



# 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.

#### **Siletz Bay National Wildlife Refuge**

The Refuge is located within the traditional territory of the Siletz-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 Siletz Bay and the estuarine reaches of the Siletz River and Drift Creek 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**

In 1855, the area surrounding Siletz Bay became part of the Coast Reservation and still later, the Siletz Reservation. Homesteaders began arriving soon after Congress passed the Dawes Act in 1887. This act opened up Coast Reservation lands to Euro-American settlement and gave eighty acre “allotments” to reservation Indians. Early settlers homesteaded the land and combined subsistence farming with fishing and hunting in order to survive on the isolated coast (Hall 2011). Much of the tidal marsh habitat was diked, drained, and converted to agricultural lands to produce crops for human and livestock consumption. The key economic activities in the late 19th to early 20th century were salmon fishing, commercial clam fishery, native oyster collection, and timber harvest. By the early 1920s, however, the numbers of fish were diminishing and new regulations in 1935 prohibited drift net fishing altogether. The area then turned to logging for its industry. Between 1925 and 1939 log rafts totaling 1.25 billion board feet of lumber crossed the bar (Rea 1975). With the completion of the Salmon River Cut-Off and the Coast Highway in the late 1920s, a surge in automobile travel brought visitors as well as settlers to the area by the hundreds (Hall 2007). The lumber and fishing industries were gradually replaced by tourism and recreation as the most important economic industry. The commercial salmon fishery was declining when the estuary was closed to gill net fishing in 1957. Clam populations are too small to support a commercial fishery, and log rafts are no longer towed across the bar. The Siletz Bay estuary is now devoid of industry and large vessel traffic (ODFW 1979).

### **5.1.3 Archaeological Sites and Surveys**

Within the approved boundary of the Siletz Bay National Wildlife Refuge there is one recorded archaeological site. There are two 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 Siletz Bay National Wildlife Refuge**

Trinomial	Common Name	Type	Attributes	Within Approved Refuge Boundary
LN00005	Siletz Spit	Prehistoric	House pit	Yes
LN00004	Syote’s Farm	Prehistoric	House pits, midden	No
LN00117	None	Prehistoric	House pits, midden	No

**Table 5-2. Archaeological Surveys Within or in the Vicinity of Siletz Bay National Wildlife Refuge**

SHPO Number	Survey Title	Author	Within Approved Refuge Boundary
245	Sewer Line	J.A. Follansbee	Yes
16819	US 101 at Schooner Creek	H. Gard	Yes
16229	Millport Slough	A. Bourdeau	Yes

### 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 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**

Currently, all portions of this Refuge are closed to public use. Approximately 50% of the Refuge is posted with official refuge boundary signs. Boundary signs are located where refuge lands are adjacent to roads and along major waterways including the Siletz River and Millport Slough.

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

The Refuge is closed to public use and there are no public entrances. The Refuge is marked with two standard entrance signs; both are located on the east side of U.S. Highway 101 in the SW corner of the Refuge. The Refuge owns two residences and both have manually operated security gates located at the entrance roads to each. A gravel road on the east side of U.S. Highway 101 leads to the former Watson House. The entrance road is gated. There is also a gate at the entrance road that leads to the Siletz Bunkhouse which is occupied year-round by volunteers. There is a small four-car gravel parking lot associated with the Siletz Bunkhouse and a small gravel parking lot associated with the Watson House.

### **5.2.3 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 Siletz 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, and a conference room and office space for 8 permanent, two term, and four temporary employees.

The Refuge owns two residences at Siletz Bay NWR. Both residences are located near the bay in the tsunami hazard zone for Lincoln County. The Watson House is located on the east side of U.S. Highway 101 and the south side of Drift Creek. It has three bedrooms, two bathrooms, and is set up for family living quarters. Over the years, it has been used as a primary residence for staff or as temporary quarters for volunteers. Built in 1969, this residence is located in a dark damp setting and it was not insulated when it was built, making it inefficient and extremely expensive to heat. Over the past decade, some of the windows have been replaced, a pellet stove was added, and the roof was replaced but the house remains very energy-inefficient. The house has an attached two-car garage and there is an old boathouse on the property currently used as a storage facility.

The Siletz Bunkhouse is located on the west side of U.S. Highway 101 and south of Drift Creek. The house has three bedrooms and two bathrooms. It has been retrofitted to serve as a bunkhouse, thus it accommodates multiple occupants. The house is in relatively good condition following major repairs and maintenance over the past decade and is occupied year-round by at least one person, usually a refuge volunteer or intern.

## **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) as “appropriate uses” by definition, and required that these uses receive priority consideration in refuge planning when allowing the use would be compatible with the refuge’s mission.

Siletz Bay NWR has been closed to public use since it was established. However, the navigable waters that flow through the Refuge including Millport Slough, the Siletz River, and Drift Creek are used by the general public.

### **5.3.1 Hunting**

There is currently no hunting program on this Refuge. Since the Refuge was established in 1991 hunting has occurred on the state-owned tidelands of Siletz Bay west of U.S. Highway 101. Refuge land west of U.S. Highway 101 consists of 98 acres of tidal wetlands where the Siletz River empties into the bay near Siletz Keys and approximately 4 acres of uplands surrounding the bunkhouse at the mouth of Drift Creek. The seaward boundary of refuge tidal marsh near Siletz Keys is posted. The tidelands are managed by the Oregon Department of State Lands and are legally open to waterfowl hunting so long as the hunter remains 200 yards or more from the shoreline/road.

### **5.3.2 Fishing and Clamming**

There is currently no fishing program on the Refuge. Fishing occurs on state tidelands and waterways adjacent to refuge lands but is done primarily from boats in the deeper channels of the bay except at the mouth of the bay. The primary clamming area in Siletz Bay, near the Refuge, stretches from the mouth of Drift Creek south across the mudflats in Snag Alley. Clamming is conducted on state-owned tidelands, and clambers occasionally trespass through closed areas of the Refuge to reach this area.

### **5.3.3 Interpretation, Wildlife Observation, and Photography**

Siletz Bay NWR is represented in a Refuge Complex general brochure that is stocked at the headquarters office and other sites along the Oregon coast. The Refuge Complex also maintains a website ([www.fws.gov/oregoncoast](http://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.

Since 2005, the Refuge has offered seasonal, guided wildlife interpretive trips via canoe/kayak through the non-refuge-owned, navigable waters that flow through Siletz Bay NWR. Refuge staff, interns, and volunteers organize 10-12 trips from late June through late September. On each trip, the guide shares the story of Siletz Bay NWR with visitors and identifies common plants, trees, and wildlife. Visitors register for the trips on a first come first served basis. Visitors provide their own boat and personal flotation device (PFD). The Refuge provides binoculars on loan and extra PFDs in case they are needed. The tour begins at the Siletz Moorage, a privately-owned site located near the intersection of U.S. Highway 101 and the Kernville Highway. This water loop trail takes approximately two hours to complete.

### **5.3.4 Environmental Education**

The Refuge offers environmental education (EE) programs both on and off-site to help promote an understanding of fish and wildlife, their habitats, and the Refuge Complex. Current refuge EE programs have been correlated with the State of Oregon benchmark standards. The largest and most requested EE program is the Shorebird Sister Schools Program (SSSP). Since 2002, the Refuge Complex has expanded and delivered the program to students in grades 4-6. The SSSP has grown to be one the largest of its kind in the National Wildlife Refuge System. Annual enrollment is approximately 700 students participating from schools in three school districts that span half of the Oregon coast.

With the assistance of interns and community volunteers, the program offers interactive lessons that are both fun and educational from January to June to students in the Lincoln County school district. Using activities and lessons from the USFWS endorsed SSSP curriculum, individual lessons stress the importance of quality habitat for shorebirds and other wildlife, and the role the USFWS plays in protecting their habitat. The field component of the program brings students to the Yaquina Bay Estuary where they spend two hours rotating through three field experience stations. It is during this trip when all of the hands-on lessons from the classroom become real as the students are able to use binoculars and field guides to identify birds they have been learning about as they walk the perimeter of the estuary. In another field activity, students are immersed in the diet of shorebirds as they dig on the edge of the estuary for invertebrates in the mud and view prey items in magnified boxes. Finally, they participate in helping the estuary during a cleanup within the high tide line.

More recently the Oregon Coast Community College along with some secondary schools, including Toledo High School, has requested the Refuge provide an educational experience via canoe/kayak. The purpose of these trips is to expose a new audience to the Refuge and to teach them about the importance of estuaries and estuarine restoration to fish and wildlife. They operate in a manner similar to the guided summer tours in that the same route is followed; however, content is focused on the purpose of Siletz Bay NWR, the tidal marsh restoration along Millport Slough, management challenges faced by the Refuge, and wildlife use of the Refuge.

## **5.4 Other Refuge Uses**

### **5.4.1 Non-recreational Public Uses (easements and right of ways)**

A parcel referred to as the Erickson/Schaffer Easement is located along the Kernville Highway. This 57-acre tract of land is included within the Refuge by conservation easement in perpetuity. Since it remains in private ownership, public access to this refuge parcel is not up for consideration; thus, this area is closed to the public. Other right-of-ways and easements on record relate to utilities (phone/electric/water) crossing the Refuge to serve refuge, private, and public facilities.

### **5.4.2 Illegal/Unauthorized Uses**

Currently, the Refuge Complex has one full-time Law Enforcement (LE) Officer. The number of LE hours spent patrolling Siletz Bay is highest during waterfowl season. LE assistance is also provided to the Refuge Complex by the Zone LE officer (who is responsible for western Oregon and Washington). Law enforcement assistance for Siletz Bay is also provided by Oregon State Police and an officer with the Bureau of Land Management. Prior to 2011, the tidal marshes west of Highway

101 had not been surveyed and thus were not boundary posted and the most common violation was trespass by waterfowl hunters. The Refuge also responds to several other law enforcement issues including illegal hunting and fishing, and littering.

## **5.5 Surrounding Area Outdoor Recreational Opportunities and Trends**

### **5.5.1 Nearby Recreational Opportunities**

Lincoln City is the urban area that is nearest to the Refuge. Its population was estimated at 8,066 individuals in 2008. 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. Oregon Parks and Recreation Department (OPRD) manages six state parks within a 15-mile radius of Siletz Bay NWR. The U.S. Forest Service manages the Siuslaw National Forest, which has a popular hiking trail that is a short drive from the Siletz Bay NWR. Other nearby popular recreation locations along the Oregon central coast includes Yaquina Head Outstanding Natural Area, Nestucca Bay National Wildlife Refuge, and Cascade Head Nature Preserve.

There are waterfowl hunting, fishing, and crabbing opportunities in Siletz Bay on state-owned tidelands west of Highway 101 (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 is 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.

Siletz Bay National Wildlife Refuge is located along the northern Oregon Coast. The Refuge is situated just south of Lincoln City, a town with a population of 8,066.

Table 5-3 shows the local population and area economy. The county population increased slightly (3 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. County employment increased by 7 percent from 1999 to 2009, slightly behind Oregon and the United States. Per capita income in Lincoln 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.

**Table 5-3. Siletz 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		2009	Percent Change 1999-2009
Lincoln County, OR	46.3	3%	26.2	7%	\$34,365	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.

The largest industry sectors for Lincoln County are ranked below by employment (Table 5-4). As shown in the Table, tourism is an important sector for the County. The largest source of employment is retail stores (3,820 jobs). Food services and hotels are also important contributors to the economy (3,846 jobs).

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

Industry	Employment	Output	Employment Income
Retail Stores	3,820	\$204,946	\$65,619
State and Local Government	3,565	\$192,560	\$170,011
Food Services	2,689	\$150,924	\$48,824
Construction	1,543	\$193,698	\$37,059
Commercial Fishing	1,454	\$70,316	\$22,702
Hotels and Motels	1,157	\$83,822	\$25,993
Private Hospitals	775	\$95,948	\$51,442
Real Estate	735	\$92,885	\$7,151
Retail Nonstores (electronic sales)	676	\$10,145	\$427
Employment Services	537	\$13,505	\$7,236

Source: Minnesota IMPLAN Group, Inc. 2008.

### 5.6.2 Economic Benefits of Refuge Visitation to Local Communities

From an economic perspective, Siletz 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 refuge budget expenditures that can be directly linked to the marketplace. 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.

**Recreational Activities**

Siletz Bay NWR has been closed to public use since it was established. However, the navigable waters that flow through the Refuge including Millport Slough, the Siletz River, and Drift Creek are used by the general public. The Refuge offers seasonal opportunities to observe wildlife via guided canoe/kayak excursion through these waters. Therefore, actual refuge visitation is extremely low. In 2010, 220 visitors enjoyed boating and 287 people participated in environmental education and interpretation opportunities. Due to the minimal visitation, economic impacts associated with recreational visitation are negligible.

**Regional Economic Impacts of the Refuge Budget**

Input-output models (Minnesota IMPLAN Group, Inc. 2004, Miller and Blair 1985) were used to determine the economic impact of budget expenditures on the Refuge’s local and regional economy. In 2010, the refuge budget totaled about \$26,200. Approximately \$15,800 (60 percent) is allocated to salaries while the remaining \$10,400 is allocated to goods and services supporting the Refuge. Table 5-5 summarizes the Refuge’s expenditures in fiscal year 2010.

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

<b>Expenditure:</b>	<b>Annual Expenditures</b>
Salary – Permanent Employees	\$15.8
Non-salary	\$10.4
<b>Total</b>	<b>\$26.2</b>

Table 5-6 shows the jobs, job income, and tax revenues generated by refuge expenditures. The Refuge’s annual budget generates less than 1 job and \$18,600 in job income. Overall, refuge expenditures result in about \$46,100 in final demand.

**Table 5-6. Local Annual Economic Effects Associated with 2010 Refuge Budget (2010 dollars in thousands)**

	Salary	Non-salary	Total
Final Demand	\$29.1	\$16.9	\$46.1
Jobs	\$0.2	0.1	0.3
Job Income	\$8.8	\$9.8	\$18.6
Total Tax Revenue	\$3.9	\$2.8	\$6.6

### 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 5-7 summarizes Refuge Revenue Sharing payments made to Lincoln County from 2006 to 2010.

**Table 5-7. Refuge Revenue Sharing Payments to Lincoln County for Siletz Bay National Wildlife Refuge**

Year	Fee Acres	Total Payment
2006	462	\$5,396
2007	462	\$5,218
2008	512	\$3,588
2009	512	\$3,371
2010	512	\$2,375

## 5.7 Special Designation Areas

Siletz 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.