers flying into the airport on Ocracoke.
(<http://www.nature.nps.gov/stats/park.cfm?parkid=171>)

- A 2009 survey of businesses in the villages around the Seashore and in the villages of Nags Head, Kill Devil Hills, and Kitty Hawk located north of the Seashore (RTI International, 2010a). The survey asked businesses about their revenue in 2007 and 2008, as well as their forecast for how different features of the action alternatives would affect their customers and revenue.
- A count of vehicles using the beach access ramps conducted between April 2009 and March 2010 (RTI International 2010b). Vehicle counts were conducted based on a sampling plan stratified by location, ramp, day of the week, time of day, and time of year. The results were weighted to produce mean estimates with 95% confidence intervals for vehicle traffic at different locations and for different times of the year. (See Section 2.3.2 for more information about the vehicle count.)
- Data purchased for analysis using IMPLAN (Minnesota IMPLAN Group, Inc. 2004), an input-output model that calculates the ripple effects that changes in direct spending have on other sectors of the economy in a particular region. IMPLAN was used to calculate the impacts of the alternatives for the FEIS.
- Profit ratios from the Internal Revenue Service (2010) "Corporation Source Book: Data Files 2004-2007."
- Additional publically available data.

The range of scenarios for each action alternative relative to each no-action alternative used to calculate producer surplus comes from the direct economic impacts calculated in the FEIS for each alternative. The impacts are based on results from the business survey, official NPS visitation statistics, and other publically available data as described in the FEIS.

To address consumer surplus changes, the data from the vehicle count and the business survey were used to qualitatively assess the number of visitors affected by the action alternatives.

3.2.3 Benefits to Visitors and the General Public

The benefits of the action alternatives relative to the no-action alternatives accrue to visitors and potential visitors who would enjoy their visit more or consider the beach safer under the changes in vehicle access detailed in the action alternatives

relative to the no-action alternatives. Table 3-2 reproduces the text from the FEIS summarizing the impacts of the different alternatives on visitor experience for visitors who want an experience that includes ORV experience and those who want an experience that does not include ORVs (either personal use of an ORV or sharing the beach with ORVs).

Based on the analysis in the FEIS, visitors who want an ORV-free experience would experience increases in welfare from all the action alternatives relative to the no-action alternatives. Both no-action alternatives are projected to result in moderate adverse impacts, while all the action alternatives would provide benefits to non-ORV visitors. The action alternatives establish year-round and seasonal areas that do not allow ORVs.

Relative to the no-action alternatives, Alternative D provides the most ORV-free areas, although pedestrian access to some areas would also be limited during breeding season. Alternative C would most likely provide the next highest level of benefits relative to Alternatives E and F. Alternative E would most likely provide the least benefits to non-ORV visitors compared to the other action alternatives, with provisions for driving on the beach until 10:00 p.m. during breeding season.

The data to estimate monetary measures of the benefits to visitors and the general public do not exist currently. Many economic studies estimate the value of a beach day and the effect of crowding on beach-day values, but none that we know of that estimate visitors' WTP to be on a beach without vehicles.

Table 3-3 provides a summary of some studies that estimate WTP for a day at the beach. These studies provide a sense of the range of consumer surplus values associated with a trip to the beach. Parsons and Massey (2003), in a study of beach day values for ocean beaches from Delaware to Assateague Island, VA, found that beaches in national, state or local parks were valued more highly. They note that most surf fishing takes place in Seashore beaches, and the value of surf fishing may be contributing to the higher value of Seashore beaches.

Members of the public who do not visit the Seashore may still place a value on the additional protection provided to the natural environment under the action alternatives relative to the no-action alternatives (referred to as nonuse or existence

value, and called preservation value in the FEIS). Table 3-4 summarizes the text from the FEIS related to the overall impacts on nonuse values or preservation values, along with the impacts on federally threatened and endangered species (the piping plover, sea turtles, and seabeach amaranth).

Alternative D provides the greatest protection for the Seashore's environmental resources and the greatest benefits for members of the general public who hold preservation values for the Seashore's natural resources. The next highest benefits come from Alternative C, followed by Alternatives F and E. There are also studies of WTP to protect threatened and endangered species. These studies estimate the WTP by the general public for improvements in the probability that a species will survive (not become extinct) or for increases in the population of a species. Whitehead (1993) estimated an option price of \$10.98 per person for a hypothetical fund to preserve loggerhead sea turtles in North Carolina.

Table 3-2. Impacts of Alternatives on Visitor Experience

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Visitors who want an experience that includes ORV use					
Those looking for an experience at the Seashore that includes ORV use would have long-term negligible to minor adverse impacts as some areas would be closed for resource protection, but alternative A would provide the most ORV access of any alternative. Should there be extensive resource closures in a given year, the potential for long-term moderate impacts exists.	Those looking for an experience at the Seashore that includes ORV use would have long-term moderate to major adverse impacts as one or more spit or point would be closed for an extended period of time during the breeding season. During the remainder of the year, there would be negligible to minor adverse impacts to ORV users as limited areas would be closed for resource protection.	Those looking for an experience at the Seashore that includes ORV use would have long-term moderate to major adverse impacts as the designation of VFAs and the establishment of the Species Management Areas would seasonally preclude ORV use from some areas of the Seashore that are popular ORV use areas. While three areas would have pedestrian access corridors, no ORV corridors would be provided in the Species Management Areas, resulting in greater impacts to ORV users.	Those looking for an experience at the Seashore that includes ORV use would have long-term major adverse impacts as all Species Management Areas and village beaches would be designated as VFAs year-round, which would prohibit the use of ORV in many popular visitor use areas.	Those looking for an experience at the Seashore that includes ORV use would have long-term moderate adverse impacts as the designation of VFAs and the establishment of the Species Management Areas would preclude ORV use, either seasonally or year-round, from areas of the Seashore that are popular visitor use areas. Three Species Management Areas would provide an ORV pass-through corridor at the start of the breeding season, subject to resource closures, lessening the impacts to this user group. Additional recreational opportunities such as park-and-stay and camping would provide long-term benefits.	Those looking for an experience at the Seashore that includes ORV use would have long term moderate adverse impacts as the designation of VFAs and carrying capacity limits could or would preclude ORV use, either seasonally or year-round, from some areas of the Seashore that are popular visitor use areas. Improved access would be provided to the soundside under this alternative.

(continued)

Table 3-2. Impacts of Alternatives on Visitor Experience (continued)

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Visitors who want an ORV-free experience					
Those looking for a vehicle free experience at the Seashore would experience long-term moderate adverse impacts as alternative A does not provide for a specific separation of uses or designation of VFAs. Since night driving would be permitted under alternative A, there would be short-term minor adverse impacts to night skies.	Those looking for a vehicle free experience at the Seashore would experience long-term moderate adverse impacts as alternative B does not provide for a specific separation of uses outside of seasonal ORV closures of village beaches and no vehicle free areas would be designated. Since night driving would be seasonally restricted under alternative B, there would be long-term negligible to minor adverse impacts to night skies, with long-term beneficial impacts during times of seasonal night-driving restrictions.	Those looking for a vehicle free experience at the Seashore would experience long-term benefits as alternative C provides for pedestrian corridors in three Species Management Areas, as well as providing additional VFAs. Since night driving would be seasonally restricted under alternative C, there would be long-term negligible to minor adverse impacts to night skies, with long-term beneficial impacts during times of seasonal night-driving restrictions.	Those looking for a vehicle free experience at the Seashore would experience long-term benefits as alternative D provides for many designated VFAs throughout the Seashore, although pedestrian access would be prohibited in the Species Management Areas during the breeding season. Since night driving would be seasonally restricted under alternative D, there would be long-term negligible to minor adverse impacts to night skies, with long-term beneficial impacts during times of seasonal night-driving restrictions.	Those looking for a vehicle free experience at the Seashore would experience long-term benefits as alternative E provides for designated year-round VFAs, as well as seasonal ORV closures in areas such as village beaches and some of the Species Management Areas. Since night driving would be seasonally restricted, but allowed until 10:00 p.m., under alternative E, there would be long-term moderate adverse impacts to night skies due to the hours of night driving allowed, implementation of park-and-stay opportunities, with long-term beneficial impacts during times of seasonal night-driving restrictions.	Those looking for a vehicle-free experience at the Seashore would experience long term benefits as alternative F provides for year round VFAs, as well as seasonal ORV closures in areas such as village beaches, one new pedestrian trail, 12 new or improved parking areas with pedestrian access, and pedestrian access seaward of prenesting closures. Since night driving would be seasonally restricted under alternative F, there would be long-term negligible to minor adverse impacts to night skies, with long-term beneficial impacts year-round in VFAs and seasonally on ORV routes during times of seasonal night driving restrictions.

NOTE: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4.

Table 3-3. Estimates of WTP for a Beach Day

Study	Location	WTP per Day-Trip	WTP per Trip
Bin et al. (2005)	North Carolina, 7 beaches from Pea Island to Wrightsville Beach	Mean per person per day value for day trip to Hatteras: \$60.37 95% confidence interval: (\$32.46 to \$252.09)	Mean per person per trip value for Hatteras: \$11.14 95% confidence interval: (\$6.27 to \$39.03)
Parsons and Massey (2003)	Beaches from Delaware to Assateague Island, VA		Per person per trip loss from beach closure: \$5.27 to \$0

Table 3-4. Impacts of Alternatives on Nonuse Value and Federally Threatened and Endangered Species (Piping Plover, Sea Turtles, and Seabeach Amaranth)

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Nonuse Value (called Preservation Value in FEIS)					
The long-term minor to major impacts to protected species would result in long-term moderate adverse impacts to preservation values.	The long-term minor to moderate impacts to protected species, and addition of protection from seasonal night driving restrictions would result in long-term minor to moderate adverse impacts to preservation values.	Adverse impacts to preservation values would be less under alternative C, relative to alternatives A and B, and overall impacts to preservation values would be long-term minor adverse with long-term beneficial impacts from the measures taken to protect sensitive species at the Seashore.	Adverse impacts to preservation values would be less under alternative D, relative to alternatives A and B, and the overall impact to preservation values would be long-term minor adverse , with the closure of sensitive areas to ORVs under alternative D year-round substantially increasing the probability of long-term beneficial impacts relative to all other alternatives.	Adverse impacts to preservation values would be less under alternative E, relative to alternatives A and B, and overall preservation values would be long-term minor to moderate adverse with long-term beneficial impacts from the measures taken by the Seashore to protect threatened and endangered, as well as special status species.	Adverse impacts to preservation values would be less under alternative F, relative to alternatives A and B, and overall preservation values would be long-term minor to moderate adverse , with long-term beneficial impacts from the measures taken by the Seashore to protect threatened and endangered, as well as special status species.

(continued)

Table 3-4. Impacts of Alternatives on Nonuse Value and Federally Threatened and Endangered Species (Piping Plover, Sea Turtles, and Seabeach Amaranth) (continued)

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Piping Plover					
Overall, impacts to piping plover from ORV and other recreational use would be long-term moderate to major adverse as much of the Seashore would be open to recreational use,	Overall, impacts to piping plover from ORV and other recreational use would be long-term moderate adverse . While some buffers would be increased in an attempt to separate recreational uses from piping plover,	Overall, impacts to piping plover from ORV and other recreational use would be long-term minor adverse . The establishment of the Species Management Areas that proactively reduce or preclude recreational use early in the breeding	Overall impacts from ORV and other recreational use would be long-term minor adverse . The establishment of Species Management Areas that are closed to ORVs year-round and managed for species protection during breeding season would proactively preclude recreational use early in	Overall impacts from ORV and other recreational use would be long-term minor to moderate adverse . The establishment of the Species Management Areas that proactively reduce or preclude recreational use early in the breeding season, ORV permit requirements, and	Overall impacts under alternative F from ORV and other recreational use would be long-term minor to moderate adverse . The establishment of prenesting closures, year-round and seasonal VFAs,
with an increased potential that piping plover could be impacted due to disturbance from ORV use and other recreational activities. Lack of a permit system for education and law enforcement, no night-driving restrictions, and lack of compliance with pet leash requirements would contribute	access to these buffers would be provided at all Seashore beaches and could result in intentional or unintentional noncompliance (i.e., when signs are washed out), which would impact the species. Adverse impacts would also occur due to limited pre-nesting protection outside of the points and spits, and the potential for protective buffers to	season, ORV permit requirements, seasonal night-driving restrictions, and pet and other recreational activity restrictions would all provide benefits in terms of species protection. As there would still be some opportunity for recreational use to come in contact with and impact piping plovers, and the fact that alternative C would still include some level of pedestrian access to	the breeding season from large areas of the Seashore, which would reduce the potential for disturbance to plovers during critical life stages. with ORV permit requirements, seasonal night-driving restriction, and pet and other recreational activities restrictions would all provide benefits in terms of species protection. As there would still be some opportunity for recreational use to come in contact with and impact the species,	pet and other recreational activity restrictions would all provide benefits in terms of species protection. Although there would be benefits from seasonal night-driving restrictions, they would not be as great as other alternatives because driving after dark (until 10:00 p.m.) would still be occurring, even during seasonal restrictions. The potential for adverse impacts would exist from the park-and-stay option under this alternative. As there would still be some	ORV permit requirements, and pet and other recreational activity restrictions would all provide benefits in terms of species protection. As alternative F would provide for more flexible access to various areas of the Seashore, the potential for disturbance to piping plover is

(continued)

Table 3-4. Impacts of Alternatives on Nonuse Value and Federally Threatened and Endangered Species (Piping Plover, Sea Turtles, and Seabeach Amaranth) (continued)

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Piping Plover (con't)					
substantially to these adverse impacts.	be reduced during critical life stages of plover chicks.	three Species Management Areas during a portion of the breeding season, impacts to piping plover would be long-term minor adverse .	impacts would be long-term minor adverse .	opportunity for recreational use to come in contact with and impact the species, impacts would be long-term minor to moderate adverse .	increased over alternatives C and D, resulting in long-term minor to moderate adverse impacts .
Sea Turtles					
Overall, resources management activities under alternative A would have long-term moderate benefits due to the protection provided to sea turtles. Overall, ORV and other recreational use under alternative A would result in long-term major adverse impacts to sea turtles due to the	Overall, resource management activities under alternative B would have long-term moderate benefits due to the protection provided to sea turtles. Although additional restrictions and regulations would help lessen some of the impacts from ORV use and other recreational activities, overall, the impacts would be long-term moderate adverse .	Overall, resource management activities under alternative C would have long-term moderate to major beneficial impacts due to the added protection provided to sea turtles. Restrictions placed on nonessential, recreational ORV use under alternative C would provide substantial long-term benefits to sea turtles, including seasonal night driving restrictions that close	Overall, similar to alternative C, management activities under alternative D would result in long-term moderate to major beneficial impacts . While restrictions placed on ORV use under alternative D would provide long-term moderate to major beneficial impacts, similar to alternative C, there would still be some level of adverse impact to sea turtles in areas where ORV use and beach fires are allowed;	Management activities would provide long-term moderate to major beneficial impacts to sea turtles. While additional restrictions and regulations would help lessen some of the impacts from ORVs and other recreational activities, overall, the impacts would be long-term moderate adverse from allowing night driving until 10:00 p.m., and due to increased recreational access throughout the Seashore during the turtle nesting season, including	Overall, resource management activities would provide long-term moderate to major beneficial impacts to sea turtles. While additional restrictions, Such as prohibiting night driving from 9:00 p.m. to 7:00 a.m., and regulations would help lessen some

(continued)

Table 3-4. Impacts of Alternatives on Nonuse Value and Federally Threatened and Endangered Species (Piping Plover, Sea Turtles, and Seabeach Amaranth) (continued)

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Sea Turtles (cont.)					
amount of Seashore available for ORV use and the lack of night-driving restrictions.		the beach before dark (7:00 p.m.), some adverse impacts would still occur in areas where their use is allowed. Therefore, overall, ORV and other recreational use would have long-term minor adverse impacts .	therefore, overall impacts from ORV and other recreational use would be long-term minor adverse impacts .	a park-and-stay option for ORVs at selected points and spits.	of the impacts from ORV and other recreational use, overall, the impacts would be long-term minor to moderate adverse , due to not prohibiting night driving prior to 9:00 p.m. and the earlier re-opening of prenesting areas (after shorebird breeding activity has concluded), resulting in increased recreational access throughout the Seashore during the sea turtle nesting season.
Seabeach Amaranth					
Overall, because of the protection of seabeach amaranth habitat and plants under	Overall, because of the protection of seabeach amaranth habitat and plants under alternative B,	Overall, because of the protection of seabeach amaranth habitat and plants under alternative C,	Overall, because of the increased level of protection of seabeach amaranth habitat and plants under alternative	Overall, because of the protection of seabeach amaranth habitat and plants under alternative E, resources management	Overall, because of the protection of seabeach amaranth habitat and plants under

(continued)

Table 3-4. Impacts of Alternatives on Nonuse Value and Federally Threatened and Endangered Species (Piping Plover, Sea Turtles, and Seabeach Amaranth) (continued)

No-Action Alternative A	No-Action Alternative B	Action Alternative C	Action Alternative D	Action Alternative E	Action Alternative F
Seabeach Amaranth (cont.)					
alternative A, resources management actions would have long-term minor to moderate beneficial impacts , if plants are detected. Overall, ORV and other recreational use under alternative A would have long-term moderate adverse impacts as plants may go undetected and therefore unprotected from this use.	resources management actions would have long-term minor to moderate beneficial impacts , if plants are detected. Overall, ORV and other recreational use would result in long-term moderate adverse impacts . Slightly more protection would be provided for the species when compared to alternative A, due to shorebird breeding closures being larger and lasting longer.	resources management actions would have long-term moderate beneficial impacts to seabeach amaranth as the establishment of SMAs and increased protection for the species would occur compared to alternatives A and B. Overall, ORV and other recreational use would result in long-term minor to moderate adverse impacts . Because of the establishment of SMAs and protection of approximately 41 miles of beach, the adverse impacts under alternative C would likely be long-term minor to moderate adverse.	D, when compared to other alternatives, resources management actions would have long-term moderate to major beneficial impacts . Overall ORV and other recreational use would result in long-term minor adverse impacts . Because the establishment of SMAs closed to ORVs year-round would protect approximately 41 miles of beach, the adverse impacts under alternative D would be greatly reduced compared to the other alternatives and result in long-term minor adverse impacts.	actions would have long-term minor to moderate beneficial impacts as ORV access to more areas would be allowed during the germination period, than under action alternatives C and D. Overall, ORV and other recreational use would have long-term minor to moderate adverse impacts to seabeach amaranth due to the increased level of recreational access allowed when compared to the other action alternatives.	alternative F, resources management actions would have long-term minor to moderate beneficial impacts as ORV access to more areas would be allowed during the germination period, than under action alternatives C and D. Overall, ORV and other recreational use would be similar to those under alternative E and result in long-term minor to moderate adverse impacts to seabeach amaranth.

NOTE: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4.

3.2.4 Benefits to Businesses

The benefits to businesses from the action alternatives are all indirect. The alternatives do not regulate the businesses but rather regulate visitor access to and use of the Seashore. As discussed in Section 3.1.2, secondary impacts are included in benefit-cost analysis if the impacts are large enough to change prices in the secondary market. Without further information on possible changes in prices, NPS chose to include the impacts.

The proposed alternatives may change the number of visitors, the type of visitors, or the spending pattern of visitors relative to the no-action alternatives. Some businesses may benefit from these changes if they serve visitors who prefer the alternative regulation. As part of the business survey, businesses were asked about the change in revenue between 2007 and 2008 and their forecast of the impact from two different regulations on revenue. Revenue increased between 2007 and 2008 despite the stricter ORV management for some of the businesses. A few of the businesses interviewed as part of the business survey forecast increases in revenue from a regulation similar to Alternative E or F. However, none of the businesses forecast increases in revenue from a regulation similar to Alternative D.

A benefit-cost analysis looks at societal welfare changes not just local changes. If visitors who decide not to visit the Seashore under one of the proposed alternatives make a trip to another beach or engage in an alternative leisure activity in another location, the gains in producer surplus to businesses in the other locations should be included in the benefit-cost calculation. Without additional information on the actions of visitors who decide not to visit the Seashore under the different alternatives, NPS cannot estimate the potential increases in producer surpluses to businesses in other locations.

3.2.5 Costs to Visitors

Visitors who drive ORVs on the beach or who travel with groups who drive ORVs on the beach may experience a loss of welfare from the proposed alternatives relative to Alternatives A and B. The alternatives regulate driving by location on the beach, the time of day, and the time of year. Under the alternatives, visitors may find that they cannot drive on the part of the beach that they want to during the time they prefer.

These visitors will suffer welfare losses if they are unable to visit the part of the beach they prefer. These visitors may shift to other parts of the Seashore or they may decide not to visit. If the areas that are open become more crowded as a result of the alternatives, this will also cause welfare losses.

As discussed in Section 2.3.2, a survey of vehicle use of beach access ramps produced a mean estimate of 350,000 beach access ramp crossings between April 2009 and November 2009, and 150,000 ramp crossings between December 2009 and March 2010. All of these visitors may be affected by the action alternatives.

The alternatives vary by the dates certain areas of the Seashore close and could be re-opened. The alternatives may also include different species management requirements and different provisions for new ramps, additional parking, bypass routes and pedestrian access. Year to year variations in turtle and bird nesting patterns also complicate any comparisons across the alternatives. The date on which an area can re-open is the earliest possible date subject to resource closures. If resource closures are widespread and long-lasting, areas may open later, leading to smaller difference between some of the more restrictive and less restrictive alternatives than the re-opening dates would imply.

Table 3-5 provides information on conditions in 2009 for ORV users at several of the most popular beach areas that we can use to assess the incremental impact of the action alternatives. The table presents the amount of time various parts of the Seashore were closed in 2009. The columns list clusters of ramps and the rows show the mean estimate of the number of vehicle trips using the ramps in the cluster between April 1 and November 31, 2009, and the percent of total ORV trips over all ramps during the time period. The last row lists the number of days nearby beach areas were closed in 2009 (Alternative B), including both prenesting closures and temporary closures due to bird or turtle nesting activity. We can use these numbers as a proxy for the impact of Alternative B, although the numbers would actually vary from year to year based on yearly variation in bird breeding activity and turtle nest locations. The ramp clusters do not correspond exactly to the beach areas in the third column (the areas for which closure data were available). For example, in the first row of data, the area open to ORVs

around ramps 2 and 4 includes 2.1 miles of beach open to ORVs all year. Although Bodie Island Spit was closed for 136 days over the summer of 2009, there were still areas around ramps 2 and 4 that remained open to ORVs.

In addition, the vehicle trip numbers include the days when some or all of the beach areas served by the ramps were closed. Using the first row of data as an example again, there were an estimated 174,949 vehicle trips on ramps 2 and 4 between April 1 and November 30, 2009. During this time, the Bodie Island Spit was closed between March 23 and August 6. Vehicles using the ramps during this time parked on the other 2.1 miles of open beach.

Alternative C: Under Alternative C, Bodie Island Spit, Cape Point, North Ocracoke, and South Point are all closed seasonally to ORVs from March 15 to October 14. Based on historic resource closure dates, these areas would be closed longer under Alternative C than under Alternatives B, E and F. The Frisco and Hatteras village beaches were closed in 2009 as part of a long-standing ORV closure but would only be closed to ORVs between May 15 and September 15 under Alternative B, provided that beach conditions allowed the removal of any safety closures that may occur. Under Alternative C, these beaches would open to ORVs one month later than Alternative B (assuming that beach conditions allowed the removal of any safety closures), but earlier than Alternatives D, E and F. The Hatteras Inlet “rip” would follow a similar closure pattern under Alternatives B, C and E. One mile of shoreline at South Point on Ocracoke would be closed all year under Alternative C, while the area from ramp 72 to the closed part of South Point would open October 14, compared to August 9 in 2009 under Alternative B.

Alternative D: Alternative D mandates the most year-round closures of beaches to ORV use. Bodie Island Spit, Cape Point, the Hatteras Inlet “rip”, North Ocracoke, and one mile of shoreline at South Point on Ocracoke are all closed to ORVs year-round.

Alternative E: Under Alternative E, Bodie Island Spit and the Hatteras Inlet “rip” are open to ORVs all year, subject to resource closures, similar to Alternative B. At Cape Point, one mile south of ramp 44 also follows the same resource closure pattern as Alternative B. The areas at Cape Point and west to

(new) ramp 47 would be closed to ORVs March 15 to August 31 under Alternative E. Based on protected species activity and resultant resource closures in 2009 (see Table 3-5), Cape Point would have been closed one month longer under Alternative E than under Alternative B in 2009. The Frisco and Hatteras village beaches would be closed all year to ORVs under Alternative E. In 2009, the Frisco and Hatteras village beaches were closed as part of a long-standing ORV closure, but would only be closed between May 15 and September 15 under Alternative B, provided that beach conditions allowed the removal of any safety closures that may occur. North Ocracoke and one mile of shoreline at South Point are both closed to ORV use all year under Alternative E.

Alternative F: Under Alternative F, Bodie Island Spit is closed March 15 to September 14, while in 2009 the spit opened on August 6 under Alternative B (0.8 miles at the southwest edge of the Bait Pond is closed all year under Alternative F). Cape Point is designated as a year-round ORV route, and it would follow a similar closure pattern under Alternatives B and F. The Frisco and Hatteras village beaches would be closed from April 1 to October 31 under Alternative F. As described above, these beaches were subject to a longstanding ORV closure in 2009, but would be closed seasonally until September 15 under Alternative B provided that beach conditions allowed the removal of any safety closures. From ramp 55, the ocean beach is open year round for 1.6 miles, but Hatteras Inlet Spit is not designated as an ORV route under Alternative F. North Ocracoke and one mile of shoreline at South Point are both closed to ORV use all year under Alternative F.

Table 3-5. Vehicle Access Ramp Use and Beach Closures to ORVs for Selected Ramps in 2009 under Alternative B

	Ramps 2, 4	Ramps 43, 44, 45	Ramps 49, 55	Ramps 59, 67	Ramps 68, 70, 72
Mean Estimate of Vehicle Trips over Ramps April-Nov. 2009 (Percent of Total)	174,949 (23%)	117,030 (15%)	123,355 (16%)	45,152 (6%)	92,588 (12%)
Days Nearby Beach Areas Closed to ORVs in 2009	Bodie Island Spit closed 136 days (Mar 23 to Aug 6)	Cape Point closed 113 days (Apr 14 to Jul 29)	<p>Frisco and Hatteras village beaches seasonal closure to Sept 15, but in 2009 were closed as part of a long standing safety closure.</p> <p>Hatteras Inlet "rip" closed 125 days (Mar 11 to Jul 15)</p>	<p>North Ocracoke closed 111 days (May 9 to Aug 28)</p> <p>Long standing safety closure from 0.25 miles south of ramp 59 to ramp 67</p>	<p>2.7 miles including day use area seasonally closed when campground open</p> <p>South Point at Ocracoke closed 80 days (May 22 to Aug 9)</p>

Source: RTI International (2010b) and the FEIS Tables ES-2 and ES-2A (NPS 2010).

3.2.6 Costs to Businesses

The costs to businesses from the action alternatives are all indirect. The alternatives do not regulate the businesses but rather regulate visitor access to and use of the Seashore. As discussed in Section 3.1.2, according to economic theory secondary impacts are included in benefit-cost analysis if the impacts are large enough to change prices in the secondary market. Without further information on possible changes in prices, NPS chose to include the impacts.

We approximate the change in producer surplus as the change in profits received by businesses resulting from the estimated changes in revenue. As discussed in more detail in the FEIS (NPS 2010), the range of direct revenue impacts was estimated using data from the business survey and from publically available data including the Seashore visitation statistics and other economic data. We estimated the change in producer surplus using average industry specific profit ratios from 2004 to 2007 (IRS, 2010) applied to our estimates of the change in revenue due to the no-action and proposed alternatives.

Tables 3-6 contains the low, middle and high producer surplus loss estimates for Alternative A, one of the no-action alternatives. Table 3-7 presents the incremental change in producer surplus from the all the action alternatives except Alternative D relative to Alternative A. The mid-point of the range for Alternative A is used as the baseline for the incremental effects. As discussed in more detail in the FEIS, Alternatives B, C, E and F are forecast to have the same range of estimated direct revenue losses. Although there are important differences between Alternatives C, E and F, the existing data are not detailed enough to justify different ranges for each alternative. For example, the impacts to businesses during a season with widespread, long-lasting beach closures could be very similar under all three alternatives. Below, we discuss the qualitative differences between C, E and F that affect the likelihood that each of these alternatives would result in lower or higher impacts.

Tables 3-8 and 3-9 present the incremental impacts of Alternative D relative to Alternatives A and B, respectively. Alternative D is estimated to result in the largest change in producer surplus, between a loss of \$1.30 and \$2.97 million

relative to Alternative A (Table 3-8), and \$0.73 and \$2.40 million relative to Alternative B (Table 3-9).

Although the largest revenue impacts are projected to occur in the food services and drinking places sector, the real estate sector is projected to have the largest producer surplus loss due to the higher profit ratio applied.

Table 3-10 describes qualitatively how the costs to businesses under Alternatives C, E, and F are expected to differ from Alternative B. All three action impacts are expected to result in higher losses than Alternative B. Alternative C is generally expected to result in higher losses than Alternatives E and F. It is more difficult to distinguish between Alternatives E and F. Alternative F offers more ORV access during some times of the year, which may result in lower revenue losses.

The impacts will have the largest impact on businesses in the Seashore villages. Visitors to other parts of the Dare County generally use the beaches in the northern part of the Outer Banks, which are outside the Seashore. Almost all of the businesses in the Seashore villages are small. Small businesses have a harder time absorbing revenue losses and there may be individual businesses that experience major impacts.

3.2.7 Costs to NPS

The action alternatives will also change the cost of managing the Seashore. Table 3-11 provides estimates of the cost to the Seashore of each alternative (NPS 2010). No-action Alternative A generates the smallest costs of all the alternatives, estimated to be \$2,208,850, while the baseline costs for Alternative B are \$3,150,550 (NPS 2010). The action alternatives are all more expensive to manage than the no-action alternatives. In order of cost, Alternative E is the most expensive, followed by Alternative F, Alternative C, and Alternative D.

Table 3-6. Estimated Change in Producer Surplus for Alternative A (in millions of dollars)

Description	IMPLAN Codes	Corporate Table Template Code	Direct Impacts			Profit Ratios	Producer Surplus		
			Low	Mid	High		Low	Mid	High
Fishing	16	114	\$0.20	\$0.00	−\$0.20	5.05%	\$0.01	\$0.00	−\$0.01
Real estate*	431	531,210	\$3.23	\$0.00	−\$3.23	8.87%	\$0.29	\$0.00	−\$0.29
Hotels and motels—including casino hotels	479	721	\$0.62	\$0.00	−\$0.62	5.23%	\$0.03	\$0.00	−\$0.03
Other amusement—gambling—and recreation industry	478	713	\$0.32	\$0.00	−\$0.32	3.06%	\$0.01	\$0.00	−\$0.01
Food services and drinking places	481	722	\$4.11	\$0.00	−\$4.11	3.98%	\$0.16	\$0.00	−\$0.16
Food and beverage stores	405	445	\$0.62	\$0.00	−\$0.62	1.65%	\$0.01	\$0.00	−\$0.01
Gasoline stations	407	447	\$0.41	\$0.00	−\$0.41	0.62%	\$0.00	\$0.00	\$0.00
Sporting goods—hobby—book and music stores	409	451	\$0.27	\$0.00	−\$0.27	1.86%	\$0.01	\$0.00	−\$0.01
Other accommodations	480	721	\$0.21	\$0.00	−\$0.21	5.23%	\$0.01	\$0.00	−\$0.01
Totals			\$9.99	\$0.00	−\$9.99		\$0.53	\$0.00	−\$0.53

*Real estate modified to reflect portion of output attributable to tourism.

Source: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4 and Internal Revenue Service, U.S. Department of Treasury. 2010. "Corporation Source Book: Data Files 2004-2007." <http://www.irs.gov/taxstats/article/0,,id=167415,00.html>. (May, 2 2010).

Table 3-7. Estimated Incremental Change in Producer Surplus for Alternatives B, C, E, and F Relative to Alternative A Mid Estimate (in millions of dollars)

Description	IMPLAN Codes	Corporate Table Template Code	Direct Impacts			Profit Ratios	Producer Surplus		
			Low	Mid	High		Low	Mid	High
Fishing	16	114	\$0.0	-\$1.0	-\$2.0	5.05%	\$0.00	-\$0.05	-\$0.10
Real estate*	431	531,210	\$0.0	-\$3.2	-\$6.5	8.87%	\$0.00	-\$0.29	-\$0.57
Hotels and motels—including casino hotels	479	721	\$0.0	-\$0.6	-\$1.2	5.23%	\$0.00	-\$0.03	-\$0.06
Other amusement—gambling—and recreation industry	478	713	\$0.0	-\$0.3	-\$0.6	3.06%	\$0.00	-\$0.01	-\$0.02
Food services and drinking places	481	722	\$0.0	-\$4.1	-\$8.2	3.98%	\$0.00	-\$0.16	-\$0.33
Food and beverage stores	405	445	\$0.0	-\$0.6	-\$1.2	1.65%	\$0.00	-\$0.01	-\$0.02
Gasoline stations	407	447	\$0.0	-\$0.4	-\$0.8	0.62%	\$0.00	\$0.00	-\$0.01
Sporting goods—hobby—book and music stores	409	451	\$0.0	-\$0.3	-\$0.5	1.86%	\$0.00	-\$0.01	-\$0.01
Other accommodations	480	721	\$0.0	-\$0.2	-\$0.4	5.23%	\$0.00	-\$0.01	-\$0.02
Totals			\$0.0	-\$10.8	-\$21.5		\$0.00	-\$0.57	-\$1.14

*Real estate modified to reflect portion of output attributable to tourism.

Source: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4 and Internal Revenue Service, U.S. Department of Treasury. 2010. "Corporation Source Book: Data Files 2004-2007." <http://www.irs.gov/taxstats/article/0,,id=167415,00.html>. (May, 2 2010).

Table 3-8. Estimated Incremental Change in Producer Surplus for Alternative D Relative to Alternative A Mid Estimate (in millions of dollars)

Description	IMPLAN Codes	Corporate Table Template Code	Direct Impacts			Profit Ratios	Producer Surplus		
			Low	Mid	High		Low	Mid	High
Fishing	16	114	\$0.0	-\$1.0	-\$2.0	5.05%	\$0.00	-\$0.05	-\$0.10
Real estate*	431	531,210	-\$8.1	-\$12.9	-\$17.8	8.87%	-\$0.72	-\$1.15	-\$1.58
Hotels and motels- including casino hotels	479	721	-\$1.5	-\$2.5	-\$3.4	5.23%	-\$0.08	-\$0.13	-\$0.18
Other amusement- gambling- and recreation ind	478	713	-\$0.8	-\$1.3	-\$1.8	3.06%	-\$0.02	-\$0.04	-\$0.06
Food services and drinking places	481	722	-\$10.3	-\$16.4	-\$22.6	3.98%	-\$0.41	-\$0.65	-\$0.90
Food and beverage stores	405	445	-\$1.5	-\$2.5	-\$3.4	1.65%	-\$0.03	-\$0.04	-\$0.06
Gasoline stations	407	447	-\$1.0	-\$1.6	-\$2.3	0.62%	-\$0.01	-\$0.01	-\$0.01
Sporting goods- hobby- book and music stores	409	451	-\$0.8	-\$1.3	-\$1.9	1.86%	-\$0.01	-\$0.02	-\$0.04
Other accommodations	480	721	-\$0.5	-\$0.8	-\$1.1	5.23%	-\$0.03	-\$0.04	-\$0.06
Totals			-\$24.5	-\$40.4	-\$56.3		-\$1.30	-\$2.14	-\$2.97

Source: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4 and Internal Revenue Service, U.S. Department of Treasury. 2010. "Corporation Source Book: Data Files 2004-2007." <http://www.irs.gov/taxstats/article/0,,id=167415,00.html>. (May, 2 2010).

Table 3-9. Estimated Incremental Change in Producer Surplus for Alternative D Relative to Alternative B Mid Estimate (in millions of dollars)

Description	IMPLAN Codes	Corporate Table Template Code	Change in Direct Impacts			Profit Ratios	Change in Producer Surplus		
			Low	Mid	High		Low	Mid	High
Fishing	16	114	\$1.0	\$0.0	-\$1.0	5.05%	\$0.05	\$0.00	-\$0.05
Real estate*	431	531210	-\$4.9	-\$9.7	-\$14.5	8.87%	-\$0.43	-\$0.86	-\$1.29
Hotels and motels- including casino hotels	479	721	-\$0.9	-\$1.8	-\$2.8	5.23%	-\$0.05	-\$0.10	-\$0.14
Other amusement- gambling- and recreation ind	478	713	-\$0.4	-\$1.0	-\$1.5	3.06%	-\$0.01	-\$0.03	-\$0.05
Food services and drinking places	481	722	-\$6.2	-\$12.3	-\$18.5	3.98%	-\$0.25	-\$0.49	-\$0.74
Food and beverage stores	405	445	-\$0.9	-\$1.9	-\$2.8	1.65%	-\$0.01	-\$0.03	-\$0.05
Gasoline stations	407	447	-\$0.6	-\$1.2	-\$1.9	0.62%	\$0.00	-\$0.01	-\$0.01
Sporting goods- hobby- book and music stores	409	451	-\$0.5	-\$1.1	-\$1.6	1.86%	-\$0.01	-\$0.02	-\$0.03
Other accommodations	480	721	-\$0.3	-\$0.6	-\$0.9	5.23%	-\$0.02	-\$0.03	-\$0.05
Totals	Total		-\$13.8	-\$29.6	-\$45.5		-\$0.73	-\$1.57	-\$2.40

*Real estate modified to reflect portion of output attributable to tourism.

Table 3-10. Qualitative Impacts of Alternatives C, E, and F Relative to Alternative B

Alternative	Certain Beach Closures	Buffer Width and Uncertain Closures	Additional Changes	Relative Impact
Alternative C	Villages and Species Management Areas closed to ORVs from March 15 to October 14, increasing beach closures by approximately 2 to 4 months in Species Management Areas and 3 months in villages.	Buffers for breeding and nesting plovers increase from 50 m to 75 m, and buffers in some areas greater than Alternative B, increasing the likelihood of closed access corridors.	Permits required. Additional parking, ramps, and interdunal road changes to provide improved access to open areas.	Impacts to businesses expected to be more negative than Alternatives B, E and F.
Alternative E	Most Species Management Areas closed March 15 to August 31 and most village beaches closed April 1 to October 31, increasing beach closures by 0.5 to 2.5 months in Species Management Areas and 3 months in villages. Some villages and Species Management Areas closed to ORVs year round.	Buffers for breeding and nesting plovers increase from 50 m to 75 m, and buffers in some areas greater than Alternative B, increasing the likelihood of closed access corridors.	Permits required. Additional parking, ramps, and interdunal road changes to provide improved access to open areas.	Impacts to businesses expected to be more negative than Alternative B, less negative than Alternative C, and uncertain relative to F.
Alternative F	Villages closed April 1 through October 31, increasing beach closures by 3 months in villages. Species Management Areas would be either year-round ORV routes, seasonal ORV routes (Bodie spit—1.5 to 3 months) or vehicle free (Hatteras Inlet and North Ocracoke—8 months).	Buffers for breeding and nesting plovers increase from 50 m to 75 m, increasing the likelihood of closed access corridors during plovers breeding and nesting.	Permits required. Changes to parking, ramps, trails and interdunal roads to provide improved access to open areas.	Impacts to businesses expected to be more negative than Alternative B, less negative than Alternative C, and uncertain relative to E. To the extent that the greater visitor experience opportunities in Alternative F encourage increased visitation, these negative impacts to businesses would lessen.

NOTE: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4.

Table 3-11. Incremental Costs to NPS of the Action Alternatives Relative to the No Action Alternatives

Action Alternative	Incremental Cost Relative to Alternative A	Incremental Cost Relative to Alternative B
Alternative C	\$974,450	\$32,750
Alternative D	\$942,100	\$400
Alternative E	\$1,707,650	\$765,950
Alternative F	\$1,508,150	\$566,450

NOTE: Impacts based on FEIS (NPS, 2010) Table ES-5. ENVIRONMENTAL IMPACT SUMMARY BY ALTERNATIVE and impact summary tables in Chapter 4.

3.3 SUMMARY

The action alternatives offer a variety of management options for ORV use in the Seashore. Each alternative generates both benefits and costs to society overall. Table 3-12 provides a qualitative ranking of the action alternatives relative to the no-action alternatives for the different categories of benefits and costs. Calculating quantitative estimates of net benefits is not possible for most of the categories evaluated for this study. For each category, qualitative and quantitative information was combined to provide a picture of the possible range of benefits and costs.

The unprecedented economic conditions that have overlapped the imposition of the Consent Decree along with the more usual uncertainty forecasting visitation changes render quantitative estimates by themselves less useful. The report provides quantitative ranges for the possible impacts on business revenue. The ranges are large in part because of the potential under any of the alternatives for large year to year differences caused by differences in nesting patterns and the weather. Under different nesting patterns, either Alternative E or F may result in the smallest revenue change. In a year with many nests and long lasting beach closures, all the alternatives may result in similar impacts during the spring, summer and fall. Furthermore, when we look at the net benefits to the U.S. as a whole, the quantitative estimates of welfare gain or loss to businesses outside the Outer Banks would need to be considered for an accurate analysis.

Table 3-12. Qualitative Ranking of Action Alternatives Relative to No-Action Alternatives for Benefit and Cost Categories from Highest to Lowest

	Alternative C	Alternative D	Alternative E	Alternative F
Benefits to visitors who want ORV-free experience	Third highest benefit	Highest benefit	Fourth highest benefit	Second highest benefit
Benefits to members of the general public with value for the Seashore's natural resources	Second highest benefit	Highest benefit	Fourth highest benefit	Third highest benefit
Benefits to businesses who serve visitors who want ORV-free experience	Third highest benefit	Highest benefit	Fourth highest benefit	Second highest benefit
Benefits to businesses in other areas outside the Seashore that serve ORV visitors	Third highest benefit	Highest benefit	Fourth highest benefit	Second highest benefit
Benefits to visitors who want ORV experience	Third highest benefit	Fourth highest benefit	Possible highest benefit	Possible highest benefit
Benefits to businesses who serve visitors who want ORV experience	Third highest benefit	Fourth highest benefit	Possible highest benefit	Possible highest benefit
Costs to the National Park Service	Second lowest cost	Lowest cost	Highest cost	Third lowest cost

The business impacts will fall most heavily on the Seashore villages and on small businesses. Some businesses north of the Seashore will be impacted by changes in ORV use; however, the impact on the villages north of the Seashore will be cushioned by the larger economic base of visitors who come primarily to use the beaches north of the Seashore. The Seashore villages depend most directly on visitors to the Seashore. Even if the overall impacts on Dare and Hyde counties or on the Seashore villages as a whole turn out to be smaller than anticipated, some individual businesses that depend on visitors to a particular beach access ramp may experience major impacts.

In general, Alternative D is likely to provide the greatest benefits for visitors who want an ORV-free experience and the members of the general public who value the Seashore's natural resources. Alternative D will most likely impose the largest costs on businesses that serve ORV visitors. It is difficult

to judge whether Alternative E or F will impose the lowest cost on visitors who prefer to use ORVs.

4

Small Entity Impact Analysis

Regulations potentially affect the economic welfare of all businesses, organizations, or governmental jurisdictions, large and small. However, because small entities may have special problems in complying with such regulations, the Regulatory Flexibility Act of 1980, as amended in 1996 (RFA), requires special consideration be given to these entities during the regulatory process.

To fulfill these requirements, agencies perform a review to determine whether a proposed or final rule will have a significant economic impact on a substantial number of small entities. This section identifies the small entities potentially affected by the Cape Hatteras National Seashore proposed ORV rule and certifies that no small businesses are impacted by the rule.

4.1 IDENTIFYING SMALL ENTITIES

The RFA applies to a wide range of small entities, including small businesses, not-for-profit organizations, and small governmental jurisdictions. The Small Business Administration (SBA) has developed size standards to carry out the purposes of the Small Business Act and those size standards can be found in 13 C.F.R., section 121.201. Section 601(5) of the RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than 50,000. In 2008, Dare and Hyde Counties contained 768 establishments in affected industries, with 222 located in Hatteras villages (InfoUSA, 2008). Assuming each location is an independent

company, 95% of these could be small entities of the ROI, and 98% could be small entities in the Seashore villages (U.S. SBA 2008).

NPS found no small entities that were potentially directly affected by the rule. The proposed rule does not directly regulate any small entities within the meaning of the RFA. The proposed rule regulates off-road vehicle (ORV) access to the beaches in the Seashore by visitors. Visitors would be required to obtain an ORV permit to access the ORV routes and trails designated by the rule. Businesses would not be required to obtain an ORV permit to use the designated ORV routes and trails while conducting their business. Businesses, including commercial fishermen, currently operate under Special Use Permits allowing them to operate in the Seashore. This system would continue unchanged. Because some visitors may change their visitation patterns based on the proposed rule, the proposed rule will indirectly affect businesses that cater to Seashore visitors. NPS has evaluated these indirect effects in the benefit-cost analysis and in the environmental impact statement. However, the RFA does not require agencies to analyze the indirect effects of proposed rules on small entities, absent direct effects on them, in a regulatory flexibility analysis. NPS would continue to regulate the actions of businesses, including commercial fishermen, that use the Seashore through Special Use Permits issued to businesses, NPS would not regulate the actions of these entities through the proposed rule.

4.2 CERTIFICATION

NPS finds that the proposed rule will not have a significant impact on a substantial number of small entities. No entities, small or large, are directly regulated by the proposed rule. According to the RFA and subsequent court decisions, NPS must assess the impacts on directly regulated entities, but is not required to analyze in a regulatory flexibility analysis the indirect effects on small entities resulting from rules (see Small Business Administration [2003] for a discussion of indirect versus direct impacts).

References

- Bin, O., C. Landry, C.L. Ellis, and H. Vogel song. 2005. "Some Consumer Surplus Estimates for North Carolina Beaches." *Marine Resource Economics* 20:145–161.
- Boardman, A.E., Greenberg, D.H., Vining, A.R. and Weimer, D.L. 1996. *Cost-Benefit Analysis: Concepts and Practice*. Upper Saddle River, NJ: Prentice Hall.
- Bureau of Labor Statistics. September 2, 2009. "Local Area Unemployment Statistics." <http://www.bls.gov/lau>.
- InfoUSA. 2008. Reference USA. <http://www.referenceusa.com/>.
- Internal Revenue Service, U.S. Department of Treasury. May 2, 2010. "Corporation Source Book: Data Files 2004-2007." <http://www.irs.gov/taxstats/article/0,,id=167415,00.html>.
- Minnesota IMPLAN Group, Inc. (MIG) 2004. *IMPLAN Professional, Version 2.0 Social Accounting and Impact Analysis Software: Data Guide*. Third edition. Stillwater, MN: MIG.
- North Carolina Department of Commerce. 2009. "Economic Impact of Travel in North Carolina Based on Visitor Spending." <http://www.nccommerce.com/en/TourismServices/PromoteTravelAndTourismIndustry/TourismResearch/visitorspending.htm>.
- North Carolina Department of Commerce. September 2, 2009. "Economic Impact of Travel in North Carolina Based on Visitor Spending." <http://www.nccommerce.com/en/TourismServices/PromoteTravelAndTourismIndustry/TourismResearch/visitorspending.htm>.

- North Carolina Marine Fisheries, North Carolina Wildlife Resources Commission. 2009. "Coastal Recreational Fishing License Sales Update."
http://www.ncfisheries.net/CRFL/downloads/CRFLSalesReportMay_31_2009.pdf.
- National Park Service. August 2007. "The Creation and Establishment of Cape Hatteras National Seashore." Cape Hatteras National Seashore Administrative History. Prepared by Cameron Binkley, Southeast Regional Office, Cultural Resource Division.
- National Park Service Public Uses Statistics Office.
<http://www.nature.nps.gov/stats/NPS>. Accessed July 2008.
- National Park Service. November 2010. "Final Environmental Impact Statement for the Cape Hatteras National Seashore Off-Road Vehicle Management Plan (FEIS)."
- North Carolina Office of State Budget and Management. September 1, 2009. "Projected Annual County Population Totals." http://www.osbm.state.nc.us/ncosbm/facts_and_figures/socioeconomic_data/population_estimates.shtm
- Parsons, G. R., and D. M. Massey. 2003. "A RUM Model of Beach Recreation." In N. Hanley, D. Shaw, and R. Wright, (eds.), *The New Economics of Outdoor Recreation*. Edward Elgar Publishing.
- RTI International. 2010a. "Business Survey: Off-Road Vehicle Management, Cape Hatteras National Seashore." Prepared for the National Park Service, Environmental Quality Division. Research Triangle Park, NC: RTI.
- RTI International. 2010b. "Cape Hatteras National Seashore Vehicle Count." Prepared for the National Park Service, Environmental Quality Division. Research Triangle Park, NC: RTI.
- RealtyTrac. 2008. "Properties with Foreclosure Filings in October, 2008: North Carolina."
<http://www.realtytrac.com/U.S>. Accessed December 10, 2008.
- U.S. Census Bureau. 2000a; generated by RTI International; using American FactFinder; "Census 2000 Summary File 3 (SF3)—Sample Data." <http://factfinder.census.gov>. (December 5, 2008).

- U.S. Census Bureau. 2002. "County Business Patterns: 2000, Zip Code Totals File."
http://www.census.gov/econ/cbp/download/00_data/index.htm.
- U.S. Census Bureau, Population Division. 2009a. "HU-EST2008-37: Housing Unit Estimates for Counties of North Carolina April 1/2000 to July 1/2008."
<http://www.census.gov/popest/housing/files/HU-EST2008-37.CSV>.
- U.S. Census Bureau, Population Division. 2009b. "HU-EST2008-37: Housing Unit Estimates for Counties of North Carolina April 1/2000 to July 1/2008."
<http://www.census.gov/popest/housing/files/HU-EST2008-37.CSV>.
- U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2008. "2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation."
<http://www.census.gov/prod/www/abs/fishing.html>.
- U.S. Small Business Administration (SBA). May 2003. *A Guide for Government Agencies: How to Comply with the Regulatory Flexibility Act*. Washington, DC: SBA.
- U.S. Small Business Administration (SBA). 2008. Table of Small Business Size Standards Matched to North American Industry Classification System Codes. Effective March 11, 2008.
<http://www.sba.gov/services/contractingopportunities/sizestandardstopics/size/index.html>.
- Whitehead, J.C. 1993. "Total Economic Values for Coastal and Marine Wildlife: Specification, Validity, and Valuation Issues." *Marine Resource Economics* 8:119-132.