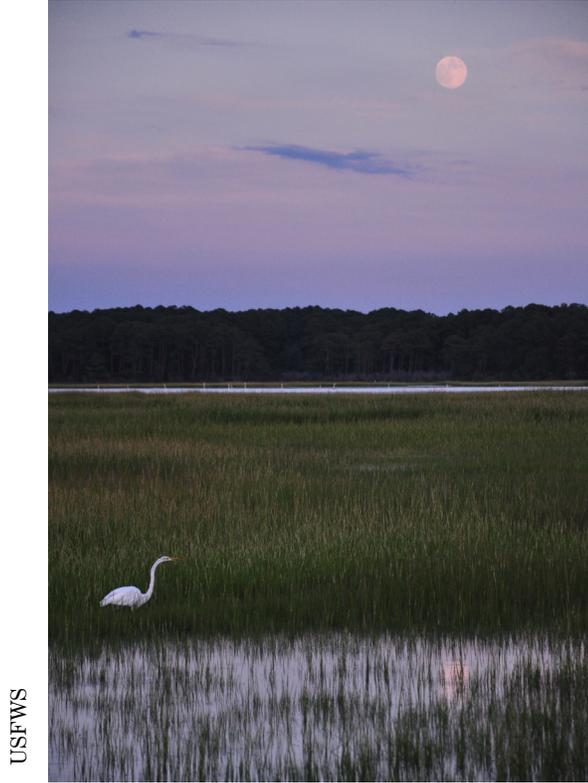


Appendix M



USFWS

Egret at Nightfall

Chincoteague National Wildlife Refuge Economic Analysis in Support of Comprehensive Conservation Plan

Division of Economics

US Fish and Wildlife Service

January 2013

Public Review Draft

Chincoteague National Wildlife Refuge Economic Analysis In Support of Comprehensive Conservation Plan

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1.0 Introduction

The National Wildlife Refuge System Improvement Act of 1997 requires all units of the National Wildlife Refuge System to be managed under a Comprehensive Conservation Plan (CCP). The CCP must describe the desired future conditions of a refuge and provide long-range guidance and management direction to achieve refuge purposes. The U.S. Fish and Wildlife Service is in the process of developing a range of management goals, objectives, and strategies for the Chincoteague and NASA Wallops Island National Wildlife Refuges CCP. The CCP for the refuge must contain an analysis of expected effects associated with current and proposed refuge management strategies.

Chincoteague NWR (CNWR) was established on May 13, 1943 through acquisition of 8,808 acres under authority of the Migratory Bird Conservation Act. The Assistant Secretary of the Interior determined that FWS ownership of this land was necessary for protection during nesting and migration seasons of all those species of wildlife determined as being of great value as a source of food, or in destroying of injurious insects, or nevertheless in danger of extermination through lack of adequate protection (U.S. District Court 1943). The Migratory Bird Conservation Commission (MBCC) initially approved the Refuge at a meeting on March 25, 1941, acknowledging the importance of Assateague Island important wintering habitat for migrating greater snow goose, and nesting habitat for black ducks, shorebirds, and migratory birds (MBCC 1941). At that time they also approved acquisition of Jerico and Hebron Islands, two small marshes adjacent to Assateague Island, just north of the Virginia boundary in Maryland.

Since 1943, numerous tracts of land have been added to CNWR. All lands have been purchased with money from either the Migratory Bird Conservation Fund or the Land and Water Conservation Fund. Federal title of these lands is acquired to the mean low water line. In 1990 Assawoman and portions of Metompkin Island (1,608.5 acres total) were purchased with Land and Water Conservation Funds, which come from royalties on off-shore oil drilling.

Refuge purposes are taken from enabling legislation and acquisition authorities for a particular refuge and from Congressional legislation affecting the refuge system as a whole. CNWR purposes include: preserving and enhancing endangered species; protecting and enhancing habitat for migratory and non-migratory species; maintaining indigenous species; and, providing opportunities for wildlife-dependent recreation (CNWR 1993). The Service database (<http://refugedata.fws.gov/databases/purposes>) lists the following Refuge Purposes for CNWR:

“... for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (16 U.S.C. 715d) (Migratory Bird Conservation Act).

“...suitable for B (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species...(16 U.S.C. 460k-1) “...the Secretary ... may accept and use real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ...” (16 U.S.C. 460k-2) Refuge Receptions Act (16 U.S.C. 460k-460k-4), as amended.

“... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ...”(16 U.S.C. 3901(b), 100 Stat. 3583 Emergency Wetlands Resources Act of 1986)

“... for the development, advancement, management, conservation, and protection of fish and wildlife resources ...” (16 U.S.C. 742f(a)(4) “... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...”(16 U.S.C. 742f(b)(1) (Fish and Wildlife Act of 1956)

"... for conservation purposes ..." (7 U.S.C. 2002 (Consolidated Farm and Rural Development Act)

In 1997, Congress passed the landmark National Wildlife Refuge System Improvement Act (NWRISA) establishing a unifying mission and a wildlife-first mandate for the Refuge System. The NWRISA affirmed that: refuges are anchors for biodiversity and ecosystem-level conservation; lands and waters of the System are biologically healthy; and refuge lands reflect national and international leadership in habitat management and wildlife conservation.

The NWRISA also declares that all existing and proposed public uses must be compatible with each refuge's purposes, and highlights six priority public uses that each Refuge should evaluate for compatibility. These are wildlife observation, photography, interpretation, environmental education, hunting and fishing. Recreational activities allowed on CNWR are also influenced by portions of Assateague Island being within the Assateague Island National Seashore (ASIS).

Recreational use and related development on Assateague Island were authorized under Public Law 85 57, Chincoteague National Wildlife Refuge, Virginia – Bridge and Road, approved on June 17, 1957, that provided for construction of a bridge and road to the Refuge beach as well as recreational facilities “to permit the controlled development of a portion of the seashore of the Chincoteague National Wildlife Refuge, Virginia for recreational purposes.” These “easements and other rights” are subject to “such terms and conditions as the Secretary deems appropriate for the adequate protection of the wildlife refuge and other interests of United States.”

The 1962 Refuge Recreation Act (16U.S.C. 460K – 460K – 4) expanded the purpose of all refuges to include “... (1) incidental fish and wildlife-oriented recreation development, (2) the protection of natural resources, (3) the conservation of endangered species and threatened species...”

On September 21, 1965, the Assateague Island Seashore Act authorized establishment of the Assateague Island National Seashore (ASIS). The ASIS encompasses the Maryland side of Assateague Island and certain beach portions of the Virginia side of Assateague Island. The Act provided that the National Park Service (NPS) manage the Virginia portion for general purposes of public outdoor recreation with the qualification that land and water within the Refuge be administered for purposes under laws and regulations applicable to national wildlife refuges, including administration for public recreation use in accordance with the provisions of the Refuge Recreation Act (P.L. 87-714 (USFWS 1993).

NASA Wallops Island National Wildlife Refuge (WINWR) was created on July 10, 1975 with the transfer of 373 acres of land to the Service from the National Aeronautics and Space Administration (NASA/Goddard Space Flight Center/Wallops Flight Facility). NASA Wallops Island NWR is located entirely in Accomack County, Virginia. The primary purpose for this land transfer was for wildlife conservation and the “. . . particular value in carrying out the national migratory bird management program.” (16 U.S.C. 667b-667d).

The Chincoteague NWR is open to the public for recreational uses centered around wildlife and wildland activities. Access to the Refuge is primarily through the town of Chincoteague, which has become a town

whose economy is increasingly dependent on the tourism dollars brought into their community by Refuge visitors.

The purpose of this analysis is to provide a better understanding of the economic relationship between the Refuge and the community. For CCP planning, a regional economic assessment provides a means of estimating how current management (no action alternative) and proposed management activities (alternatives) could affect the local economy. This type of analysis provides two critical pieces of information. First it illustrates a refuge's contribution to the local community. Second, it can help in determining whether local economic effects are or are not a real concern in choosing among management alternatives.

This report is organized as follows: (1) a general summary of demographic characteristics of Accomack County and the Town of Chincoteague (Chincoteague); (2) a discussion of the economic characteristics of Accomack County and Chincoteague, with the focus on Chincoteague; (3) a discussion of Chincoteague National Wildlife Refuge visitation and the associated economic impacts; (4) estimates of how the economies of Chincoteague and Accomack County are impacted by Refuge visitors; and (5) an estimate of the economic impacts to the local and regional area of Refuge budget expenditures.

1.1 Refuge Profile

The original purpose for the establishment of Chincoteague NWR was "...for use as an inviolate sanctuary or for any other management purpose, for migratory birds" (16 U.S.C. § 715d, Migratory Bird Conservation Act), especially migrating and wintering waterfowl. Approximately 2,600 acres of fresh and brackish water impoundments on Chincoteague NWR have been created and managed for migrating and wintering waterfowl and other migratory birds. Chincoteague NWR also provides and manages habitat for the American black ducks, as part of a long-term effort, in compliance with the North American Waterfowl Management Plan, to reverse significant drops in this species' populations. These efforts also benefit other wildlife, especially shore and wading birds.

Today, wildlife management strategies at Chincoteague NWR continue to provide quality habitat for migrating and wintering waterfowl but also include a greater variety of wildlife, such as wading birds, shorebirds, and neotropical migrants. For example, Chincoteague NWR supports breeding populations of the endangered Delmarva fox squirrel and the threatened piping plover. The American peregrine falcon (a recently delisted threatened and endangered species) is seen quite frequently during its annual autumn migration. Additionally, the Atlantic loggerhead sea turtle is a threatened species that nests occasionally on Chincoteague NWR. Refuge management programs are targeted to provide feeding and resting areas for birds in migration, and nesting and brood-rearing habitat for those birds that find Chincoteague NWR suitable for reproduction. To this end, Chincoteague NWR continues efforts toward acquiring land and water for increased conservation of migratory bird resources and to protect important wildlife habitat from the impacts of development.

Chincoteague NWR has been designated as a Globally Important Bird Area by the American Bird Conservancy, designated as one of the top ten birding Hotspots by the National Audubon Society, and a Site of International Importance within the Western Hemisphere Shorebird Reserve Network, a conservation partnership of stewards and landowners led by the Manomet Center for Conservation Sciences. This coastal barrier island/lagoon system has been designated a World Biosphere Reserve by the United Nations Educational, Scientific, and Cultural Organization in recognition of its great

ecological value. Moreover, the Department of the Interior designated the area a National Natural Landmark in recognition of its outstanding natural values.

Chincoteague NWR is also an important recreational destination, particularly for people living in the Washington D.C., Baltimore, Philadelphia, and New York City areas. With approximately 1.25 million visits annually, Chincoteague NWR is one of the most visited refuges in the United States, providing visitors with the six wildlife-dependent recreation opportunities (hunting, fishing, wildlife observation and photography, environmental education and interpretation), as well as other public uses that have been deemed appropriate and compatible, including a recreational beach, which is managed by the NPS under an agreement with USFWS. Visitation to Chincoteague NWR supports the tourism economy of the Town of Chincoteague, which is the refuge's gateway community and is located on Chincoteague Island, and through which visitors must travel to access Chincoteague NWR.

A bridge spanning Assateague Channel separates Refuge headquarters from the Town of Chincoteague. Chincoteague, the largest community in Accomack County (population 33,164), had approximately 2,941 permanent residents in 2009 (Chincoteague 2009). Numerous small rural communities and towns surround the Refuge. The Refuge headquarters and visitor center are located about two miles from the Chincoteague town center.

The Refuge has a single entry point for vehicle traffic, which is accessed via the Town of Chincoteague. Visitors come to the Refuge to participate in a variety of activities including wildlife watching, surf fishing, and general beach recreation. The Refuge is well known for its wild pony population, popularized by the bestselling children's book, Misty of Chincoteague by Marguerite Henry first published in 1947. This book popularized the annual roundup of the Assateague Island ponies that are located on the Refuge. These animals are herded to the Assateague Channel where they then swim across to Chincoteague Island where the foals are then auctioned off to benefit the Chincoteague Volunteer Fire Company. The event attracts tens of thousands of tourists every year to witness the pony swim.

The first European explorer to record landing in the Assateague Island vicinity was Giovanni da Verrazano, sailing for the King of France in 1524 (Bearss, 1968). During the next one-hundred years, many explorers investigated the area but colonists preferred the better soils and protected environments of the mainland. In the mid-1600's Chincoteague and Assateague Islands were used to graze livestock by landowners wanting to avoid fencing ordinances on the mainland. Camps for livestock herders were established (Bearss, 1968 and Wroten, 1972); salt extraction and shell-fishing brought more seasonal inhabitants. These activities remain currently popular on the Refuge.

Chincoteague NWR (CNWR) was established on May 13, 1943 through acquisition of 8,808 acres under authority of the Migratory Bird Conservation Act. The Assistant Secretary of the Interior determined that FWS ownership of this land was necessary for protection during nesting and migration seasons of all those species of wildlife determined as being of great value as a source of food, or in destroying of injurious insects, or nevertheless in danger of extermination through lack of adequate protection (U.S. District Court 1943). The Migratory Bird Conservation Commission (MBCC) initially approved the Refuge at a meeting on March 25, 1941, acknowledging the importance of Assateague Island important wintering habitat for migrating greater snow goose, and nesting habitat for black ducks, shorebirds, and migratory birds (MBCC 1941). At that time they also approved acquisition of Jerico and Hebron Islands, two small marshes adjacent to Assateague Island, just north of the Virginia boundary in Maryland.

Today, the Refuge is well known for its population of wild ponies. The Chincoteague ponies are most likely descendants of colonial horses brought to Assateague Island in the 17th century by Eastern Shore planters (AINS, 1986 and Bearss, 1968) when crop damage caused by free roaming animals led colonial legislatures to enact laws requiring fencing and taxes on livestock (AINS, no date). The modern day descendants of those domestic horses are wild and have adapted to their environment. Today, the ponies found on the Refuge are owned by the Chincoteague Volunteer Fire Company (CVFC). The Refuge permits the CVFC to graze their ponies within two designated areas on the Refuge. Following tradition, the Fire Company rounds up the entire herd (approximately 150 adult ponies plus foals) for the Annual Pony Penning and Auction held on the last Wednesday and Thursday of July; all foals and yearlings are sold at auction to benefit the town's ambulance and fire services.

2.0. Socio-Demographics of Accomack County and Chincoteague

This section provides an overview of basic socio-demographic information for the Town of Chincoteague as well as for Accomack County, the State of Virginia, and the United States for comparative purposes. This information is being provided so that both current and future refuge managers and workers who base decisions on this CCP will have a better appreciation for the nearby communities that surround the refuge. This information should help the refuge better understand how their management decisions may impact Town residents and their livelihood. This information may also help Refuge management better communicate to local officials and residents rationales behind their decisions.

In October 2011, the U.S. Fish and Wildlife Service released "Conserving the Future, Wildlife Refuges and the Next Generation." The document reflects the Service's vision that will guide the management of the Refuge System during the next decade and beyond. The Service recognizes in this document that successful conservation will require strategic, collaborative, science-based landscape conservation – along with effective public outreach, education, and environmental awareness. The Service recognizes that forming partnerships with other federal, State, and local government agencies as well as conservation-oriented non-profits is a necessary step for success. Themes that are adopted in the document include: relevance to a changing America, the impact of a changing climate, the need for conservation at the landscape scale, the necessity of partnership and collaboration, and the absolute importance of scientific excellence.

The socio-demographic information contained in this document will hopefully serve as a basis for both current and future Refuge managers to better understand the basic characteristics of the people and communities that surround the Refuge, which hopefully will be used to improve outreach and collaborative projects that will benefit both the Refuge and its trust species as well as the communities economic well-being.

2.1 Population

According to the U.S. Census Bureau the population of Chincoteague grew 21 percent from 3,572 to 4,317 individuals between 1990 and 2000 but declined to 2,941 residents in 2010.¹ The population in

¹ U.S. Census Bureau, 2010 Demographic Profile Data, DP-1. Accessed at www.factfinder2.census.gov on March 20, 2012.

2010 reflects a 32 percent decline from the 2000 Census count.² In comparison, Accomack County's population declined by 13.4 percent in contrast to the change in total population for the State, which increased by 13 percent an amount greater than the nation's'. Table 1 shows the comparison between these geographical entities.

Table 1
Change in Population, 2010 and 2000

Year	Chincoteague Town	Accomack County	Virginia	U.S.
2010	2,941	33,164	8,001,024	308,745,538
2000	4,317	38,305	7,078,515	281,421,906
% chg	-31.9%	-13.4%	13.0%	9.7%

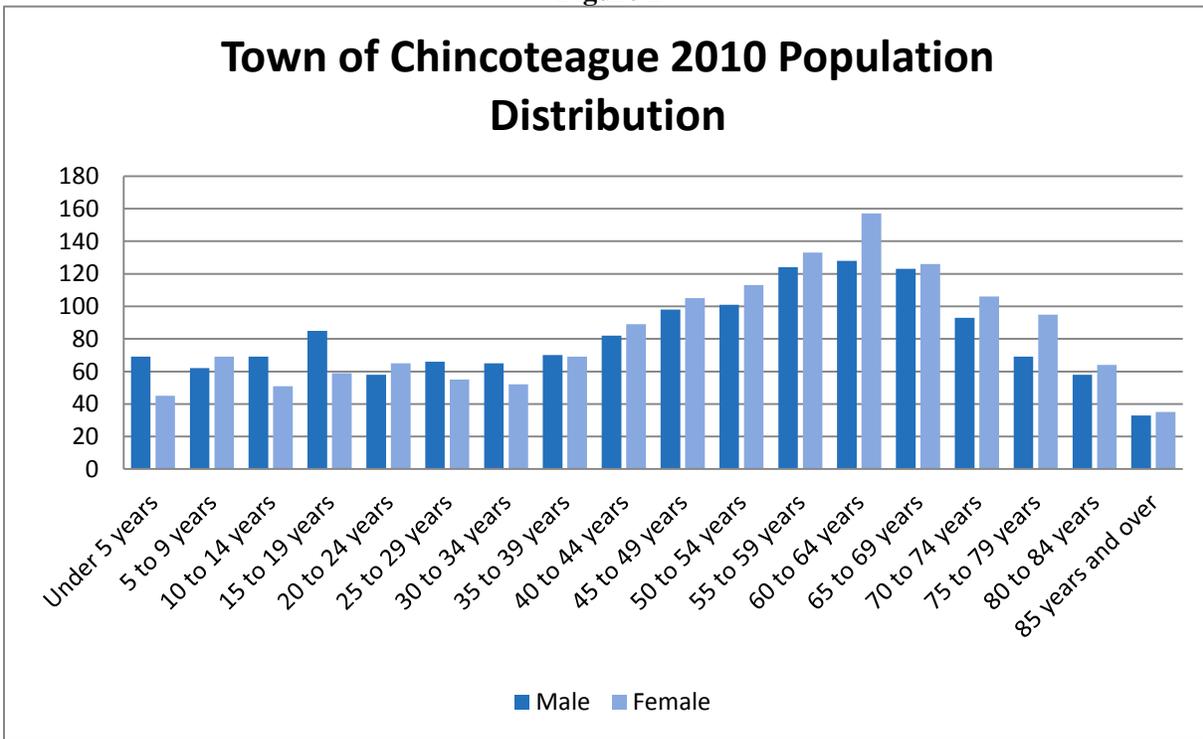
U.S. Census Bureau, 2010 and 2000 Demographic Profile Data, DP-1. Accessed at www.factfinder2.census.gov on March 20, 2012

Figure 1 shows the breakdown of population by sex and age group category for the Town of Chincoteague. The table shows that the Town's residents skew towards the elderly. Individuals between 60 and 64 years constitute the greatest number of residents. The table also shows a decline in residents for the years 20 through 40, which likely reflects an outward migration of individuals after completing high school as they continue their educations or look for employment elsewhere.

Figure 2 compares the percentage of all residents by age category between the Town of Chincoteague and the U.S. The table shows that up until the age of 50, the Town of Chincoteague has significantly fewer children, young adults and middle aged adults than the national average. Beyond age 50 the Town has proportionally more adults in every age-group than the national averages, reflecting the Town's desirability as a retirement destination.

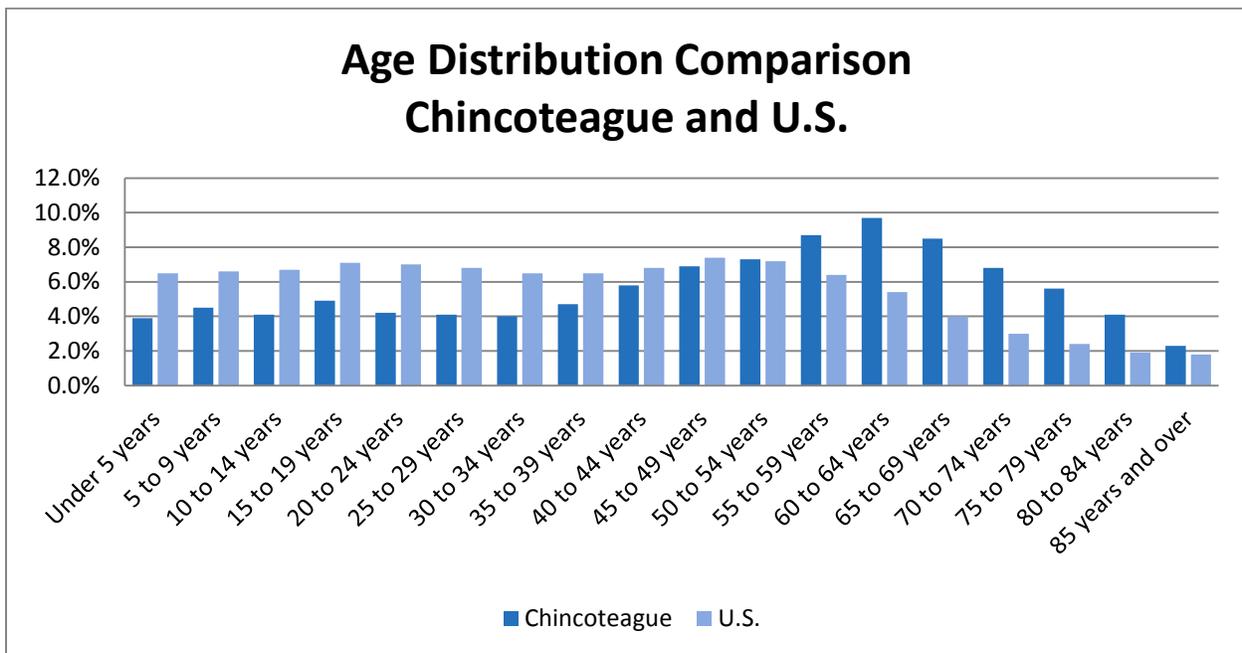
² It is noted that the Town of Chincoteague disagrees with the Census findings and believes that the resident population is approximately 3,974. Town Resolution, April 6, 2011.

Figure 1



Source: U.S. Census Bureau, 2010 Demographic Profile Data, DP-1. Accessed at www.factfinder2.census.gov on March 20, 2012.

Figure 2



Source: U.S. Census Bureau, 2010 Demographic Profile Data, DP-1. Accessed at www.factfinder2.census.gov on March 20, 2012.

2.2 Demographics

The Town of Chincoteague is not as racially or ethnically diversified as the rest of the County, State, or nation. The 2010 Census reports that over 95 percent of the Town residents are white compared to 65 percent for Accomack County, 68 percent for Virginia, and 72 percent for the nation as a whole. Hispanics also constitute a small percentage of the ethnic composition of the Town (1.7 percent) compared to the county (8.6 percent), State (7.9 percent), or nation (16.3 percent). Table 2 provides a breakdown of the racial and ethnic composition of the Town along with the corresponding data for the county, State, and nation for comparative purposes.

Table 2
Racial and Ethnic Characteristics

Race and Ethnicity	Chincoteague Town	Accomack County	Virginia	U.S.
Total population	2,941 ⁽¹⁾	33,164	8,001,024	308,745,538
One race	97.2%	98.4%	97.1%	97.1%
White	95.3%	65.3%	68.6%	72.4%
Black or African American	0.8%	28.1%	19.4%	12.6%
American Indian and Alaska Native	0.3%	0.4%	0.4%	0.9%
Asian	0.6%	0.6%	5.5%	4.8%
Other	3.0%	5.7%	6.2%	9.3%
Hispanic or Latino (of any race)	1.7%	8.6%	7.9%	16.3%

(1) The Town of Chincoteague officially disagrees with the Census findings and believes that the correct population count is 3,974. April 7, 2011 Resolution.
Source: U.S. Census; 2010 Census Data, Summary File 1.

2.3 Households and Housing

There are 1,417 households living in the Town of Chincoteague, according to the 2010 U.S. Census. Census defines a household as all the people who occupy a housing unit. A housing unit is a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied. The average household size was 2.06 persons, which if multiplied by the total number of households corresponds to the Town's population.

Family households constituted 61.2 percent of the total number of Chincoteague households, which is about five percent less than the county, State, or national percentages. A family household is defined by Census as a householder living with one or more individuals related to him or her by birth, marriage, or adoption. Census data shows that Chincoteague family sizes were slightly smaller than the county, State,

or national percentages, likely reflecting the fact that Chincoteague draws proportionally more elderly married couples, without kids, due to its desirability as a retirement community. In fact, over 40 percent of the total number of Chincoteague households consisted of individuals 65 years and over. Table 3 presents the household characteristics for the Town, county, State, and nation.

Table 3
Household Characteristics

	Chincoteague	Accomack	Virginia	US
Total households	1,417	13,798	3,056,058	116,716,292
Family households (families)	61.2%	66.1%	67.0%	66.4%
With own children under 18 years	17.7%	22.9%	29.9%	29.8%
Households with individuals under 18 years	20.1%	27.7%	33.4%	33.4%
Households with individuals 65 years and over	41.4%	33.8%	23.3%	24.9%
Average household size	2.06	2.37	2.54	2.58
Average family size	2.58	2.88	3.06	3.14

Source: U.S. Census, DP-1: Profile of General Population and Housing Characteristics: 2010.

Chincoteague has nearly three times the number of housing units as total households, reflecting the town's linkages to the tourism-based industry. Census reports that nearly 60 percent of all vacant housing units were built for seasonal, recreational, or occasional use, compared to the State average of 2.4 percent. Table 4 shows some of the key housing characteristics for the Town, along with those for the county, State, and nation.

Table 4
Housing Characteristics

	Chincoteague	Accomack	Virginia	US
Total housing units	4,517	21,002	3,364,939	131,704,730
Occupied housing units	31.4%	65.7%	90.8%	88.6%
Vacant housing units	68.6%	34.3%	9.2%	11.4%
For rent	4.4%	2.7%	2.5%	3.1%
Rented, not occupied	0.2%	0.2%	0.2%	0.2%
For sale only	2.5%	2.1%	1.3%	1.4%
Sold, not occupied	0.2%	0.4%	0.3%	0.3%
For seasonal, recreational, or occasional use	59.5%	23.0%	2.4%	3.5%
All other vacants	1.8%	5.9%	2.6%	2.8%
Homeowner vacancy rate	9.5%	4.1%	2.1%	2.4%
Rental vacancy rate	36.0%	12.9%	7.6%	9.2%

Source: U.S. Census, DP-1: Profile of General Population and Housing Characteristics: 2010.

2.4 Education and Earnings

Over 83 percent of Chincoteague residents have a high school degree or higher, which is near the national average of 85 percent. Compared to the county, Chincoteague has a higher percentage of residents with a bachelor's, graduate, or professional degree (13.7 percent vs. 10.3 percent). Only 16.6 percent of Chincoteague residents have not achieved a high school diploma, which is less than the county but more than the State average (13.9 percent) and nation (14.9 percent). Table 5 provides an overview of education attainment for the Town, county, State, and nation.

Table 5
Educational Attainment for Population 25 years and Over

	Chincoteague town, Virginia	Accomack County, Virginia	Virginia	United States
	Total	Total	Total	Total
	Estimate	Estimate	Estimate	Estimate
Population 25 years and over	2,529	24,217	5,208,536	199,726,659
Less than 9th grade	6.6%	7.9%	5.5%	6.2%
9th to 12th grade, no diploma	10.0%	13.2%	8.4%	8.7%
High school graduate (includes equivalency)	37.0%	37.9%	26.0%	29.0%
Some college, no degree	15.1%	17.4%	19.6%	20.6%
Associate's degree	5.5%	5.5%	6.7%	7.5%
Bachelor's degree	12.1%	10.3%	19.9%	17.6%
Graduate or professional degree	13.7%	7.7%	13.9%	10.3%
Percent high school graduate or higher	83.4%	78.9%	86.1%	85.0%
Percent bachelor's degree or higher	25.8%	18.0%	33.8%	27.9%

Source: U.S. Census, American Community Survey 5 year estimates, 2006 - 2010.

In general, the average earnings for people 25 years and over is less in Chincoteague than other areas. Specifically, the average earnings for a Town resident is \$23,000 compared to \$27,406 for a county resident, \$39,409 for a State resident, and \$34,665 for an average national resident. However, these estimates are heavily influenced by the lower earnings power of Town residents with only a high school diploma or less. Town residents with a bachelor's degree or higher earn more on average than a resident of the county or nation (but not the State). Regardless of educational attainment, however, Chincoteague residents have a higher percentage of residents experiencing poverty than State or national residents. Table 6 presents an overview of poverty status and earnings.

Table 6
Poverty Status and Earnings

	Chincoteague town, Virginia	Accomack County, Virginia	Virginia	United States
	Total	Total	Total	Total
	Estimate	Estimate	Estimate	Estimate
POVERTY RATE FOR THE POPULATION 25 YEARS AND OVER FOR WHOM POVERTY STATUS IS DETERMINED BY EDUCATIONAL ATTAINMENT LEVEL				
Less than high school graduate	30.7%	28.0%	21.3%	24.7%
High school graduate (includes equivalency)	22.8%	13.2%	9.6%	12.0%
Some college or associate's degree	9.4%	12.2%	6.2%	8.4%
Bachelor's degree or higher	5.4%	3.6%	2.5%	3.8%
MEDIAN EARNINGS IN THE PAST 12 MONTHS (IN 2010 INFLATION-ADJUSTED DOLLARS)				
Population 25 years and over with earnings	23,000	27,406	39,409	34,665
Less than high school graduate	12,852	16,634	21,001	19,492
High school graduate (includes equivalency)	15,729	25,979	29,064	27,281
Some college or associate's degree	28,495	27,535	36,137	33,593
Bachelor's degree	52,417	40,809	53,522	48,485
Graduate or professional degree	66,563	50,898	75,613	63,612

Source: U.S. Census, American Community Survey 5 year estimates, 2006 - 2010.

2.5 Employment and Earnings by Industry

Census estimates that throughout the year 2010 there were a total of 1,363 people employed in the Town of Chincoteague. 908 of these people were employed year-round with the remainder primarily seasonal. Accordingly, median salaries were greater for the year-round workers (\$39,028) than the total, which included seasonal workers (\$27,702). The difference between the number of year-round employment and total employment, which included seasonal workers, were in the fields of retail trade, real estate and rental leasing, and accommodations and food services. Median earnings were estimated to be highest for year-round manufacturing jobs (\$93,529) and lowest in the field of Other Services (\$6,467).

The greatest number of year-round jobs were in public administration (148), accommodations and food services (117), and professional, scientific, and technical services (112). Total jobs, which includes seasonal work, were greatest in the fields of accommodations and food services (213), public administration (173) and health care and social assistance (146). Table 7 provides a detailed breakdown of estimated employment and median earnings by industry for total employment and year-round employment.

Table 7
Total Employment by Industry and Full-Time, Year-Round Employment by Industry, 2010

Chincoteague Town, Virginia	Total Civilian employed population 16 years and over		Full-time, year-round civilian employed population 16 years and over	
	Total	Median earnings (dollars)	Total	Median earnings (dollars)
	Estimate	Estimate	Estimate	Estimate
Total	1,363	27,702	908	39,028
Agriculture, forestry, fishing and hunting, and mining:	72	9,136	35	9,931
Agriculture, forestry, fishing and hunting	72	9,136	35	9,931
Mining, quarrying, and oil and gas extraction	0	-	0	-
Construction	62	16,364	49	16,856
Manufacturing	64	93,529	64	93,529
Wholesale trade	30	40,294	30	40,294
Retail trade	56	17,976	0	-
Transportation and warehousing, and utilities:	17	-	17	-
Transportation and warehousing	17	-	17	-
Utilities	0	-	0	-
Information	0	-	0	-
Finance and insurance, and real estate and rental and leasing:	103	15,852	61	27,688
Finance and insurance	37	29,188	32	29,500
Real estate and rental and leasing	66	14,052	29	-
Professional, scientific, and management, and administrative and waste management services:	187	32,202	140	41,000
Professional, scientific, and technical services	140	56,250	112	56,042
Management of companies and enterprises	0	-	0	-
Administrative and support and waste management services	47	20,625	28	21,944
Educational services, and health care and social assistance:	277	39,688	187	50,605
Educational services	131	51,573	90	52,258
Health care and social assistance	146	31,607	97	32,232
Arts, entertainment, and recreation, and accommodation and food services:	251	13,695	155	14,629
Arts, entertainment, and recreation	38	14,083	38	14,083
Accommodation and food services	213	13,504	117	14,898
Other services, except public administration	71	6,467	22	7,708
Public administration	173	65,353	148	66,154

Source: 2006-2010 American Community Survey 5-Year Estimates

3.0. Economic Characteristics of Chincoteague and Accomack County

The Town of Chincoteague has several sources of economic activity, including tourism, both Refuge-related and other outdoor-based recreation opportunities, commercial fishing and seafood manufacturing, and impacts from the nearby National Aeronautics and Space Administration (NASA) Wallops Island Flight Facility. This section will summarize some general economic characteristics for Chincoteague and discuss tourist-related characteristics of the economy, the commercial and seafood manufacturing sectors and the impacts of the NASA Wallops Island Flight Facility.

3.1 Establishments and Employment

Table 8 shows Chincoteague employment by business sector for the years 2007 and 2010. Total employment in 2007 was 908, which increased by 74 jobs to 982 in 2010. In 2010, the three largest employment sectors, accommodation and food services, retail trade and health care and social assistance, accounted for almost 75 percent of total wage and salary employment. This compares with 2007, where the three largest sectors, accommodation and food services, retail trade and public administration, also accounted for about 75 percent of employment. The largest gain in jobs came from the health care sector, which showed a net gain of 62 jobs. Other sectors which showed significant gains include the retail trade sector, which showed a gain of 25 jobs, and the agriculture, forestry, fishing and hunting sector, which added 28 jobs.

Note that the above figures are wage and salary employment and do not include the self-employed. Chincoteague has a substantial number of self-employed, as evidenced by the number of business licenses issued in 2011 compared with the number of businesses which employed at least one person during the year (Table 8). In 2011, 1,269 business licenses issues. Table 9 shows 149 businesses which employed at least one person during 2010. Over 700 of the business licenses issued were for tourist rental homes, leaving 565 licenses covering the rest of the business sectors in town. Consequently, about 416 licenses are for the self-employed aside from the tourist rental home business.

For businesses that did employ people, the accommodation and food service sector accounted for 47 businesses, the retail trade sector accounted for 31 businesses, the construction sector for 15 and the real estate, rental and leasing sector for 11. These four sectors accounted for 70 percent of all businesses which hired workers in 2010.

Table 8
Chincoteague Town Employment by Business Sector: 2010 - 2007 Comparison

Industry Sector	2010		2007		Change
	Count	Share	Count	Share	
Agriculture, Forestry, Fishing and Hunting	29	3.0%	1	0.1%	28
Mining, Quarrying, and Oil and Gas Extraction	0	0.0%	-	0.0%	-
Utilities	0	0.0%	-	0.0%	-
Construction	33	3.4%	40	4.4%	(7)
Manufacturing	2	0.2%	4	0.4%	(2)
Wholesale Trade	10	1.0%	9	1.0%	1
Retail Trade	163	16.6%	138	15.2%	25
Transportation and Warehousing	4	0.4%	10	1.1%	(6)
Information	14	1.4%	17	1.9%	(3)
Finance and Insurance	11	1.1%	19	2.1%	(8)
Real Estate and Rental and Leasing	26	2.6%	34	3.7%	(8)
Professional, Scientific, and Technical Services	9	0.9%	14	1.5%	(5)
Management of Companies and Enterprises	0	0.0%	-	0.0%	-
Administration & Support, Waste Management and Remediation	11	1.1%	19	2.1%	(8)
Educational Services	3	0.3%	3	0.3%	-
Health Care and Social Assistance	104	10.6%	42	4.6%	62
Arts, Entertainment, and Recreation	7	0.7%	1	0.1%	6
Accommodation and Food Services	454	46.2%	462	50.9%	(8)
Other Services (excluding Public Administration)	23	2.3%	19	2.1%	4
Public Administration	79	8.0%	76	8.4%	3
Total	982	100%	908	100%	74

Source: U.S. Census Bureau 2012. OnTheMap Application. <http://onthemap.ces.census.gov/>. Accessed July 2012.

Table 9 breaks down the total number of businesses employing workers by industry for the year 2010. In that year there were 149 business employing workers. Businesses in the Accommodation and Food Service sectors accounted for over one-third of the local businesses employing workers. Retail Trade and Construction businesses combined accounted for another one-third of the business sectors employing workers.

Table 10 shows business sectors which are typically associated with tourism (and which employed people during the year). This does not imply that all the revenue generated by these sectors comes from tourism, only that, under typical circumstances, most of tourist spending occurs in these categories. The sectors in Table 10 are sub-sectors of the more general sector categories in Table 9. Hotels, motels, bed and breakfast inns, RV parks and campgrounds, and other accommodations account for 27 businesses, or 33 percent of the total.³ Food services also account for 27 businesses.⁴ For all 82 businesses, about one-third provide accommodations, one-third are food-related and one-third are other retail purchases.

Table 9
Chincoteague Business Sectors Employing Workers by Major Category, 2010

Sector	Number of Businesses
Accommodation and Food services Total	47
Retail Trade Total	31
Construction Total	15
Real Estate, Rental and Leasing Total	11
Health care and social assistance Total	8
Other services Total	8
Arts, entertainment and recreation Total	6
Professional, scientific and Tech services Total	5
Wholesale trade Total	3
Transportation and warehousing Total	3
Information Total	3
Finance and Insurance Total	3
Administrative and support, and waste management and remediation services Total	3
Agriculture, Forestry, Fishing, Hunting Total	2
Educational Services Total	2
Manufacturing Total	1
Public administration Total	1
Total Businesses employing workers	149

Source: Virginia Employment Commission 2011

³ NAICS codes for Accommodations include: 721110,721191, 721211, and 721199.

⁴ NAICS codes for Food Services include: 722110,722211,722213, 445110, 445120, 445299, 445310, 722212.

Table 10
Tourism Related Businesses Employing Workers in Chincoteague, 2010

NAICS Code	Sector	Number
721110	Hotels (except Casino Hotels) and Motels	16
722110	Full-Service Restaurants	11
453220	Gift, Novelty, and Souvenir Stores	7
721191	Bed-and-Breakfast Inns	5
722211	Limited-Service Restaurants	5
721211	RV (Recreational Vehicle) Parks and Campgrounds	4
448190	Other Clothing Stores	3
713990	All Other Amusement and Recreation Industries	3
722213	Snack and Nonalcoholic Beverage Bars	3
445110	Supermarkets and Other Grocery (except Convenience) Stores	2
447110	Gasoline Stations with Convenience Stores	2
452990	All Other General Merchandise Stores	2
721199	All Other Traveler Accommodation	2
445120	Convenience Stores	1
445299	All Other Specialty Food Stores	1
445310	Beer, Wine, and Liquor Stores	1
446110	Pharmacies and Drug Stores	1
447190	Other Gasoline Stations	1
448120	Women's Clothing Stores	1
448140	Family Clothing Stores	1
451110	Sporting Goods Stores	1
487210	Scenic and Sightseeing Transportation, Water	1
488490	Other Support Activities for Road Transportation	1
491110	Postal Service	1
532292	Recreational Goods Rental	1
712190	Nature Parks and Other Similar Institutions	1
713930	Marinas	1
722212	Cafeterias, Grill Buffets, and Buffets	1
Total		82

Source: Virginia Employment Commission 2011

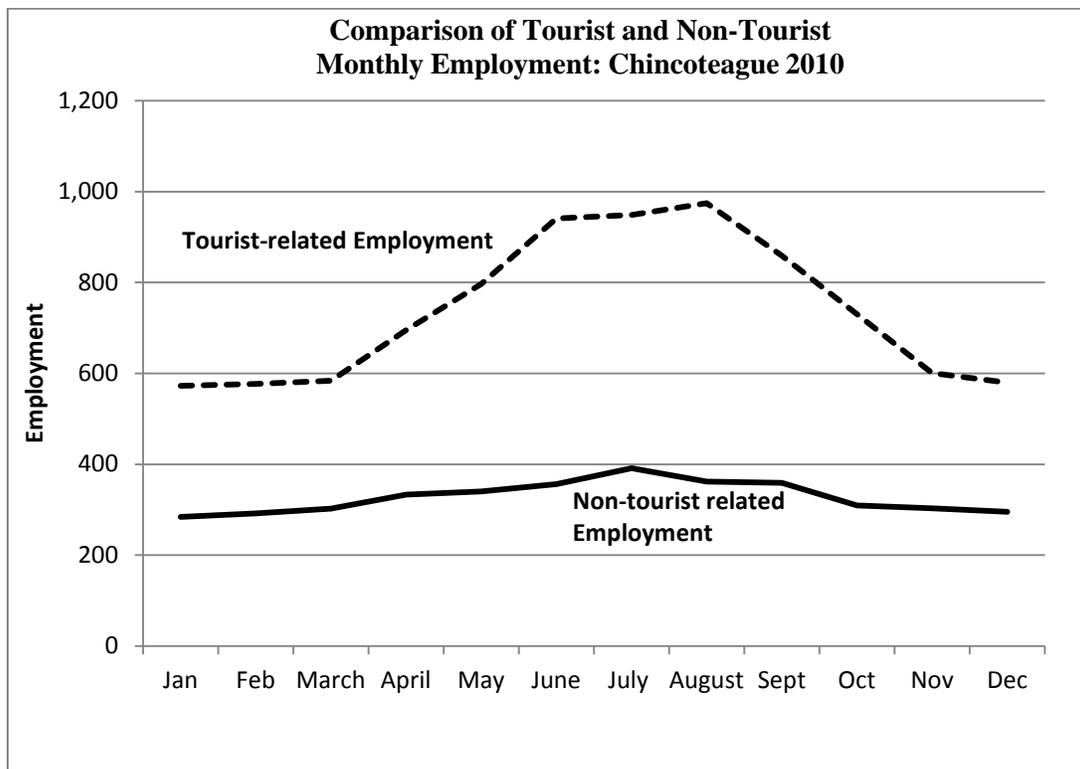
Chincoteague relies to a significant degree on tourism for town income. Tourism is not constant throughout the year, the summer months showing the highest concentration of visitors and the winter months the lowest. Consequently, much of the employment in Chincoteague follows a similar pattern. Table 11 shows Chincoteague 2010 employment by month categorized by tourist and non-tourist related businesses. Total employment is lowest in January and highest in July, ranging from 857 to 1,340. Tourist-related employment ranges from 573 in January to 975 in August, an increase of 70 percent from January. In contrast, non-tourist related employment ranges from 284 in January to 391 in July, an increase of 38 percent. Figure 3 shows a monthly graph of tourist and non-tourist employment in 2010.

Table 11
Chincoteague Town Tourist and Non-Tourist Employment by Month, 2010

Month	Tourist-related Businesses	Non-Tourist related Businesses	Total
Jan	573	284	857
Feb	577	292	869
March	584	302	886
April	695	333	1,028
May	797	340	1,137
June	941	356	1,297
July	949	391	1,340
August	975	362	1,337
September	859	359	1,218
October	730	309	1,039
November	601	303	904
December	580	295	875
Annual range	573 - 975	284 - 391	857 - 1,340

Source: Virginia Employment Commission 2011

Figure 3



Source: Virginia Employment Commission 2011

Table 12 shows the total number of establishments providing lodging in the Town of Chincoteague by type. In total, in the year 2010 there were 2,775 combined rooms, spaces, and sites provided by 707 establishments. Ninety percent of these establishments were vacation rental homes. Chincoteague had 21 hotels/motels that offered 849 rooms, six bed and breakfasts offering 33 rooms and six cottages offering 80 rooms. Four campsites offered 1,143 spaces. The rental of these places to tourists not only generates revenue for the owners but also generates revenue for the town in the form of food and lodging excise taxes.

Table 12
Available Lodging in Chincoteague by Type, 2010

Lodging Type	Number of Establishments	Number of rooms/spaces/sites
Hotels/motels	21	849
Bed and breakfast	6	33
Cottages	6	80
Campgrounds	4	1,143
Vacation Rental Homes	670	670
Total	707	2,775
Source: Town of Chincoteague 2011		

3.2 Town Revenues

The town levies taxes on many of the tourist-related business to help pay for the provision of many public goods. In particular, taxes are levied on real estate, business licenses, occupancy, and meals.

Real estate is assessed by the Accomack County Assessor. Real estate within the Town of Chincoteague is taxed by both the Town and Accomack County with each having different rates. Real estate taxes for the Town are billed in early November of each year and are due on or before December 5th of the same year. The current Town real estate tax rate is \$0.06 per \$100 of assessed value.⁵

⁵ The Town offers tax relief on real estate for certain elderly or handicapped individuals. The relief may be 50 percent or 100 percent. There are eligibility criteria, such as: income and amount of real estate owned. The contact is the Accomack County Commissioner of Revenue. The Commissioner of Revenue will notify the Town of those eligible for this relief.

Personal property taxes are assessed by the Accomack County Commissioner of Revenue on such items as automobiles, motorcycles, travel trailers, boats and mobile homes. Personal property is also taxed by the Town and Accomack County with different rates. Personal property bills are mailed the same time as real estate and have the same due date. The current Town personal property tax rate is \$0.85 per \$100 of assessed value. However, mobile homes are billed at the real estate rate.

The Town of Chincoteague levies an annual business license tax on all persons conducting business within the Town. The tax is due on April 30th of each year. For most business categories, the current rate for this tax is \$0.13 per \$100 of gross receipts of the previous year, with a minimum tax of \$50.00 and a maximum of tax \$500.00 per year.

Transient occupancy tax is charged by providers of lodging of less than 30 days. The current Town transient occupancy tax rate is 3 percent. Meals tax is charged on all prepared meals including beverages within the Town. The current meals tax rate is 5 percent.

Table 13 shows gross receipts derived from the transient occupancy tax (lodging excise tax) from 2001 to 2010. Over the 10-year period, hotels and motels account for 60.5 percent of average annual gross receipts, tourist homes 31.3 percent, campgrounds 4.7 percent and bed and breakfasts 3.5 percent. Annual receipts averaged \$17.6 million over the 10 year period. Table 14 shows the tax receipts derived from the lodging tax for both Chincoteague and Accomack County. Chincoteague tax receipts ranged from \$339,000 in 2005 to \$602,800 in 2010, an increase of 78 percent.

Table 13
Chincoteague Transient Occupancy Tax; Gross Receipts Reported, 2001 – 2010
(dollars in millions)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Tourist Homes	\$4.6	\$4.9	\$5.2	\$5.4	\$5.2	\$5.4	\$5.9	\$5.9	\$6.3	\$6.3
Hotels /motels	\$8.8	\$9.4	\$10.2	\$10.4	\$10.6	\$11.8	\$11.7	\$12.7	\$12.0	\$9.1
Campgrounds	\$0.899	\$0.904	\$0.724	\$0.733	\$0.758	\$0.846	\$0.929	\$0.769	\$0.991	\$0.781
Bed and Breakfasts	\$0.702	\$0.648	\$0.584	\$0.583	\$0.635	\$0.694	\$0.705	\$0.587	\$0.594	\$0.378
Total	\$15.0	\$15.9	\$16.7	\$17.1	\$17.2	\$18.7	\$19.2	\$20.0	\$19.9	\$16.6

Source: Town of Chincoteague 2011

Table 14
Chincoteague Lodging tax receipts as percentage of Accomack County Lodging Tax Receipts
(dollars in thousands)

	2005	2006	2007	2008	2009	2010
Chincoteague excise tax collected	\$339.0	\$358.4	\$384.0	\$573.4	\$620.0	\$602.8
Accomack County Tax collected	\$670.4	\$724.5	\$791.3	\$991.9	\$1,047.5	\$1,017.7
Chincoteague portion of County Excise Tax	50.6%	49.5%	48.5%	57.8%	59.2%	59.2%
Source: Town of Chincoteague 2011						

In addition to the lodging tax, Chincoteague also has a food excise tax, which applies to restaurants and other establishments which prepare food for consumption (as opposed to grocery stores). Table 15 shows both food and lodging excise tax revenue for the years 2004 to 2010. The food service excise tax revenue has been fairly constant, ranging from \$433,100 in 2004 to \$487,100 in 2010, a 12.5 % increase. Total excise tax collections ranged from \$761,500 in 2004 to \$1,089,900 in 2010, a 43.1 % increase.

Table 15
Town of Chincoteague: Lodging and Food Excise Tax Collected: 2004-2010
(dollars in thousands)

	2004	2005	2006	2007	2008	2009	2010
Lodging Excise tax Collected	\$328.4	\$339.0	\$358.4	\$384.0	\$573.4	\$620.0	\$602.8
Food Service Excise tax Collected	\$433.1	\$434.3	\$435.0	\$451.0	\$452.2	\$480.7	\$487.1
Total Excise Tax collected	\$761.5	\$773.3	\$793.4	\$835.0	\$1,025.6	\$1,100.7	\$1,089.9
Source: Virginia Tourism Corporation 2011							

3.3 Commercial Shell and Finfishing

The waters surrounding the Town of Chincoteague and the national wildlife refuge support a great diversity of fin and shellfish that have been harvested for centuries for commercial purposes. In 2010 the total value of commercial finfish and shellfish harvested from the area waters was estimated to be in excess of \$3.3 million. In recent years, the bulk of the commercial harvest and associated value has been the result of private shellfish farms that are forming in the area waters. In 2010 the sales from these ventures accounted for over one-half of the total value of the harvest.

To assess the economic importance of the shell and finfish industries, data was collected from the Virginia Marine Resources Commission. The Commission works to protect the resources for current and future generations. As part of its duties, the Commission collects data on the amount and types of shell and finfish species harvested in State waters. For the purposes of this analysis, the Commission was approached for all of the readily available historical the data that they have collected for water areas in the vicinity of Chincoteague. Table 16 shows the specific water bodies in Accomack County where data was requested.

Table 16
Water Areas Proximal to Accomack County

Bogue Bay	Gargathy Bay	Upshur Bay
Bradford Bay	Kegotank Bay	Watts Bay
Burton's Bay	Metomkin Bay	Unclassified
Chincoteague Bay	Outlet Bay	
	Oyster Bay	
Source: Virginia Marine Resources Commission, Plans and Statistics. May 2012.		

Data provided by the Commission show that since 1993, Blue crab harvests are the greatest of all marine species both in total amount and value. Also of significant economic importance is the harvesting of private quahogs. Table 17 shows the total amount and value of every species harvested in the waters surrounding Chincoteague since 1993. Annual and average values are not reported because not every species is harvested in every year. For example, the harvesting of private quahogs is a relatively new business and reporting did not begin until 2007.

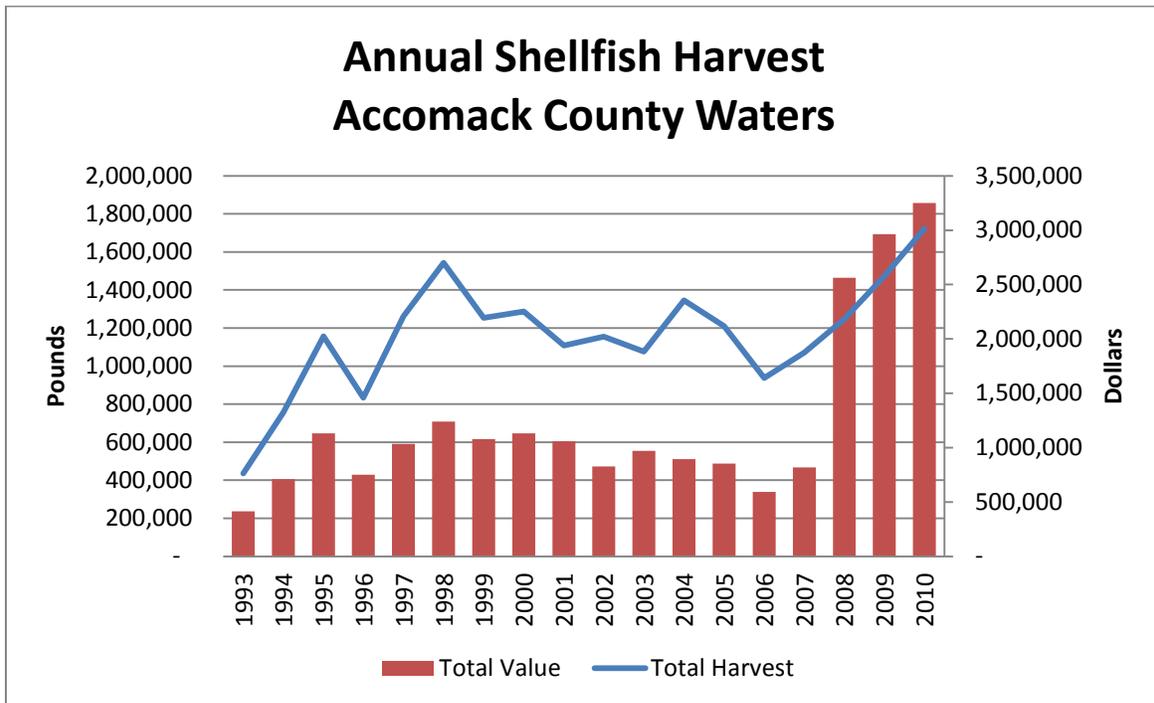
Table 17
Total Shellfish and Finfish Harvest (pounds) and Value (dollars)
1993 through 2010 (Accomack County Waters)

Species	Total Pounds	Total Value
SHELLFISH		
CONCHS	13,334	\$ 10,718
CRAB, BLUE	18,263,850	\$ 13,280,263
CRAB, HORSESHOE ¹	361,072	\$ 208,407
OYSTERS, PRIVATE	58,192	\$ 237,009
QUAHOG, PRIVATE	1,386,670	\$ 6,066,194
QUAHOG, PUBLIC	792,733	\$ 2,477,834
FINFISH		
ALEWIFE	32,160	\$ 3,729
BASS, STRIPED	97,145	\$ 189,584
BLUEFISH	227,587	\$ 82,069
CROAKER, ATLANTIC	1,617,701	\$ 747,540
DOGFISH	196,909	\$ 34,252
FISH, OTHER INDUSTRY	35,660	\$ 2,205
FLOUNDER, SUMMER	26,546	\$ 68,068
PUFFER, NORTHERN	32,763	\$ 86,083
SEATROUT, GREY	349,812	\$ 244,837
SHAD, AMERICAN	101,977	\$ 87,124
SPOT	1,968,817	\$ 992,654
¹ For purposes of the economic analysis, the horseshoe crab is included with other shellfish even though it is official classified as an arachnid. Source: Virginia Marine Resources Commission, Plans and Statistics. May 2012.		

Figures 4 and 5 show the aggregated total harvests for shellfish and finfish for each of the years 1993 through 2010. These data reflect the harvests from all of the waters in Accomack County that are within the vicinity of the Town of Chincoteague. The data were compiled by the Virginia Marine Resources Commission based on the specific water bodies shown in Table 16.

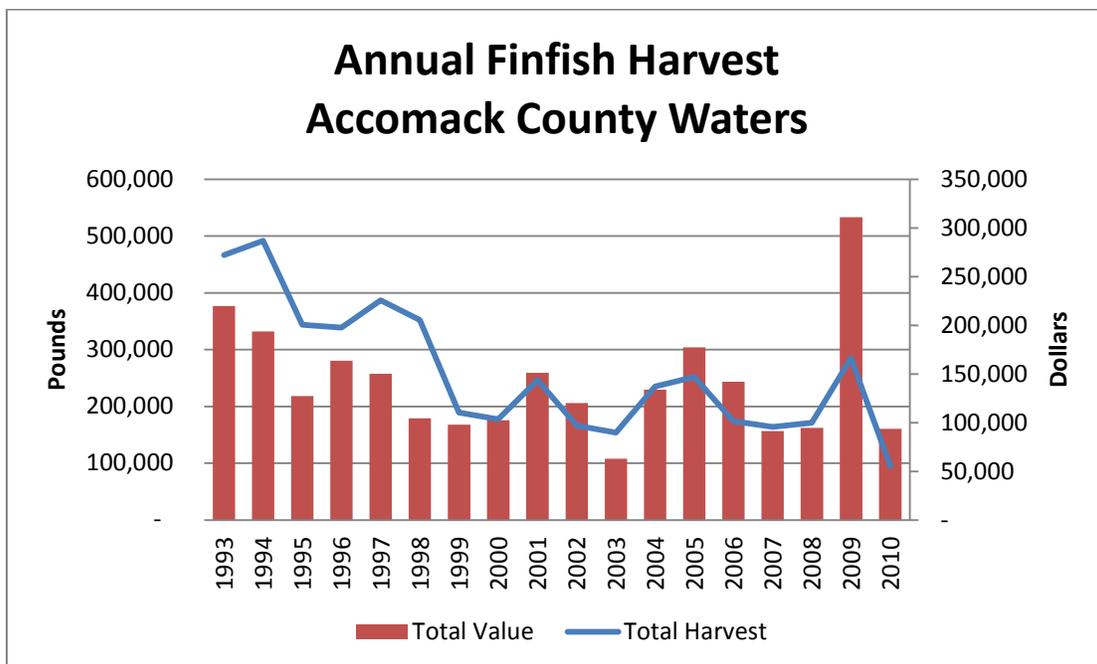
The data show that the annual total amount of the finfish harvest is declining over the years, while the amount of the shellfish harvest has been increasing. In 1993, Accomack County waters produced nearly 400,000 pounds of finfish and 400,000 pounds of shellfish. By 2010, shellfish harvests increased to nearly 1.8 million pounds, while finfish harvests declined to less than 100,000 pounds.

Figure 4



Source: Virginia Marine Resources Commission, Plans and Statistics. May 2012.

Figure 5



Source: Virginia Marine Resources Commission, Plans and Statistics. May 2012.

3.4 NASA Wallops Flight Facility and Mid-Atlantic Regional Spaceport

The NASA Wallops Flight Facility, just a few miles northwest of Chincoteague, is a source of economic activity for the town. This facility, which also includes the Mid-Atlantic Regional Spaceport administered by the Virginia Commercial Space Flight Authority, generates economic activity in several ways: (1) the annual impacts from operations of the various businesses at the site; (2) the employment impact generated by the percentage of the employees' payroll spent locally; and (3) the annual impact from the additional tourism generated in Accomack County (and Chincoteague) by the Flight Facility.⁶ Table 17 shows that Accomack County accounted for \$77.8 million in economic impacts, the rest of the Lower Eastern Shore in Virginia \$110.5 million, for a total of \$188.3 million. Accomack County accounted for 1,206 jobs, Lower Eastern Shore 1,141 for a total of 2,347 jobs. The portion of these impacts which occur in Chincoteague is not known, but it is reasonable to assume that Chincoteague derives significant economic activity from the Flight Facility.

Table 17
Estimated Annual Economic, Employment and Fiscal Impacts of Activities at NASA Wallops Island
(dollars in millions)

	Accomack County	Lower Eastern Shore	Total	Outside of Region	Total Impacts
Total Economic Impacts	\$77.8	\$110.5	\$188.3	\$207.2	\$395.5
Employment Impacts	1,206	1,141	2,347	704	3,051
State and Local Tax Revenue	\$2.7	\$4.5	\$7.1	\$6.3	\$13.4
Federal Tax Revenue	\$2.3	\$3.5	\$5.8	\$7.5	\$13.3

Source: Bunch 2011, p.2

3.5 Accomack County

Table 18 shows taxable sales by business sector for Accomack County in 2010. Taxable sales totaled \$286.4 million with retail trade accounting for \$179.5 million, 62.7 percent of the total, and accommodation and food services accounting for \$47.1 million, 16.5 % of total taxable sales.

Table 19 shows estimates of travel-related expenditure impacts in Accomack County. These are expenditures by travelers going to or through Accomack County. In 2010, travel-related expenditures totaled \$145.1 million, a 14.3 percent increase from 2006. These expenditures resulted in \$31.4 million in payroll and 1,847 jobs. State tax receipts totaled \$6.9 million and local tax receipts totaled \$4.5 million.

⁶ Bunch 2011, p.4.

Table 18
Accomack County Taxable Sales by Business Sector, 2010

Business Sector	Taxable Sales	Percent of Total
No Sector Name Information	\$5,089,123	1.8%
Construction	\$2,399,516	0.8%
Manufacturing	\$1,975,603	0.7%
Wholesale Trade	\$16,204,731	5.7%
Retail Trade	\$179,502,391	62.7%
Real Estate Rental and Leasing	\$10,551,698	3.7%
Professional, Scientific and Technical Services	\$2,723,241	1.0%
Administrative and Support Services	\$309,500	0.1%
Arts, Entertainment and Recreation	\$1,674,294	0.6%
Accommodation and Food Services	\$47,125,069	16.5%
Other Services	\$5,568,627	1.9%
Sub-Total	\$273,123,793	95.3%
Misc. and unidentifiable	\$13,340,460	4.7%
Total	\$286,454,253.35	100.0%

Source: University of Virginia 2011

Table 19
Accomack County Travel Related Economic Impacts: 2006 - 2010
(Dollars in millions)

Impacts	2006	2007	2008	2009	2010	Percent Change 2006 - 2010
Expenditures	\$127.0	\$134.3	\$140.4	\$137.5	\$145.1	+14.3%
Payroll	\$28.5	\$28.8	\$30.0	\$30.6	\$31.4	+10.2%
Employment	1,780	1,795	1,827	1,852	1,847	+3.8%
State tax receipts	\$6.1	\$6.4	\$6.5	\$6.8	\$6.9	+13.1%
Local tax Receipts	\$4.0	\$4.2	\$4.4	\$4.4	\$4.5	+12.5%

Source: Virginia Tourism Corporation 2011

4.0. Chincoteague National Wildlife Refuge Recreation Visits and Associated Economic Impacts

In 1997, President William Jefferson Clinton signed into law the Refuge Improvement Act which establishes a unifying mission for the Refuge System. The mission of the Refuge System is:

To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. — Refuge Improvement Act; Public Law 105-57

The Refuge Improvement Act also establishes a new process for determining compatibility of public uses on refuges, and requires the Service to prepare a CCP for each refuge. The Act states that the Refuge System must focus on wildlife conservation. It also requires that the mission of the Refuge System, coupled with the purposes for which each refuge was established, will provide the principal management direction on that refuge. The Refuge Improvement Act identifies six wildlife-dependent public uses—hunting, fishing, wildlife observation and photography, and environmental education and interpretation—that will receive priority consideration on refuges and, therefore, in CCPs. Furthermore, the Act declares that all existing or proposed public or commercial uses must be “compatible” with the refuge’s purpose and consistent with public safety. The refuge manager determines if an existing or proposed use is “compatible” by evaluating its potential impact on refuge resources, insuring that the use supports the System mission, and does not materially interfere with or detract from the purpose for which the refuge was established.

Chincoteague National Wildlife Refuge is one of the most heavily visited refuges in the national system. Visitors come to Chincoteague for a variety of reasons. Many come in the summer months to access the beach. The beaches of Assateague Island offer a unique experience in the mid-Atlantic area as they exist primarily in an undeveloped setting unlike other beaches like Virginia Beach or Ocean City Maryland that are heavily developed. This natural setting draws many families seeking out a more traditional beach going experience.

Many summer beach visitors also take time to enjoy the wildlife found on the Refuge as they pass through on their way to or from the beach. While the Refuge is famous for its Chincoteague ponies, which families delight in watching, visitors will also see many different types of migratory birds and waterfowl, and animals thus exposing them to other types of wildlife that they may not normally see on a more traditional beach visit and hopefully leaving the visitor with a greater appreciation of the importance of conservation and the ability to participate and enjoy low-impact activities.

During the fall and spring seasons the many visitors come to the beach for surf fishing opportunities. In the fall, the Refuge opens up lower part of the beach from the southern-most parking lot to Toms Cove Hook to off-road vehicles. While some of these users are primarily engaged in wildlife watching, traditionally, most users are engaged in surf fishing activities.

The fall is also prime time for waterfowl hunting. Chincoteague NWR allows the hunting of waterfowl during the State season. Hunters must obtain a Migratory Game Bird Hunting permit from the Refuge for five dollars in order to hunt on the Refuge. Hunters must also possess valid State permits as well as a

federal Migratory Duck Stamp in order to hunt waterfowl. During the hunting season, hunters may target ducks, geese, swans, coots, and rails. The Refuge allows hunting during the days of Thursday, Fridays, and Saturdays. The Refuge allows hunting only within the designated areas of Wildcat Marsh, Morris Island, Assawoman Island, and Metompkin Islands. The harvesting of waterfowl on the Refuge is conducted in an environmentally friendly and sustainable manner, helping to ensure that the resources will be available to future generations for their enjoyment.

There is also limited big game hunting on the Refuge for Sika and White-tailed deer. Hunting occurs during the months of December and January. Hunting on the Refuge is controlled through a lottery process. Once selected by the lottery system, hunters must attend a firearms orientation session prior to hunting on the Refuge. The Refuge is divided into eleven primary hunting zones, with a few of those zones that are located closer to developed portions of the Refuge for use by mobility-impaired hunters.

4.1. Chincoteague NWR Visitor Use

Table 20 shows Chincoteague NWR visitor use for 2010. A “visitor” is one person visiting the Refuge for all or part of one day. “Visits” are the number of activities a visitor engages in; for example, a person who goes bird watching and engages in nature photography is counted as two visits. Most of the activities on the Refuge are wildlife observation, hiking, nature walks, photography and beach use. Table 21 shows the number of Refuge visitors for the months June through August from 2005 to 2010. Well over half of total annual visitation occurs during these three months, ranging from 55 percent in 2010 to 58 percent in 2005.

Beach use is an important component of Chincoteague NWR visitor use. Table 22 shows one measure of visitor use (traffic counts) measured at the National Park Service visitor center near the beach. While most of the beach use occurs from June through August, a considerable amount of use occurs before and after this period, ranging from about 40 to 45 percent of total annual use. Figure 6 shows a graph of the traffic count for the months June through August for the years 1997 to 2011 as well as the total annual traffic count for the same years. On average, the Refuge receives 56 percent of its total visitors during the summer season.

Several times during the summer, the beach parking lot is filled to capacity and closes.

Parking lot closures:	2007- 8
	2008 - 4
	2009 - 12
	2010 – 5
	2011 – 8
	2012 - 1

Table 20
Chincoteague NWR 2010 Visitation

Total number of visitors		1,359,553
Visits¹	Special events on site	8,568
	Visitor Center or Contact Station	364,568
	Upland game hunt	0
	Big game hunt	2,097
	Total hunting	2,304
	Fishing	129,885
	Foot Trail/Pedestrian	1,019,664
	Auto Tour	1,359,553
	Boat Trail/Launches	0
	Bicycle	352,740
	Wildlife Observation	2,731,957
	Photography	815,731
	Environmental education programs.	8,948
	Interpretation participants in on- and off-site talks/programs	60,226
Other recreation	2,719,106	

¹ The term "visits" represents the number of activities a visitor participated in during their visit to the refuge.
Source: USFWS 2011

Table 21
Chincoteague National Wildlife Refuge: June - August and Annual Visitors, 2005 – 2010

Month	2005	2006	2007	2008	2009	2010
June	181,724	162,293	172,760	145,904	162,572	160,581
July	375,862	307,132	297,697	291,281	314,110	304,248
August	289,398	311,846	317,484	311,367	328,783	282,916
3 month total	846,984	781,271	787,941	748,552	805,465	747,745
Annual Total	1,454,371	1,401,862	1,386,842	1,296,285	1,400,254	1,359,553
June - August total as % of annual total	58.2 %	55.7 %	56.8 %	57.7 %	57.5 %	55.0 %

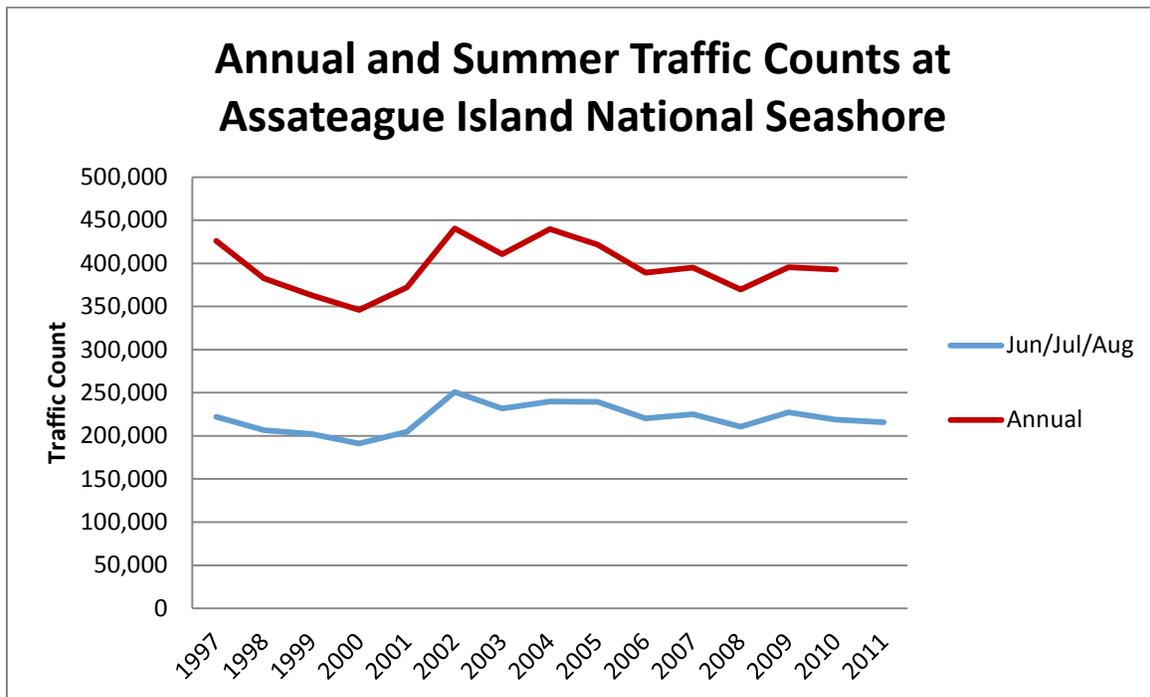
Source: USFWS 2011

Table 22
Assateague Island National Seashore: Traffic Counts At Chincoteague NWR
July - August and Annual Counts

Year	JUN	JUL	AUG	Total	Annual
1997	56,005	76,957	89,035	221,997	426,162
1998	45,160	81,378	80,021	206,559	382,650
1999	42,140	78,541	81,349	202,030	363,118
2000	44,041	77,717	69,399	191,157	346,181
2001	47,166	82,783	74,797	204,746	372,385
2002	63,893	94,053	93,011	250,957	440,341
2003	49,836	86,568	95,346	231,750	410,768
2004	48,391	108,164	83,179	239,734	439,679
2005	51,765	106,164	81,358	239,287	421,819
2006	45,999	86,357	87,827	220,183	389,107
2007	49,105	86,638	89,452	225,195	395,067
2008	41,136	81,789	87,689	210,614	369,548
2009	46,082	88,368	92,708	227,158	395,648
2010	45,821	91,884	81,155	218,860	392,804
2011	51,765	91,987	72,038	215,790	na

Source: National Park Service 2011

Figure 6



Source: U.S. Fish and Wildlife Service, Chincoteague National Wildlife Refuge.

4.2. Economic Impact of Refuge Visitation

Spending associated with recreational use of the Refuge can generate a substantial amount of economic activity in both local and regional economies. Refuge visitors spend money on a wide variety of goods and services. Trip-related expenditures may include expenses for food, lodging and transportation. Anglers, hunters, boaters and wildlife watchers also buy equipment and supplies for their particular activity. Because this spending directly affects towns and communities where these purchases are made, recreational visitation can have a significant impact on local economies, especially in small towns and rural areas. These direct expenditures are only part of the total picture, however. Businesses and industries that supply the local retailers where the purchases are made also benefit from recreation spending. For example, a family may decide to purchase a set of fishing rods for an upcoming vacation. Part of the total purchase price will go to the local retailer, say a sporting goods store. The sporting goods store in turn pays a wholesaler who in turn pays the manufacturer of the rods. The manufacturer then spends a portion of this income to cover manufacturing expenses. In this fashion, each dollar of local retail expenditures can affect a variety of businesses at the local, regional and national level. Consequently, consumer spending associated with Refuge recreation can have a significant impact on economic activity, employment, household earnings and local, state and Federal tax revenue.

Ideally, information would be available on Refuge-specific expenditures, how much visitors spend and what they spend it on, and where they spend it. This information is not currently available, consequently in order to derive quantitative estimates of Refuge recreation impacts on Chincoteague and Accomack County, a number of assumptions will have to be made. While any estimates based on these assumptions will lack the precision of estimates based on site-specific information, these estimates may work as reasonable, reconnaissance-level estimates.

4.2.1. Major assumptions

Several assumptions are used to enable estimates of the economic impact of Refuge visitation.

1. The estimate of Refuge visitors is essentially “visitor days”, in the sense that a visitor is one person on the Refuge for at least part of one day. A visitor who spends two days visiting the Refuge counts as two visitors.
2. Refuge-specific spending information is not available. Regional spending averages are available from the National Survey of Fishing, Hunting and Wildlife-Associated Recreation (2007). Table 23 shows average per day per person expenditures based on survey information for Fish and Wildlife Service Region 5 Northeast Region (including Virginia). In the present context, local non-consumptive expenditures are expenditures by local residents for day trips to the Refuge; non-local non-consumptive expenditures are for visitors from out of the local area which include both day trips and overnight visits averaged together. It is assumed that these expenditures are reasonably reflective of actual expenditures for Refuge visitors.

Table 23
Average Per Person Per Day Expenditures: FWS Northeast Region

Sector	Local Non-consumptive Expenditures	Non-local Non-consumptive Expenditures
Lodging	\$3.19	\$26.18
Food/Drink	\$6.76	\$39.40
Transportation	\$7.54	\$24.06
Other Retail	\$1.58	\$1.98
Total	\$19.07	\$91.62
Source: USDOJ 2007		

- Information is not currently available as to where Refuge visitors make their purchases. While it reasonable to assume that Chincoteague receives a significant portion of these expenditures, it is not know precisely what portion is spent in Chincoteague. For example, a visitor from Norfolk Virginia south of the Refuge may spend some money in Norfolk, some in North Hampton County and some in Accomack County, including Chincoteague. All of these purchases are related to a Refuge visit, but the expenditures occur in up to four different areas.

To address this issue, information from previous area studies will be used to help determine the proportion of Refuge spending occurring in Chincoteague and Accomack County. A study on the economic impact of NASA Wallops Island Flight facility (Beacon 2011) estimates where visitors spend their money when visiting the facility. The report estimates that 45 percent of expenditures are in Accomack County, 45 percent in Worcester County to the north and 10 percent out of the area. In lieu of any other currently available information, it is assumed that these percentages are reasonably representative of where Refuge visitors spend their money.

- The economic model used to estimate economic impacts can only derive estimates at the county level or above. The model can estimate impacts for the combined counties of Accomack and Worcester, but information is not currently available to derive Chincoteague economic impacts using the model. Consequently, an alternative approach is used to derive Chincoteague impacts (discussed below).
- The use of 80 percent as the percentage of Chincoteague's tourist economy attributable to Refuge visitation may be too high; reliance on a range of percentages based on expert opinion may be more reasonable.

4.2.2. Economic Impacts Measures

The economic impact estimates of the Accomack -Worcester model is shown first. Economic impacts include expenditures (retail sales), economic output, jobs and job income and tax revenue. These are discussed below.

Total expenditures shows the total annual retail expenditures associated with recreational visits to the Refuge. Currently, it is not know where (geographically) exactly Refuge visitors spend money. This approach assumes that 100 percent of expenditures occur in the Accomack - Worcester County area.

Economic output (also known as *industrial output*) shows the total output generated by total recreation-related expenditures. Total output is the production value (alternatively, the value of all sales plus or minus inventory) of all output generated by recreation expenditures. Total output includes the direct, indirect and induced effects of these expenditures. Direct effects are simply the initial effects or impacts of spending money; for example, spending money in a grocery store for a fishing trip or purchasing ammunition or a pair of binoculars are examples of direct effects. The purchase of the ammunition by a sporting goods retailer from the manufacturer or the purchase of canned goods by a grocery from a food wholesaler would be examples of indirect effects. Finally, induced effects refer to the changes in production associated with changes in household income (and spending) caused by changes in employment related to both direct and indirect effects. More simply, people who are employed by the grocery, by the food wholesaler, and by the ammunition manufacturer spend their income on various goods and services which in turn generate a given level of output. The dollar value of this output is the induced effect of the initial (or direct) recreation expenditures⁷. The economic impact of a given level of expenditures depends, in part, on the degree of self-sufficiency of the area under consideration. For example, a county with a high degree of self-sufficiency (out-of-county imports are comparatively small) will generally have a higher level of impacts associated with a given level of expenditures than a county with significantly higher imports (a comparatively lower level of self-sufficiency). Consequently, the economic impacts of a given level of expenditures will generally be less for rural and other less economically integrated areas compared with other, more economically diverse areas or regions.

Jobs and job income include direct, indirect and induced effects in a manner similar to total industrial output. Employment includes both full and part-time jobs, with a job defined as one person working for at least part of the calendar year, whether one day or the entire year. Job income in the IMPLAN system consists of both employee compensation and proprietor income (MIG, Inc. 1999).

Tax revenues are shown for business taxes, income taxes, and a variety of taxes at the county, state and national level. Like output, employment and income, tax impacts include direct, indirect and induced tax effects of expenditures, output and job income.

Two types of information are needed to estimate the economic impacts of recreational visits to the refuge: (1) the amount of recreational use on the Refuge; and (2) expenditures associated with recreational visits to the Refuge. With this information, total recreation-related expenditures can be estimated. At the county level or above, these expenditures, in turn, can be used in conjunction with a county or regional economic model to estimate economic output, jobs, job income and tax impacts associated with these expenditures.

4.2.3. Accomack and Worcester Counties Economic Impacts

⁷ Technically, direct effects are production changes associated with the immediate effects of changes in final demand (in this case, changes in recreation expenditures); indirect effects are production changes in those industries directly affected by final demand; induced effects are changes in regional household spending patterns caused by changes in regional employment (generated from the direct and indirect effects) Taylor et al. 1993, Appendix E, p. E-1)

The basic approach to estimating retail expenditures is to multiply per person per day expenditures by the number of visitors (visitor days) to obtain total expenditures. Previously, Table 23 showed per person per day recreation expenditures by activity and by resident and non-resident for Region 5 (Department of the Interior et al. 2007). Table 20 showed recreation visits and participation by activity for the Refuge in 2010. Since the number of visitors to the Refuge is primarily based on car counts, and since there is no overnight visitation on the Refuge, the total number of visitors (minus environmental education participants) can be interpreted to reflect total number of visitor days (one person visiting the Refuge for at least part of one day). Using the above information, retail expenditures, economic output, jobs, job income and tax revenue can be estimated for the Accomack - Worcester County area.

Table 24 shows estimates of Refuge recreation-related expenditures, and associated economic output, jobs, job income and total (county, state and Federal) tax revenue. Total retail expenditures are estimated at \$113.8 million; economic output at \$150.3 million; jobs at 1,794, job income at \$48.6 million and total tax revenue of \$10.6 million.

Table 24
Chincoteague NWR: 2010 Visitor Recreation Expenditures Within Accomack and Worcester Counties
(Dollars in millions, adjusted for inflation to 2010 dollars)

	Residents	Non-Residents	Total
Retail Expenditures	\$2.9	\$110.9	\$113.8
Economic Output	\$3.8	\$146.5	\$150.3
Jobs	45	1,749	1,794
Job Income	\$1.2	\$47.4	\$48.6
Total Tax Revenue	\$0.6	\$10.0	\$10.6

Source: Estimates compiled by the Division of Economics, USWFS.

4.2.4. Town of Chincoteague Economic Impacts from Refuge Visitation

This section estimates the economic impacts that are specific to the Town of Chincoteague from Refuge visitation and related spending. Because the economic model used to estimate Accomack and Worcester County impacts cannot estimate impacts at the sub-county level, the following approach is adopted: First, this analysis estimates the amount of direct expenditures (in 2010 dollars) spent by refuge visitors from out of the area. Second, the analysis estimates how expenditures in the Town breakdown for lodging and food and other retail services. As a final step, the analysis estimates the number of jobs associated with these out of town expenditures.

Estimation of Total Spending by Refuge Visitors in the Town of Chincoteague

Step 1. Total non-resident refuge visitor expenditures in 2010 were estimated to be \$110.9 million (Table 24). Resident expenditures are not included in this calculation because it is likely that their expenditures for local goods and services such as food and gas would have occurred regardless of whether or not they visited the refuge.

Step 2. The Wallop Island Flight Facility study (section 3.3) estimated that 45 percent of visitor spending occurred in Accomack County. This analysis assumes that refuge visitor spending breaks down in the same manner. Based on this assumption 2010 refuge visitor expenditures in Accomack County are estimated to be \$49.9 million ($0.45 * \110.9).

Step 3. The Springsted report (Review of Revenues Received by Accomack County from the Town, Springsted Inc, 2010) estimated that about 85 percent of travel-related expenditures in Accomack County occurred in the Town of Chincoteague (Table 16). Based on this assumption, this analysis estimates that in 2010 refuge-related visitor expenditures in the Town were \$42.4 million ($0.85 * \49.9).

Estimation of Food and Lodging Expenditures by Refuge Visitors in the Town of Chincoteague

Step 1. Table 25 shows the lodging and prepared food excise tax collected by Chincoteague in 2010. The excise taxes for lodging and food are 3 and 4 percent respectively. Dividing the respective excise tax collected by the rate gives gross sales shows that total expenditures on lodging were \$20.1 million and \$12.2 million for prepared foods.

Table 25
2010 Chincoteague Lodging and Food Excise Tax Revenue and Estimated Gross Sales

	Excise Tax Revenue Collected	Gross Sales
Lodging	\$602,800	\$20.1 million
Prepared Food	\$487,100	\$12.2 million
Total	\$1,089,000	\$32.3 million

Source: Excise Tax Revenue obtained from the Town of Chincoteague (Jim confirm), Estimation of gross sales conducted by the Division of Economics.

Step 2. Information on the percentage of gross sales of lodging and prepared food attributable to Refuge-related spending is not currently available. Given the volume of visitors to the Refuge and associated visits to Chincoteague, an estimate of 80 percent will be used for estimating further impacts. Accordingly, the portion of lodging and prepared food gross sales attributable to Refuge visitation is estimated to be \$25.8 million ($0.8 * \32.3 million). By association, this implies that \$16.6 million in refuge-related visitor expenditures were associated with other types of retail expenditures, including groceries (\$42.4 million in total direct expenditures less \$25.8 million spent on lodging and prepared foods).

Step 3. Ideally, grocery expenditures would be included in a food and lodging estimate. To do this, this analysis estimates the number of jobs per \$1 million in expenditures for the prepared foods and accommodations sector and uses this ratio to estimate the amount of grocery sales based on the reported number of jobs in the grocery sector. Census reports that there were 454 jobs in the Accommodations and Food Service sector (NAICS 72, Table 8). Given that it was estimated that the total purchases in the Town for accommodations and prepared foods was \$32.3 million in 2010, it is estimated that 14.1 jobs are generated for each \$1 million in expenditures (454 divided by 32.3). The Virginia Employment Commission reports that there were 53 jobs in the grocery sector in 2010 (NAICS 4451), which by association implies that total sales were \$3.8 million (53 divided by 14.1).

Step 4. To estimate the amount of grocery sales (and associated jobs) related to refuge visitor expenditures, this analysis again assumes that 80 percent of grocery sales are related to refuge visitation. This implies that refuge visitors spent \$3.0 million on groceries.

Estimation of total jobs Associated with Refuge-Related Expenditures

Continuing with the job estimates, accommodation and food sectors accounted for 504 jobs in 2010. Using the 80 percent figure, 403 jobs are attributable to Refuge recreation visits. To estimate the number of jobs in other retail sectors, the 13.96 jobs per \$1 million in gross sales can be used. If other retail expenditures total \$13.6 million, then $13.6 * 13.96$ results in 190 jobs associated with retail sales other than lodging and food. Consequently, total Chincoteague jobs affected by Refuge visitor expenditures are estimated to be 593 (403 plus 190). Table 26 summarizes the expenditure and employment impacts of Refuge visitation.

Table 26
Summary of Refuge Visitor Expenditures and Associated Employment
in the Town of Chincoteague, 2010

Sectors	Direct Expenditures (millions)	Employment
Lodging and Food (including groceries)	\$28.8	403
All other retail sales	\$13.6	190
Total Impacts	\$42.4	593
Source: Data compiled by the Division of Economics, U.S. Fish and Wildlife Service, May 2012.		

A general check on the accuracy of these impacts compared with the Accomack -Worcester County model can be achieved by running the lodging and food gross sales in the Accomack -Worcester County model, using the 80 percent figure to adjust for Chincoteague's share of Refuge expenditures, and comparing the job estimates with the actual jobs. This comparison is shown in Table 27. The model underestimates jobs for both sectors, but the estimates appear to be reasonable ball park estimates given the data used in the analysis.

Table 27
Comparison of Model Estimated Jobs with Actual Jobs

Sector	Gross sales	Actual jobs	Model Estimated jobs
Lodging	\$20.1 million	248	211
Prepared Food	\$12.2 million	203	171

4.3 Proximity Effects of Refuge on Local Property Values

It has been well documented that the value of certain types of real property is positively affected by the proximity of open space. (cite standard open space studies). Typically, this value is directly related to the density of the property development along with the scarcity of open space. In other words, all things equal, one would expect that the open-space premium for a given house abutting dedicated open space in an urban area would be greater than for a similar house in a rural area. With this in mind, the U.S. Fish and Wildlife Service recently commissioned a study to determine specifically how National Wildlife Refuges affect real property values.

This study identified 93 Refuges in the Lower-48 States whose boundary was within two miles of the boundary of an urbanized area with a population greater than 50,000. The study used micro-level Census data that contained information on owner-assessed housing values and housing characteristics along with location to develop an economic model that after controlling for housing characteristics and other variables determined the effect Refuge proximity had on housing values. Results from the study found that homes located within 0.5 miles of a Refuge and within eight miles of an urban center are valued four percent to five percent higher in the Northeast region.

While Chincoteague National Wildlife Refuge and its surrounding s were not included in the study, it is nonetheless feasible that the protection that the Refuge provides to Assateague Island and seashore is reflected to a degree in nearby home values. Unfortunately, the results of the Refuge Proximity study are not directly transferable to the Town of Chincoteague because the Town fails to meet the criteria that the study used to define urban areas for the analysis. Nonetheless, given the earlier findings concerning the Town's economic dependence on tourism and given the fact that the Refuge draws so many visitors it is entirely reasonable to expect that the Refuge exerts some influence on real property values although it is difficult to reliably quantify this relationship at this time.

5.0. Chincoteague NWR Budget Expenditures

5.1. Refuge Expenditures

As shown in Table 28, Chincoteague NWR spends \$3.4 million in operations and maintenance each year. Forty-five percent of this funding is spent on salaries to employees who live in the area. Employee benefits for these people are paid to the Social Security administration, insurance companies and other entities outside the refuge area so \$397,700 in benefit amounts are not counted in local spending.

Table 28
Chincoteague NWR: Budget Expenditures for fiscal year 2009

	Dollars	Percent
<i>Local Expenditures</i>		
Personnel Compensation	\$1,507,699	44.8%
Transportation of People	\$4,206	0.1%
Transportation of Things	\$4,962	0.1%
Communications	\$30,769	0.9%
Utilities	\$43,304	1.3%
Contracts	\$115	0.0%
Building Repairs	\$1,196,301	35.5%
Equipment Maintenance	\$74,809	2.2%
Supplies and Materials	\$296,760	8.8%
Motor Vehicle Fuel	\$37,571	1.1%
Equipment-Capitalized	\$48,111	1.4%
Equipment-Non-capitalized	\$123,806	3.7%
Local Sub-Total	\$3,368,415	100.0%
<i>Non-Local Expenditures</i>		<i>Non-Local Expenditures</i>
Employee Benefits	\$ 397,735	Employee Benefits
Air Travel	\$29,040	Air Travel
<i>Non-Expense Item</i>		<i>Non-Expense Item</i>
Real Property	\$ 20,325	Real Property
Grants	\$ 909	Grants
Organization Total	\$ 3,816,424	

Changes in the value of real property do not necessarily lead to local economic activity. Purchases of land, for example, are best understood as a change in the form of assets rather than expenditures. Therefore, these expenditures are not considered to benefit the local economy. Similarly, grants for research efforts at refuges often go to nearby research institutions to study significant wildlife issues. Although some of this funding may return to the local economy as researchers work in the area a significant portion may leave the immediate area, particularly if the recipients work off-site (e.g., research grants to a State university) and so grant funding is not counted as local spending in this study.

Refuge spending in the local economy paid for both locally produced items and things imported into the region for sale. So all of the expenditures did not result in increased local output. Table 29 shows \$2.7 million had a direct effect on local output. Typical purchasing patterns for households and industries in the region suggest the remaining spending flowed to suppliers outside the area. About \$663,900 became compensation for local workers in 36.3 jobs. The iteration of refuge spending through the local economy generated \$3.5 million in total output and 44.4 jobs.

Table 29
Chincoteague NWR: Economic Impacts of Refuge Budget Expenditures

Sector	Output (\$ 2010)		Employee Compensation (\$ 2010)		Employment (Number of Jobs)	
	Direct	Total	Direct	Total	Direct	Total
Agriculture	2,100	4,900	100	400	0.0	0.0
Utilities	56,500	78,900	8,400	11,600	0.1	0.1
Construction	100	19,200	0	4,900	0.0	0.2
Manufacturing	126,800	142,100	33,600	36,200	0.7	0.8
Trade	283,600	390,500	90,200	125,900	4.1	5.7
Transportation	7,700	14,000	2,400	4,300	0.1	0.2
Information	29,300	75,800	4,300	11,600	0.1	0.2
Finance	253,500	539,500	12,900	40,900	0.5	1.7
Lodging	99,000	176,700	30,100	53,900	1.5	2.7
Government	22,400	49,500	8,000	17,800	0.1	0.3
Other	1,789,800	2,042,800	473,900	566,600	29.2	32.5
Total	2,670,800	3,533,900	663,900	873,900	36.3	44.4
Multipliers		1.32		1.32		1.22

Most of the increased output and employment occurs in the Finance, Trade, and Other Services industries. The Other sector includes upkeep for buildings and payments for planning services. Much of what employees buy locally falls into the trade and finance categories so these sectors appear to have very large multipliers. Chincoteague's economy is highly seasonal so earnings by seasonal laborers may not be spent within the region but returned to the workers' distant place of residence. This may help explain the high leakage and low multipliers.

5.2. Refuge Revenue Sharing and Payments in Lieu of Taxes

Chincoteague contains 13,433 acres of fee lands that were appraised at \$42.3 million in FY2008. The refuge revenue sharing fund paid \$72,938 to Accomack County, Virginia, \$6,360 to Chincoteague, and \$6,099 to Worcester County, Maryland in fiscal year 2010. The refuge earned no funds for refuge revenue sharing. None of Chincoteague's lands were reserved from the public domain so PILT payments were not made for this refuge.

6.0 Alternatives Analysis

6.1 Alternative A: No Action

Alternative A is the No Action Alternative. It assumes that the Refuge will lose a significant number of beach parking spaces over the next 15 years. Losses are expected to occur because of the projected intensity and frequency of coastal storm and sea-level rise. Whether or not the U.S. National Park Service (NPS) will continue to be successful in obtaining repair/replacement funds for the parking lots is unknown. The Fish and Wildlife Service (Service) recently asked the U.S. Army Corp of Engineers for a cost proposal for beach re-nourishment activities to replace some of the recreational beach in front of the parking lots that has eroded over time. Beach re-nourishment would entail activities that would build up the beaches using dredge and fill technology. A recent cost estimate provided by the U.S. Army Corp of Engineers found that the total project cost for the first, initial phase of beach re-nourishment would be over \$24 million with an additional cost of \$8 million for every re-nourishment cycle, which could take place every three to seven years.

Under Alternative A, the Service is not able to accurately predict the availability of parking spaces over the next 15 years, the planning period for this CCP. Climate Change and the corresponding rise in sea levels, coupled with strong coastal storms, will likely continue to significantly damage existing beach parking areas ultimately requiring the complete rebuild of the 961 parking spaces/parking lots. Also, it is impossible to predict if a sufficient land base will remain so as to allow the rebuilding of the parking lots or that sufficient funding will be available to complete this task.

In conjunction with the NPS, the Service has surveyed the current recreational beach area and have determined that the land base directly behind parking lots 1 and 2 will likely have sufficient area to provide for 400 parking spaces over the 15 year planning period covered by this CCP but they will require constant rebuilds as strong coastal storms will erode and/or wash them away. These lots lie immediately north and south of Beach Road.

However, the fates of parking lots 3 and 4, which represent the southernmost parking areas, are less certain. These lots have a combined current capacity of 561 parking spaces and it can be projected that the land base for these parking lots may be partially or fully lost over time.

For the purposes of this analysis, the effect of losing these lots and the potential corresponding impact to visitation will be compared directly to the base year of the analysis without adjustment. This is done because the Service and NPS are unable to reliably predict at what point in the future period the parking lot spaces would be lost. The Services are also unable to predict whether the parking lot losses would all occur due to a single storm event or whether they would be lost incrementally over a period of years. Finally, the Service anticipates that it would take several years to identify alternative parking on-site or off-site and to develop a shuttle system; it is furthermore assumed that not all visitors are likely to ride the shuttle. Thus, by simply comparing how a total loss of 561 parking lot spaces affects the local economy under the assumption that neither alternative parking nor transit will be provided the analysis of this alternative makes clear the local economy's relationship to beach tourism in its current form.

6.1.1 *Estimating the Number of Visits Affected*

Over the years, the Chincoteague National Wildlife Refuge has tracked the total number of vehicles entering the Refuge. As previously shown in Table 21, 57 percent of Refuge visits occur during the summer months of June, July, and August. Using 2009 as a base year, Table 30 shows both the total number of vehicles entering the Refuge as well as the calculated daily average for the traditional summer beach season (Memorial Day weekend through Labor Day weekend). While a few data gaps exist due to equipment malfunction (data was collected via a pneumatic vehicle traffic counter) the data show the average daily number of vehicles entering the Refuge to be 1,505 in June, 2,881 in July, and 2,542 in August. On Memorial Day weekend the average number of vehicles entering the Refuge is 2,186 and on Labor Day weekend the average number of vehicles entering the Refuge is 2,843.

Not all vehicles entering the Refuge head to the beach parking area. Because the traffic counter was located at the main entrance to the Refuge it counted vehicle visits associated with other trip purposes. Along with visitors in vehicles intending to drive and park at the beach parking lot, it also includes vehicles crossing into the Refuge for other activities such as hiking, wildlife photography and/or observation. Visitors heading only to the visitor center and/or the lighthouse are also included in the count. Nonetheless, because it is likely that the vast majority of vehicles entering the Refuge during this time of year are associated with beach visits, this analysis does not attempt to make any adjustments to the summer count for non-recreational beach visits.

Given that current beach parking is limited to 961 spaces, it would appear that based on the average daily number of vehicles entering the Refuge that the parking lot would be full every single day during the summer months. This is not the case, however. In fact, since 2009, the parking lot has only been closed 24 times. Closures typically occur during mid-day as early arrivers start heading out but not necessarily before the arrival of afternoon beach visitors. According to a survey conducted by the NPS for Assateague Island National Seashore, beach visitors typically spend 4 hours at the beach.⁸ Thus, while the data show that there are twice or more as many vehicles entering the Refuge as there are beach parking spaces, parking has been more or less ample for the majority of the visitors for the majority of the time as each parking lot space can potentially hold two or more vehicle visits per day.

⁸ Assateague Island National Seashore Visitor Survey Report, p. 30.

Table 30
Total and Daily Average Vehicle Counts Entering Chincoteague NWR, 2009 – 2012

Year	Memorial Day Weekend		June		July		August		Labor Day Weekend	
	Total	Daily Avg	Total	Daily Avg	Total	Daily Avg	Total	Daily Avg	Total	Daily Avg
2009	7,016	2,339	39,732	1,324	88,033	2,840	86,742	2,798	7,968	2,656
2010	3,799	1,266	n/a	1,465	87,191	2,906	81,155	2,618	9,273	3,091
2011	5,852	1,951	51,767	1,726	91,987	2,967	72,058	2,324	8,349	2,783
2012	9,569	3,190	n/a	n/a	87,073	2,809	75,211	2,426	n/a	n/a
	Avg:	2,186	Avg:	1,505	Avg:	2,881	Avg:	2,542	Avg:	2,843

Source: Chincoteague National Wildlife Refuge, US FWS. September 2012.

While 961 parking spaces appears to be ample to handle the majority of beach parking demand under baseline conditions the Refuge anticipates that the land base will only support the maintaining of 400 parking lot spaces under Alternative A. These spaces are located in Parking Lots 1 and 2, which the Refuge and NPS have identified as most likely to be reclaimable/restorable (if funding is available) given likely future erosion scenarios. This analysis assumes that the demand for vehicle access to the beach will remain relatively constant during the period of analysis. This assumption is based on the analysis of seasonal and annual total counts found in Table 22. Thus, this analysis assumes that 1,505 vehicle per day in June, 2,881 vehicles per day in July, and 2,542 vehicles per day in August will on average attempt to access the beach and parking during future years of this CCP. During the Memorial Day weekend this analysis assumes that the daily average number of cars entering the Refuge will be 2,186 and for Labor Day weekend 2,843 vehicles.

While the number of parking lots may be reduced by 58 percent, the total number of vehicles restricted from beach parking may be less because some of these vehicles enter either in the early morning hours and exit before the mid-day surge or arrive later in the evening at the end of the day. Nonetheless, the expected effect of losing 58 percent of parking spaces would be a significant increase in both the number and length of parking lot closures. Unfortunately, because the Service does not have any information or data pertaining to how often there are 400 or more parking spaces occupied at any given time, this analysis must again make a series of assumptions to estimate the effect on parking space demand.

6.1.2 Estimating the Upper-bound Impact of the Loss of 561 parking lots

This analysis makes a series of relatively conservative assumptions in order to avoid understating the economic impact associated with the loss of 561 parking lots. Although the Assateague Survey found that the average vehicle visit lasted approximately four hours, it follows that some visits lasted longer and others for a shorter period. Unfortunately, the Services do not have any data or information on how many parking lot spaces are occupied at any given time during the summer months. The only information that is collected is when 961 spaces are occupied at which time the Services must turn back visiting vehicles.

At the very extreme, it is feasible that the first 400 vehicles parking at the beach parking lot elect to spend the entire day at the beach thus preventing all other vehicles with occupants targeting the beach parking lot from obtaining access during the day. For the purposes of this analysis, the beach day is defined as the prime hours to be on the beach, which is between the hours of 10:00 am and 5:00 pm. While this scenario is highly unlikely, particularly for every single day of the summer season, this analysis will adopt this assumption in order to estimate an upper-bound estimate of potential economic impacts to the community. This assumption is reasonable because while it is known from the beach closure data along with the Assateague Survey that there are essentially two waves of visitation during the day, a morning wave and an afternoon wave, it is not known whether or not 400 total spaces could adequately handle the visitation shifts and associated overlaps. What is only known is that over the past several years, the beach parking lot consisting of 961 spaces has only experienced closures 24 times and that the closures involved mid-day periods that for the most part lasted only an hour or two. This data is shown in Table 31.

Table 31
Closure Dates and Times for Chincoteague NWR Beach

Year	Date	Time Full	Total Hours
2009	7/03/09	11:30am - 3:00 pm	3.5
	7/04/09	11:00am - 2:45pm	3.8
	7/11/09	1:10pm - 3:05pm	2.0
	7/19/09	no time given	2.0
	7/25/09	12:00pm - 1:30pm	1.5
	8/02/09	1:30pm - 2:30 pm	1.0
	8/03/09	1:00 pm - 2:00 pm	1.0
	8/04/09	1:30 pm - 2:30 pm	1.0
	8/07/09	12:00 pm - 2:30 pm	2.5
	8/08/09	no time given	2.0
	8/09/09	no time given	2.0
	9/05/09	12:30 pm - 2:45 pm	2.3
2010	7/03/10	12:00 pm - 2:10 pm	2.0
	7/04/10	11:20 pm - 2:15 pm	3.0
	8/07/10	12:50 pm - 3:10 pm	2.5
	8/14/10	12:15 pm - 2:30 pm	2.3
	Labor Day	no time given	no time given
2011	7/02/11	11:40 am - 2:30 pm	3.0
	7/04/11	11:30 am - 12:45 pm	1.3
	7/16/11	12:45 pm - 2:35 pm	2.0
	8/06/11	1:30 pm - 3:30 pm	2.0
	9/03/11	10:30 am - 3:30 pm	5.0
	9/04/11	9:30 am - 5:00 pm	7.5
	9/05/11	10:45 am - 12:30 pm	2.0
	9/10/11	11:30 am - 1:15 pm	1.8
2012	8/8/2012	12:20 pm - 1:30 pm	1.0

Source: Chincoteague National Wildlife Refuge, US FWS. September 2012.

Notes: As a result of Hurricane Irene, parking was reduced to approximately 350 spaces for Labor Day Weekend 2011.

This analysis does make one adjustment to the total number of vehicles entering the Refuge to account for the fact that not all vehicles entering the Refuge during the day enter in order to spend the entire day parked at the beach parking lot. Because data is unavailable pertaining to the time that vehicles enter the Refuge and because the Refuge is open from dawn through dusk this analysis assumes that ten percent of the vehicles entering the Refuge arrive in the very early morning hours and that another ten percent arrive in the evening hours. This assumption is not unreasonable because it is commonly observed to see vehicles enter in the early morning to either watch the sun rise over the water, to fish before it becomes too light, or to observe wildlife before the heat of the day arrives. It is also very common to observe vehicles entering the Refuge in the evening hours to watch the sunset, fish, and/or observe wildlife.

Table 32, shows how the total number of vehicles, on average, would be affected through a reduction in the number of parking lot spaces at the Refuge beach. The percent of vehicle trips associated with full day recreational-beach use that would be affected under this scenario range from 82 percent to 67 percent.

Table 32
Estimated Number of Daily Vehicles Denied Access to Chincoteague NWR
400 Space Parking Limit

Month	Avg Daily Visits	Avg Daily Visits During Peak Hrs	Parking Available	Assumed Length of Stay (hrs)	Vehicles Denied Access	Pct of Day-long Beach Use Visits Affected
Memorial Day weekend	2,186	1,749	400	8	1,349	0.77
June	1,505	1,204	400	8	804	0.67
July	2,881	2,304	400	8	1,904	0.83
August	2,542	2,033	400	8	1,633	0.80
Labor Day weekend	2,843	2,275	400	8	1,875	0.82

Notes: Assumes ten percent of average daily visits occur in early morning hours and that another ten percent occur in evening hours. Also assumes that remainder of vehicles cannot access beach or parking lot once first 400 vehicles park for remainder of beach day.

Table 33 shows the estimated impact to the economy associated with a loss of vehicle visits to the Refuge due to a reduction of 561 parking spaces from a baseline of 961. It is estimated that during a typical summer season, the economic impact to the region in terms of a loss of direct expenditures from tourists would be \$38.4 million. This estimate is based on the assumption that visitors who cannot access the parking lot spaces during peak beach visiting hours would elect not to travel to the region at all (i.e., Accomack and Worcester Counties). In reality, some visitors may elect to stay in the area but either travel for the day up to Assateague Island National Seashore or Ocean City, down to the Norfolk area, or even elect to stay in Town for its various other tourist-related amenities, including shopping, recreational charter fishing, bike riding, etc., so the impact may be less. Nonetheless, the estimated impact to the baseline estimate of direct regional expenditures for the year (\$113.8 million) is nearly 34 percent of the annual total.

Table 33

**Estimated Economic Impact Associated with Loss of 561 Parking Spaces
Summertime Visits, Memorial Day weekend through Labor Day weekend
Accomack and Worcester Counties**

Month	Daily Vehicles Denied Access	Associated Number of Daily Visitors Affected	Economic Impact Per Day	Economic Impact per Month/Holiday Weekend
Memorial Day weekend	1,349	4,317	\$ 361,073	\$ 1,083,219
June	804	2,573	\$ 215,185	\$ 6,455,560
July	1,904	6,094	\$ 509,720	\$ 15,801,328
August	1,633	5,227	\$ 437,155	\$ 13,551,794
Labor Day weekend	1,875	5,999	\$ 501,748	\$ 1,505,243
Total			\$ 2,024,881	\$ 38,397,143

6.2 Alternative C

Alternative C considers a number of management changes to the refuge. Changes that could negatively affect visitation include:

- Reduce beach parking to 480 spaces
- Closing the service road to walkers/hikers
- Closing Beach Road causeway and Toms Hook to public access
- Eliminating off-road vehicle use
- Eliminating horseback riding.

While all of the above mentioned changes could negatively affect visitation, Alternative C also includes some changes that could serve to either mitigate the negative impacts to visitation or that would serve to increase visitation associated with other types of recreational activities on the refuge. Management changes under Alternative C that could positively affect visitation or serve to mitigate some of the negative impacts include:

- Instituting a shuttle bus system to allow visitors to access the refuge from remote sites
- Implementing a non-migratory goose hunting season
- Implementing light goose hunting
- Implementing fox and raccoon hunting

- Implementing fur bearer trapping

Of all these proposed changes to the management of the refuge, the most notable in terms of affecting visitation would be the loss of 481 parking spaces, which would primarily affect beach use activities during the busy summer season. This change would affect one-half of the current number of spaces, leaving a remaining 480 spaces. With partners, the refuge would pursue identification of off-site parking and institution of a shuttle system, but as for Alternative A, the timeline and ridership for such a service are unknown. Thus, following the same logic used to estimate the impacts under Alternative A, the loss of 481 parking spaces would result in a total economic impact of \$36.3 million in terms of reduced expenditures by visitors. This translates to a 32 percent reduction from current baseline expenditures of \$113.8 million that affect both Accomack and Worcester Counties. Table 34 shows the breakout of impacts for the summer season.

Table 34
Estimated Economic Impact Associated with Loss of 481 Parking Spaces
Summertime Visits, Memorial Day weekend through Labor Day weekend
Accomack and Worcester Counties

Month	Daily Vehicles Denied Access	Associated Number of Daily Visitors Affected	Economic Impact Per Day	Economic Impact per Month/Holiday Weekend
Memorial Day weekend	1,269	4,061	\$ 339,661	\$ 1,018,983
June	724	2,317	\$ 193,774	\$ 5,813,208
July	1,824	5,838	\$ 488,309	\$ 15,137,565
August	1,553	4,971	\$ 415,743	\$ 12,888,031
Labor Day weekend	1,795	5,743	\$ 480,336	\$ 1,441,008
Total				\$ 36,298,795

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