

Chapter 5 Human Environment



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Chapter 5. Human Environment

5.1 Cultural Resources

5.1.1 Native American Cultural Landscape

For thousands of years, people living on the Oregon coast relied upon resources obtained from estuaries (Minor and Toepel 1983, Draper 1988, Ross 1990, Lyman 1991 as cited in Byram 2002). Fish, shellfish, terrestrial and marine mammals, avian species, and edible plants all provided the means for sustenance. With its dense food value and predictable runs, salmon in particular were of high value. This is reflected in the ethnographic accounts and archaeological evidence. Major river drainages are known to have been well populated and have many major archaeological sites. However, smaller estuaries without a major stream to support a strong salmon run had smaller populations and fewer major archaeological sites.

The concentration of preferred resources in the productive interface of ocean and land led to numerous stable and distinct groups of Native people on the Oregon coast. These are recorded in early written records and later ethnographic studies. Each estuary and bay was associated with a unique group which broadly shared the same cultural habits, beliefs, and sometimes language with other coastal groups.

Nestucca Bay National Wildlife Refuge

Nestucca Bay National Wildlife Refuge (NWR or Refuge) is located within the traditional territory of the Nestucca-dialect speaking people of the Tillamooks or Killmooks. This larger tribe consisted of the Salish-speaking people generally located west of the Coast Range and along the coast from Tillamook Head to 10 or 20 miles south of Siletz Bay. The Tillamooks can be considered the southernmost full expression of the classic Northwest Coast Culture that extended north to British Columbia, Canada. For example, permanent homes, which varied slightly in shape and size through time, were commonly built of cedar logs and split planks. These cedar plank houses could be built totally above ground or partially buried into the terrain. The roof pattern, style of entry, and internal layout were of the Northwest Coast pattern.

The year was divided by procurement and religious ritual recognition of various resources. Along the estuary and on the outer coast, many food resources such as marine fish and shellfish were probably harvested throughout the year, but some of the most valued foods had to be harvested in quantities, processed, and stored when they were available. These included salmon, drift whales other sea mammals, starchy plants such as camas and fern roots, and elk. Weirs, nets, and other traps were common fish catching techniques; spearing and clubbing also occurred. Many products would be steam cooked in an earth oven or could be brought to a boil with hot stones dipped into a water-filled basket. Some food would be preserved through air drying or smoking on a rack.

In spring, various plants and marine fish became abundant, and the tides were low on the shore for shellfish harvests. Salmonberry sprouts were gathered beginning in April and harvested when ripe during May and June. In late spring and summer, anadromous fish would become available above tidewater, and groups would move to upriver camps to begin their harvests, and to gather and process plant foods such as camas. Salalberry, huckleberry and strawberry were harvested in July and August. When adequate stores were acquired, people had time to travel to inland valleys or north and

south along the coast for trade, gaming, and socializing. The Chinook salmon were caught in the runs of August and September, coho in October. During the fall, elk would be taken, and in November, chum salmon could be caught. Winter was a period of less outdoor work activity, when most village residents remained at home and relied largely on stored foods. Stories were told, dances were held, and tools, clothing, basketry, and other crafts and art were produced and maintained. Winter steelhead obtained between December and April brought the cycle back to spring.

Evidence of the above activities and items has been found along the coast. Shell middens or layers of shell, bone, charcoal and fire-cracked rocks that accumulate at occupation sites are common on the coast. Large quantities of fire-cracked rock with charcoal indicate a roasting pit location. Subtle ground depressions may indicate where a plank house stood. Although Nestucca Bay and the estuarine reaches of the Nestucca and Little Nestucca Rivers were prime locations for prehistoric Native American villages, to date no archaeological sites that may represent such villages have been recorded.

5.1.2 Post-settlement Overview

Nestucca Bay Unit

The first recorded European to enter the area was Arthur Black in 1828, who sheltered with the Tillamooks. The Donation Land Claims Act of 1850 and the Homestead Act of 1862 provided incentives that encouraged the settlement of the coastal lowlands and river valleys. Lands adjacent to the Nestucca River were first homesteaded in the mid to late 1800s. Fishing, logging, and eventually dairy farming, became the primary occupations in the Nestucca Valley. A commercial salmon cannery was established on the east side of Nestucca Bay in 1886; however, after a few good years the salmon became scarce and the cannery ceased operations and was dismantled. Demand for lumber began to increase in the late 1800s, and timber companies acquired land in the watershed. Through diking, installation of culverts and tide gates, removal of trees, and extensive ditching for drainage, dairies were established in the lower valleys.

Neskowin Marsh Unit

A Nestucca Indian encampment at the mouth of Neskowin Creek was reportedly abandoned before the time of the white settlers (Tillamook County 1999). Euro-American settlers first moved into the area along Neskowin Creek in the late 1870s. Early on, Neskowin became a campground and picnic area where families came for fun, relaxation and relief from the stresses of city life. A plat of the town of Neskowin was filed in 1910 and in the 1930s, beachgrass was planted in dune areas to make more land available for the development of building sites. Deed restrictions shaped the growing community into one of primarily single family residences and discouraged commercial development. The rich bottomlands along the major Neskowin drainage (i.e., Neskowin Creek, Hawk Creek, Butte Creek, and Meadow Creek) were all farmed. Old drainage ditches are still evident in the Butte and Meadow Creek wetlands areas. At one time, areas now within the Neskowin Marsh Unit along Meadow Creek were dry enough to pasture horses and cattle. Additionally, cranberry bogs were planted in this area during 1912-13; however, the plants failed to grow and the project was abandoned. It is believed that salt water from high tides killed the plants.

5.1.3 Archaeological Sites and Surveys

Within the approved boundary of the Nestucca Bay NWR, there are three recorded archaeological sites. There are three known archaeological sites within the vicinity of the Refuge but outside of the approved boundary (Tables 5-1 and 5-2).

Table 5-1. Known Archaeological Sites within or in the Vicinity of Nestucca Bay National Wildlife Refuge

Trinomial	Common Name	Type	Attributes	Within Approved Refuge Boundary
TI00028	Dodge’s Cabin	Prehistoric	Midden	Yes
TI00087	Burnt Ledge	Prehistoric	Roasting pit	Yes
Unrecorded	Village	Prehistoric	Ethnographic report	Yes
TI00024		Prehistoric	Midden	No
TI00025		Prehistoric	Midden	No
Unrecorded	Village	Prehistoric	Ethnographic report	No

Table 5-2. Archaeological Surveys within or in the Vicinity of Nestucca Bay National Wildlife Refuge

SHPO Number	Survey Title	Author	Within Approved Refuge Boundary
323	US 101-Green Timber Road	D.L. Cole	Yes
326	Waste Water Facilities	C.R. Swanson	Yes
631	Water Facilities Improvement	J.A. Follansbee	Yes
20382	Cannery Hill Overlook	A. Bourdeau	Yes
17568	Private House		Yes
18772	Straub Park OSMA 2003-7	G. Tassa	No
22230	Waste Water Line		No
16604	US 101		No

5.1.4 Threats to Cultural Resources

A variety of natural and human-caused activities can threaten cultural resources, including:

- Fire, both naturally occurring and prescribed for habitat restoration, can cause significant damage to historic structures and archaeological sites as can the activities to suppress and manage fire (such as creating fuel breaks, etc.)
- Erosion, whether the byproduct of fire, wind, waves or another natural or manmade agent
- Habitat restoration and other land management activities.
- Vandalism or “pot hunting”

Any activity identified in the CCP’s management direction (see Chapter 2), including wetland restoration, construction of new facilities, or changes in public use could have a potential impact to cultural resources. The greatest threats may be posed by earthmoving, removal of structures, or alteration of the current erosion patterns occurring during habitat restoration, construction, or other land management activities.

The Service is committed to protecting valuable evidence of plant, animal, and human interactions with each other and the landscape over time. These may include previously recorded or yet undocumented historic, cultural, archaeological, and paleontological resources as well as traditional cultural properties and the historic built environment. Protection of cultural resources is legally mandated under numerous Federal laws and regulations. Foremost among these are the National Historic Preservation Act (NHPA) as amended, the Antiquities Act, the Historic Sites Act, the Archaeological Resources Protection Act (ARPA) as amended, and the Native American Graves Protection and Repatriation Act (NAGPRA). The Service's Native American Policy (USFWS 1994) articulates the general principles guiding the Service's relationships with Tribal governments in the conservation of fish and wildlife resources. Additionally, the Refuge seeks to maintain a working relationship and consult on a regular basis with the Tribes that are or were traditionally tied to lands and waters within the Refuge.

5.2 Refuge Facilities

The infrastructure and facilities discussed in this section include boundary signs, public entrances, roads, trails, and administrative buildings. Facilities associated with specific public use programs are discussed in Section 5.5. All public and administrative facilities, with the exception of boundary signs, are depicted on the map located in Chapter 2.

5.2.1 Boundary Signs

To date, approximately 70% of the Refuge is posted with official refuge boundary signs. Boundary signs are located primarily where refuge lands are adjacent to roads, dikes, and privately owned agricultural fields. The perimeter areas that need to be posted include the north end of the Upton Slough Tract, the eastern portion of the Mecklem Tract, the Utter Tract, and the Lyda Tract. The western boundary of Brooten Marsh adjacent to state tidelands is also not posted due to lack of survey for exact placement as well as inhospitable terrain for posts. Approximately 60% of the Neskowin Marsh Unit has been posted with boundary signs or markers. The perimeter areas that need to be posted include the south end, the southeast and northwest corners, and the northeast line of the Neskowin Marsh Tract; and the west and north portion of the Sahhali Shores Tract.

5.2.2 Public Entrances, Roads, Launches, Access Points, and Parking

There is one official public entrance to Nestucca Bay NWR and it is located on the west side of U.S. Highway 101 on Christensen Road. The area accessed through this road is referred to as Cannery Hill and it is the only area where public use is currently allowed on the Refuge. There are two standard refuge entrance signs on Nestucca Bay NWR. Both signs are located on the west side of Highway 101 in refuge-managed pastures. One is at the entrance road (Christensen Road) to Cannery Hill and the other is approximately 2 miles north of Christensen Road in refuge pasture #1.

The 1-mile entrance road to Cannery Hill, Christensen Road, is paved for the first 0.4 mile while the remainder is graveled. There are two vehicle parking areas for the public on Cannery Hill and both have parking stalls that are accessible for people with disabilities. The paved lower parking lot has 10 parking spaces and a single vault restroom, which is maintained by refuge volunteers and staff. There are two solar-powered electronic gates on Christensen Road. The gate by the lower parking area opens at sunrise and closes at sunset to coincide with the open public use hours for this part of the Refuge. The second gate is adjacent to the upper parking lot and remains closed at all times to

prevent visitors from trespassing onto closed areas of the Refuge and onto neighboring private property. The paved upper parking lot contains five parking spaces.

The public can access the Little Nestucca River and Nestucca Bay by motorized or non-motorized boat during high tide via three public boat launches. One launch is located within Bob Straub State Park. The other two additional launches are managed by Tillamook County. One is located on Brooten Road just south of the entrance to Pacific City while the other one is sited on the south bank of the Little Nestucca River on Meda Loop Road and just east of Highway 101.

The Neskowin Marsh Unit is closed to public use thus there are no public entrances to the unit and the USFWS does not have a standard refuge entrance sign installed at Neskowin Marsh. The Refuge does maintain the Neskowin tsunami evacuation trail, though it is not accessible to wheelchairs. This is a trail located on an old roadbed that crosses the southern portion of the marsh and is maintained by the USFWS for use by local residents in order for them to escape during a tsunami.

5.2.3 Trails

Cannery Hill

There are two official wildlife observation and interpretation trails at Cannery Hill. Christensen Road/Trail is a 0.4-mile graveled trail that is not accessible to visitors with disabilities. It leads visitors from the lower parking lot to the upper parking lot through a matrix of forest including restored forest, mature coniferous forest, and a small patch of native hardwoods. The Pacific View Trail is paved, accessible to people with disabilities, 0.3 mile in length, and starts at the upper parking lot and leads to an elevated viewing deck perched atop Cannery Hill. The viewing deck affords visitors a sweeping view of the Pacific Ocean, Haystack Rock, Cape Kiwanda, Nestucca Bay, and the Coast Range.

Neskowin Marsh Unit

The “Neskowin Tsunami Evacuation Trail”, which traverses the south end of the marsh near the north end of the Neskowin Beach Golf Course, serves as one of only a few tsunami escape routes for residents living along Hawk Street in the low-lying community of Neskowin. The trail is located on a former roadbed that crossed the marsh and there is a small wooden footbridge that spans the marsh outlet channel. This trail would theoretically allow local residents in the nearby dunes to escape on foot to high ground in the Neskowin Crest area as well as foot passage to U.S. Highway 101. The tsunami evacuation trail is not open to the general public.

5.2.4 Administrative Buildings and Other Infrastructure

The Oregon Coastal Field Office is located on the campus of the Oregon State University, Hatfield Marine Science Center in Newport, OR and houses the Refuge Complex and the Newport Ecological Services Field Office. Management of Nestucca Bay NWR, as well as the other north coast refuges, is carried out from this office. The administrative facilities consist of a small interpretive display, a laboratory, an attached shop/garage, a conference room and office space for 8 permanent, two term, and four temporary employees.

The Refuge owns facilities at Cannery Hill. These facilities consist of a residence dating from 1951 and a maintenance shop built in 2000 and expanded in 2004. The residence has two bedrooms and

one bath and is set up for refuge staff or volunteer family living quarters. The house is in poor condition and is scheduled for replacement in 2014. The house is intermittently occupied by refuge volunteer(s). The Refuge also owns two dairy barns in fair condition on the Hagerty Tract.

The Refuge manages pastures for wintering goose forage. To manage these pastures, the Refuge maintains a system of levees, ditches, culverts, and tidegates. Part of the Nestucca Bay Unit pastures is slightly above the estuary water level and was tiled before becoming refuge; the remainder of the units is at estuary level or below, and could not be tiled since the water constantly percolates onto the Refuge. All the pastures are drained by open cross ditches that flow out into the bay through tidegates. Two refuge tidegates drain the northerly pastures.

5.3 Wildlife-dependent Public Uses

The National Wildlife Refuge System Improvement Act of 1997 defined six wildlife-dependent recreational uses (hunting, fishing, wildlife observation and photography, environmental education, and interpretation) and required that they receive priority consideration in refuge planning when they are compatible with the refuge mission.

Nestucca Bay NWR currently offers four of the six wildlife-dependent activities including wildlife observation and photography, environmental education, and interpretation. The Refuge was closed to all public use until October of 2008 when Cannery Hill was opened. Since then visitation has increased to approximately 77,000 visitors annually as people learn about public use opportunities through communication with refuge staff and volunteers, news articles, directional highway signage, a refuge website, Facebook, and general word-of-mouth within the local community. The Neskowin Marsh Unit of the Refuge is not open to the general public.

5.3.1 Hunting

There is currently no official hunting program on the Nestucca Bay NWR. The tidelands adjacent to the Refuge are owned and managed by the Oregon Department of State Lands and are legally open to hunting where some waterfowl hunting, managed by the Oregon Department of Fish and Wildlife, occurs.

5.3.2 Fishing and Clamming

There is currently no fishing program on Nestucca Bay NWR. Clamming takes place, under Oregon Department of Fish and Wildlife regulations, on state tidelands adjacent to refuge lands at two locations. The first location is the Little Nestucca River tideflats 0.5 mile west (downstream) from the Highway 101 Bridge. Some clambers have been reported trespassing through closed wildlife refuge pastures to access this area. The second area where clams and sand shrimp are harvested is the tide flat adjacent to Brooten Marsh. Access to this area is provided by a developed access point 0.3 mile east of Tract 12 and an undeveloped access point on the eastern edge of Tract 12. Some harvesting at this location may occur on the Refuge, but the south end of Tract 12 has not yet been surveyed and this refuge boundary is not posted.

5.3.3 Wildlife Observation and Photography

These two wildlife-dependent activities are popular on Cannery Hill. The Pacific View Trail, the Viewing Deck, and the lower parking lot at Cannery Hill are the some of the best locations for these two activities. The best season for viewing geese and other species of waterfowl on the Refuge is from November to March. This public use does not coincide with the peak of visitation primarily due to seasonal migration of waterfowl and geese, inclement weather, and a dearth of tourists in winter months. Another good time for wildlife viewing is during songbird migration in the spring. Lincoln City Audubon Society regularly offers guided bird walks that follow the existing Christensen Road/Trail and Pacific View Trail and coincide with the migration and nesting season for songbirds.

5.3.4 Environmental Education

The Refuge offers very few environmental education (EE) programs onsite at Nestucca Bay NWR. All EE programs are informal and led by refuge volunteers, interns, or staff. The Refuge conducts a citizen science program called Project NestWatch. NestWatch is a continent wide citizen science project and nest monitoring database of the Cornell Lab of Ornithology.

5.3.5 Interpretation

Nestucca Bay NWR is represented in a Refuge Complex general brochure that is stocked at the headquarters office and in the welcoming kiosk in the lower parking lot at Nestucca Bay NWR. The Refuge Complex also maintains a website (www.fws.gov/oregoncoast) where current information regarding the Refuge can be obtained at any time. The Refuge further involves the public through social media and maintains a Facebook account and a Flickr site.

Cannery Hill

The lower parking lot contains a welcoming kiosk that orients visitors to Nestucca Bay NWR. It contains information on the hiking trails, things for visitors to do, and the rules and regulations of the Refuge. Along the Pacific View Trail there are four interpretive panels that share the story of the diversity of wildlife habitats and wildlife found on the Refuge.

Also at Cannery Hill, there is a trail that follows the power line right-of-way corridor from Christensen Road to a refuge-maintained tide gate and dike. The trail is maintained by staff, volunteers, and the local power company. The trail is closed to public use due to the potential for disturbance of geese during fall and winter, as well as safety concerns resulting from frequently flooded conditions. Staff lead visitors down the trail during special wildlife observation events such as the Birding and Blues Festival in April. The trail goes through a variety of habitats and thus provides visitors with some of the best birdwatching opportunity on the Refuge.

During the summer, refuge staff and volunteers lead a series of events that provide opportunities for the public to learn more about the wildlife and habitats of Nestucca Bay. These events include nature photography, nature sculpture, guided bird walks, historical talks on the early settlers of the area and more. The Refuge is partnering with the Tillamook Estuaries Partnership to develop a water trail for the Nestucca and Little Nestucca Rivers. Water trails are defined boating routes on a waterway connected through signs, maps and access points providing a scenic and educational experience for recreational users.

The Birding and Blues Festival is an annual springtime event hosted by the community of Pacific City. The festival attracts from 150 to 300 visitors to the local area. The Service is one of the festival sponsors offering wildlife oriented presentations, workshops, and guided bird walks. The various festival events educate birders of all interest levels and ages. This festival promotes tourism in the area and informs visitors of the many outdoor activities available in the Pacific City area, including the Refuge.

5.4 Other Refuge Uses

5.4.1 Non-recreational Public Uses

Four private inholdings have easements to use Christensen Road to access their property. The Tillamook People's Utility District has an easement to access and maintain a power line that runs north through the Cannery Hill area. The Refuge is also part of the Little Nestucca Drainage District. On the Neskowin Marsh Unit, right-of-ways on record relate to the county maintained road and utilities (phone/electric) to serve public facilities. In addition, the Neskowin Regional Water District holds several easements for domestic water supply lines that cross the Neskowin Marsh Unit. Finally, the homeowners association for Sahhali Shores holds an easement on a trail that provides the homeowners with access to the beach from the development.

5.4.2 Economic Use

A total of 346 acres of refuge pastures are managed for wildlife habitat by five local dairy farmers through Cooperative Land Management Agreements. The vegetation in the pastures is kept short and actively growing for geese and waterfowl habitat throughout most of the year using various management practices including grazing, mowing and "greenchopping" (cutting silage for dairy cattle). Through this arrangement, wildlife receive 100% of the crop in the form of short, green browse available to foraging white-cheeked geese from November through April; and the cooperator also gets a share of the crop in the form of cattle forage and/or silage during the summer months when the geese are not present.

5.4.3 Illegal/Unauthorized Uses

Currently the Oregon Coast NWR Complex has one full-time Wildlife Law Enforcement (LE) Officer. LE assistance is also provided to the Refuge Complex by the Zone LE Officer (who is responsible for western Oregon and Washington) as well as Oregon State Police, the Tillamook County Sheriff's Office, Bureau of Land Management, and the U.S. Forest Service.

The Refuge deals with law enforcement (LE) issues that include wildlife disturbance, geocaching (when conducted in closed areas), illegal hunting, trespass, destruction of government property, illegal tree cutting and girdling, litter and pet related infractions.

5.5 Surrounding Area Outdoor Recreational Opportunities and Trends

5.5.1 Nearby Recreational Opportunities

Nestucca Bay NWR is nestled in between two small urban areas on the coast. Lincoln City is approximately 20 miles to the south and the city of Tillamook is 30 miles to the north. Local, state, and Federal governments have all developed recreational opportunities for both residents and visitors. The Lincoln City Department of Parks and Open Space collectively manages 11 parks with amenities that include picnic tables, boat ramps, walking trails, interpretive signs, beach access, and crabbing docks. They also manage nine open space properties that provide habitat for wildlife and a place for people to walk and enjoy nature. The City of Tillamook manages three city parks with facilities for the public to enjoy day use activities and they manage one interpretive trail.

Oregon Parks and Recreation Department (OPRD) manages nine state parks within a 40-mile radius of Nestucca Bay NWR. The U.S. Forest Service manages the Siuslaw National Forest, which has a total of seven hiking trails, three campgrounds and multiple day use areas for off-road vehicles in the vicinity of Nestucca Bay NWR. Other nearby popular recreation locations includes Cape Kiwanda State Natural Area, Clay Meyers State Natural Area at Whalen Island, and Cascade Head Nature Preserve.

There are waterfowl hunting opportunities in Tillamook County in Tillamook Bay, Nestucca Bay and Netarts Bay and on privately owned pasturelands (ODFW 2011b).

5.5.2 Outdoor Recreation Trends

OPRD is responsible for providing guidance, information and recommendations to Federal, state, and local units of government, as well as the private sector, in making policy and planning decisions regarding outdoor recreation in Oregon. They do this in the Statewide Comprehensive Outdoor Recreation Plan or SCORP (OPRD 2008). The latest SCORP is a five-year plan covering outdoor recreation in Oregon from 2008 through 2012.

The OPRD began the SCORP planning process in September 2005. The agency took a more proactive approach in addressing a limited number of previously identified and defined issues. Key findings from the 2003-2007 SCORP and the 2005-2014 statewide trails planning efforts identified a number of important demographic and social changes facing outdoor recreation providers in the coming years including: (1) a rapidly aging Oregon population, (2) fewer Oregon youth learning outdoor skills, and (3) an increasingly diverse Oregon population. Key findings for each of these issues are:

Aging Oregon Population

- On average across all activities, respondents expect to spend 28% more days recreating 10 years from now than they currently do.
- The most popular outdoor recreation activities for Oregonians between the ages of 42 and 80 included walking, picnicking, sightseeing, visiting historic sites, and ocean beach activities. A comparison across age categories for top five activities by participation intensity leads to the following conclusions: Walking is the top activity across all age categories (40-79);

jogging is a top activity between the ages of 40-59, but is also popular for those in their 70s; bicycling is a top activity between the ages of 40-64; sightseeing is a top activity between the ages of 45-74; bird watching is a top activity between the ages of 55-79; and RV/trailer camping is a top activity between the ages of 55-74.

- The top five activities in terms of future participation intensity 10 years from now included walking, bicycling, jogging, bird watching, and day hiking.
- Over one-third of Oregon Boomers and Pre-Boomers volunteered in their community, with an average time commitment of 5.3 hours per week. Of those who volunteered, 43% expect future changes in their volunteer activities, with most of the changes involving greater volunteerism: more time, more projects at current volunteer opportunities, and new volunteer opportunities.

Youth Learning Outdoor Skills

- The most popular outdoor activities for parents were walking, viewing natural features, and relaxing/hanging out. For children, the most popular were walking, followed by outdoor sports/games, relaxing/hanging out, and general play at neighborhood parks/playgrounds.
- The more a parent engages in an outdoor recreation activity, the more their child does. Participation varies across child age, with both the number of activities and the number of activity-days peaking amongst 12-14 year olds and decreasing for 15-17 year olds.
- Rural children spend more days, on average, in outdoor activities relative to urban and suburban children.
- Outdoor sports programs and day camps were the most popular types of outdoor recreation programs with respect to past participation. Many parents indicated that it would be very likely for their children to participate in outdoor sports programs (62%), multi-day camps (49%), outdoor adventure trips (45%), and day camps (45%) in the future.

An Increasingly Diverse Oregon Population

- Walking for pleasure was the most common favorite activity for both Hispanics and Asians, with fishing and soccer being the next most common for Hispanics and hiking and fishing the next most common for Asians.
- Both Hispanic and Asian respondents most commonly did their favorite activity with members of their immediate family. Asians were more likely than Hispanics to do activities alone, as were older respondents relative to younger respondents.
- The most common location for Hispanic and Asian respondents to do their favorite activity was in a park or other area outside one's town or city. Males were more likely than females to engage in their favorite activity further from home.
- Walking for pleasure was also the activity respondents spent the most days engaged in during the past year. Hispanics engage more intensely than Asians in jogging/running, day hiking, picnicking, fishing, viewing natural features, visiting nature centers, and visiting historic sites.
- The most common activities respondents would like to do more often, or start doing were walking for Asians and walking and camping for Hispanics. The factor that would most help make this happen is availability of partners, followed by more time.
- For the Hispanic population, being in the outdoors, relaxing and having fun were the most important motivators or reasons for participating in outdoor activities. For the Asian population, relaxing, fitness, and having fun were the top motivators.

A summary of management recommendations, that are relevant to the types of outdoor recreation that the Service is engaged in, resulting from the SCORP are as follows:

- Develop a statewide youth outdoor programming framework and funding source to focus youth programming efforts across Oregon to address a specific set of key measurable objectives.
- Create a new Outdoor Recreation Section within OPRD addressing the areas of outdoor recreation and environmental education.
- Develop a strategy to strengthen the role of park and recreation agencies in the state's Safe Routes to Schools grant program.
- Plan and develop regional trail systems in areas having highest relocation intensity in the 40 to 79 age range (Coastal, Southern and Central Oregon communities).
- Provide design assistance for innovative park designs connecting kids with nature.
- Encourage organizational cultural change within public recreation agencies/organizations to effectively address the diversity issue.
- Develop recommendations for addressing language barriers to encourage underrepresented population use of outdoor recreation facilities and programs
- Create a customer service training module related to serving the outdoor recreation needs of an increasingly diverse population.

5.6 Socioeconomics

5.6.1 Population and Area Economy

Oregon's population of approximately 3,825,700 ranks 27th in the nation. State land area covers 95,997 square miles compared to 3,537,438 square miles in the United States with a population density of 40 persons per square mile compared to 87 nationwide.

Table 5-3 shows the local population and area economy. The county population increased 2 percent from 1999 to 2009, compared with an 11 percent increase for the State of Oregon and a 10 percent increase for the U.S. as a whole. Tillamook County employment increased by 9 percent from 1999 to 2009, slightly outpacing Oregon and the United States. Per capita income in Tillamook County increased by 9 percent over the 1999-2009 period, while the State of Oregon and the U.S. increased by 4 and 9 percent respectively.

The largest industry sectors for Tillamook County are ranked below by employment (Table 5-4). The largest employer is the State and local government. Natural resource-based industries (logging and sawmills) totaled 758 jobs while the dairy and cheese industries supported 1,184 jobs. Food services and retail stores, which are impacted by refuge visitation, are also important contributors to the economy (1,476 jobs).

Table 5-3. Nestucca Bay NWR: Summary of Area Economy, 2009 (population and employment in thousands; per capita income in 2010 dollars)

	Population		Employment		Per Capita Income	
	2009	Percent Change 1999-2009	2009	Percent Change 1999-2009	2009	Percent Change 1999-2009
Tillamook County, OR	24.9	2%	13.4	9%	\$33,311	9%
Oregon	3,825.7	11%	2,202.7	8%	\$36,785	4%
United States	307,006.6	10%	173,809.2	8%	\$40,285	9%

Source: U.S. Department of Commerce 2011.

Table 5-4. Industry Summary for Tillamook County (dollars in thousands)

Industry	Employment	Output	Employment Income
State and Local Government	1,473	78,724	69,505
Food Services	962	49,780	14,711
Dairy Cattle and Milk Production	821	92,409	6,595
Retail Stores	514	31,293	12,289
Commercial Logging	386	93,309	14,103
Sawmills and Wood Preservation	372	97,621	22,854
Cheese Manufacturing	363	322,988	20,326
Real Estate	358	39,339	2,136
Private Hospitals	271	31,963	16,511
Animal (except poultry) slaughtering, rendering, and processing	259	119,474	10,357

Source: Minnesota IMPLAN Group, Inc. 2008.

5.6.2 Economic Benefits of Refuge Visitation to Local Communities

From an economic perspective, Nestucca Bay National Wildlife Refuge provides a variety of environmental and natural resource goods and services used by people either directly or indirectly. The use of these goods and services may result in economic impacts to both local and state economies. The various services the Refuge provides can be grouped into five broad categories: (1) maintenance and conservation of environmental resources, services and ecological processes; (2) production and protection of natural resources such as fish and wildlife; (3) protection of cultural and historical sites and objects; (4) provision of educational and research opportunities; and (5) outdoor and wildlife-related recreation. People who use these services benefit in the sense that their individual welfare or satisfaction level increases with the use of a particular good or service. One measure of the magnitude of the change in welfare or satisfaction associated with using a particular good or service is economic value. Aside from the effect on the individual, use of the good or service usually entails spending money in some fashion. These expenditures, in turn, create a variety of economic effects collectively known as economic impacts.

A comprehensive economic profile (baseline) of the Refuge would address all applicable economic effects associated with the use of Refuge-produced goods and services. However, for those goods and services having nebulous or non-existent links to the market place, economic effects are more difficult or perhaps even impossible to estimate. Some of the major contributions of the Refuge to the natural environment, such as watershed protection, maintenance and stabilization of ecological

processes, and the enhancement of biodiversity would require extensive on-site knowledge of biological, ecological, and physical processes and interrelationships even to begin to formulate economic benefit estimates. This is beyond the scope of this section. Consequently, this section focuses on economic effects, which can be estimated using currently available information. As a result, benefits represent conservative estimates of total social impacts.

The following section focuses on a limited subset of refuge goods and services, primarily those directly linked in some fashion to the marketplace, such as recreation use and refuge budget expenditures. It should be kept in mind that the emphasis on these particular market-oriented goods and services should not be interpreted to imply that these types of goods and services are somehow more important or of greater value (economic or otherwise) than the non-market goods and services previously discussed.

Regional Economic Impacts of Recreational Activities

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 by activity; and (2) expenditures associated with recreational visits to the Refuge. Recreational use is estimated by refuge staff. Expenditure patterns used were obtained from the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (USFWS 2007b). With this information, total expenditures for each activity can be estimated. These expenditures, in turn, can be used in conjunction with regional economic models to estimate industrial output, employment, employment income and tax impacts associated with these expenditures.

Nestucca Bay NWR currently offers four of the “Big Six” wildlife-dependent activities including wildlife observation and photography, environmental education, and interpretation. The Refuge was closed to all public use until October 2008 when Cannery Hill was opened. Since then visitation has increased as people learn about public use opportunities through communication with refuge staff and volunteers, news articles, directional highway signage, a refuge website, and general word-of-mouth within the local community. In 2009, over 40 wildlife-dependent special events were hosted onsite, and 235 people participated in these events. Refuge visitors are a blend of local residents, owners of second homes in Pacific City or Neskowin, and tourists. Refuge visitation peaks in the summer starting in late May and use tapers off in late September. If the weekend weather is sunny in fall, winter, or spring the public use facilities at the Refuge get a spike in visitation ranging from 5 to 20 vehicles per day.

Table 5-5 shows the recreation visits for Nestucca Bay NWR. The Refuge had 77,154 recreation visits in 2010. In addition to recreation visits, the Refuge also had 446 environmental education and interpretation visits for programs such as Project NestWatch and Through the Looking Glass. However, education and interpretation opportunities do not contribute to the local economic impacts because the events do not generally bring visitors who are spending money toward travel-related goods and services. Therefore, only visits associated with recreational activities are used to estimate economic effects.

Table 5-5. Nestucca Bay NWR: FY 2010 Recreation Visits

Activity	Residents	Non-residents	Total
Non-consumptive:			
Pedestrian	35,074	35,074	70,147
Photography	3,437	3,437	6,873
Total Recreation Visitation	38,644	38,510	77,154

Regional Economic Analysis

Visitor recreation expenditures for 2010 are shown in Table 5-6. Total expenditures were \$787,500 with non-residents accounting for \$618,000 or 78 percent of total expenditures. Pedestrian visits represented 84 percent of expenditures.

Table 5-6. Nestucca Bay NWR: Visitor Recreation Expenditures (2010 dollars in thousands)

Activity	Residents	Non-residents	Total
Non-consumptive:			
Pedestrian	\$141.7	\$516.7	\$658.5
Photography	\$27.8	\$101.3	\$129.0
Total Expenditures	\$169.5	\$618.0	\$787.5

Input-output models (Minnesota IMPLAN Group, Inc. 2004, Miller and Blair 1985) were used to determine the economic impact of expenditures on the Refuge’s local economy. The estimated economic impacts are expected to occur in the local area of Tillamook County, Oregon. It is assumed that visitor expenditures occur primarily within this county. Table 5-7 summarizes the local economic effects associated with recreation visits. Final demand totaled \$927,600 with associated employment of 11 jobs, \$288,600 in employment income and \$140,200 in total tax revenue.

Table 5-7. Nestucca Bay NWR: Local Economic Effects Associated with Recreation Visits (2010 dollars in thousands)

	Residents	Non-Residents	Total
Final Demand	204.9	722.7	\$927.6
Jobs	3	8	11
Job Income	65.3	223.3	\$288.6
Total Tax Revenue	\$31.1	\$109.1	\$140.2

The economic impacts from recreation expenditures estimated in this report are gross area-wide impacts. Information on where expenditures may occur locally and the magnitude and location of resident and non-resident expenditures (resident and non-resident relative to the geographical area of interest) is not currently available. Generally speaking, non-resident expenditures bring outside money into the area and thus generate increases in real income or wealth. Spending by residents is simply a transfer of expenditures on one set of goods and services to a different set within the same area. In order to calculate net economic impacts within a given area derived from resident expenditures, much more detailed information would be necessary on expenditure patterns and visitor characteristics. Since this information is not currently available, the gross area-wide estimates are used as an upper-bound for the net economic impacts of total resident and non-resident spending in the two and six county areas. The economic impacts of non-resident spending in Table 5-7

represent a real increase in wealth and income for the area (for additional information, see Loomis 1993:191).

Regional Economic Impacts of the Refuge Budget

In addition to impacts from recreational visitors, there are also economic effects related to the refuge expenditures that contribute to local and regional economies. In 2010, the refuge budget totaled about \$31,500. Approximately \$21,000 (67 percent) is allocated to salaries while the remaining \$10,500 is allocated to goods and services supporting the Refuge. Table 5-8 summarizes the Refuge’s expenditures in fiscal year 2010.

Table 5-8. Nestucca Bay National Wildlife Refuge Annual Expenditures, 2010 (2010 dollars in thousands)

Expenditure	Annual Expenditures
Salary – Permanent Employees	\$21.0
Non-Salary	\$10.5
Total	\$31.5

Table 5-9 shows the jobs, job income, and tax revenues generated by refuge expenditures. The Refuge’s annual budget generates less than one job and \$16,600 in job income. Overall, refuge expenditures result in about \$40,100 in final demand.

Table 5-9. Local Annual Economic Effects Associated with 2010 Refuge Budget (2010 dollars in thousands)

	Salary	Non-salary	Total
Final Demand	\$23.7	\$16.4	\$40.1
Jobs	0.2	0.2	0.4
Job Income	\$7.0	\$9.6	\$16.6
Total Tax Revenue	\$3.2	\$2.6	\$5.8

5.6.3 Refuge Revenue Sharing

National wildlife refuges, like other Federal, State, and County-owned lands are not subject to property taxes. However, under provisions of the Refuge Revenue Sharing Act, the Service annually reimburses counties for revenue lost as a result of acquisition of fee title. Payments to the county are based on the highest value as determined by one of the following three equations: three-fourths of 1 percent of the fair market value of the land; 25 percent of net receipts; or \$.75 per acre, whichever is greater. Refuge lands are re-appraised every 5 years to ensure that payments are based on current land values. The revenue sharing fund consists of net income from the sale of products or privileges such as timber sales, grazing fees, permit fees, mineral royalties, etc. If this fund has insufficient funds to cover payments to local counties, Congress is authorized to appropriate money to make up the deficit. Should Congress fail to appropriate such funds, payments to counties will be reduced accordingly.

Table 5-10 summarizes refuge revenue sharing payments made to Tillamook County from 2006 to 2010.

Table 5-10. Refuge Revenue Sharing Payments to Tillamook County for Nestucca Bay National Wildlife Refuge

Year	Fee Acres	Total Payment
2006	812	\$6,855
2007	812	\$6,628
2008	812	\$6,787
2009	888	\$8,257
2010	888	\$5,818

5.7 Special Designation Areas

Nestucca Bay has been designated as an Important Bird Area (IBA) by the National Audubon Society. Oregon’s IBA program recognizes sites of outstanding importance to birds in the state (Audubon Society of Portland 2011). Sites with IBA designation are extremely important to Oregon’s birds, though the IBA program by itself does not ensure the continued productivity of selected sites and certainly cannot guarantee continued avian diversity throughout the state. Most species of birds within IBAs are at least partially migratory, and most of the waterfowl, shorebirds, and seabirds of Oregon’s IBAs are highly migratory or at least make extensive flights between the recognized IBAs and other areas. In Oregon, this non-regulatory global program is coordinated by The Audubon Society of Portland (2011) with a mission to identify places in Oregon that are important for birds and to promote the restoration and conservation of important bird values at these sites through partnerships, education, observation, and hands-on efforts.