PART THREE: AFFECTED ENVIRONMENT

This section describes the resources that could or would be changed under the alternatives. The environmental issues or problems that could occur under any of the alternatives are stated at the beginning of each subsection.

NATURAL RESOURCES

AIR QUALITY

Issues Associated with Air Quality

- Changes in the number of people or the distribution of visitors to the Schoodic Education and Research Center (SERC) may result in differences in the concentrations of air pollutants associated with automobile or bus traffic. These include nitrous oxide, hydrocarbons, carbon monoxide, and carbon dioxide, some of which are precursors to ozone and/or contribute to changes in visibility and acid precipitation.

- Building removal and construction work on existing buildings may require grading, digging, or other actions that could cause temporary dust or larger particulates.

- The base operated several generators for which it had air quality permits. Continued operation of these generators would result in emissions associated with diesel engines, including those listed above.

- Radon, a human carcinogen, is naturally occurring in the granite bedrock underlying the peninsula. Indoor air may need to be tested and mitigation measures installed in buildings occupied by park staff, students, visitors or lessees to prevent exposure to unsafe levels.

- Asbestos, also a known human carcinogen when inhaled, is present in the building materials used to construct some of the buildings on the base.

Air Quality in the Study Area

Acadia National Park is one of 48 units of the National Park System designated as a mandatory Class I area, defined by Congress as any national park unit over 6,000 acres and its additions established by August 1977. These areas are afforded the greatest degree of air quality protection under the Clean Air Act, and the National Park Service (NPS) is required to do all it can to ensure that air quality–related values (including flora, fauna, soil, water and visibility) are not adversely affected by air pollutants. To this end, NPS reviews any permit applications for industrial or other facilities that wish to locate or expand nearby and that may contribute to the deterioration of the air shed.

Visibility - Visibility is affected by very fine particulates, organics, and aerosols of nitrates and sulfates. Regional haze from the midwestern United States is the primary source of visibility problems at the park (NPS 2001 Joseph memo). Reductions in visibility affect both how far visitors can see from a particular viewpoint as well as the clarity of the view itself. Monitoring shows that sulfate is the largest contributor to reductions in visibility at Schoodic, and accounts for 62% of light extinction (i.e., the point at which light can no longer be seen because of fog, clouds, smoke, air pollution, etc.). Visibility at Schoodic is generally best in the fall and worst in the summer months.

Despite a statistically significant improvement in sulfate concentrations in precipitation at the park in recent years, visibility on good days (the best 10% of the year) and average days has improved only slightly. Monitoring from 1990 through 1999 shows an improving trend in days with poor visibility (the worst 10%), although the data indicate that the trend is not statistically significant.

Mobile Sources - Automobiles use internal–combustion engines for the most part. These engines produce the pollutants nitrous oxide, hydrocarbons, carbon monoxide, and carbon dioxide, some of which are precursors to ozone and/or contribute to changes in visibility and acid precipitation. While the number of visitors shows a high degree of seasonal fluctuation, a recent traffic study estimated that in 2000, an average of 800 cars per day travel the 1-mile Moore Road leading from State Route 186 into the park, continue on around the 6-mile Schoodic Loop Road, and exit back to State

TABLE 3. TOTAL 1998 EMISSIONS FOR NAVAL SECURITY GROUP ACTIVITY WINTER HARBOR
(Source: NSGA 2000)

Pollutant	1998 Emissions (tons/yr.)	License Allowable (tons/yr.)
SOx (sulfur dioxide)	8.26	14.65
NOx (nitrogen oxides)	11.43	50.3
CO (carbon monoxide)	2.03	10.3
PM10 (particulates smaller than 10 microns)	3.0	12.8
VOC (volatile organic compounds—hydrocarbons)	0.48	2.8

Route 186 via the 1.9-mile Wonsqueak Road out of the park. Assuming the national average for vehicle emission rates (U.S. Department of Transportation 2002), these cars add about 6.5 tons of hydrocarbons, 58 tons of carbon monoxide, and 4 tons of nitrogen oxides each year to the immediate vicinity of the Schoodic Peninsula.

Stationary Sources - The U.S. Navy conducted activities at its Schoodic and Corea sites that contributed to emissions, including painting, incinerating solid waste, using solvents and degreasers, dispensing and storing gasoline, operating boilers for building heat, and running diesel generators. The primary sources of emissions were the emergency generators at the Corea site, which is located about five miles east of the Schoodic District. The total emissions from all activities at the Naval Security Group Activity Winter Harbor are listed in Table 3.

Ozone - Some of the pollutants emitted from cars, such as hydrocarbons and nitrogen oxides, can contribute to ground-level ozone or "smog." In addition, the precursors to ozone are emitted from industrial and other stationary sources to the south and west of the park, and are carried to the park via long-range transport. The pollutants emitted on a given day from the Philadelphia–New York City–Boston region often do not reach the park until between 6:00 p.m. and midnight, a time which often corresponds to maximum daily ozone levels at Acadia National Park. Ozone in the park has been monitored since 1982. In the summer, ozone concentrations periodically reach 85 parts per billion (ppb) or greater (NPS 2001). This is typical of most areas along the Maine coast, but is among the highest in the eastern U.S. Ozone concentrations are worst in the summer, and the Environmental Protection Agency standard for an 8-hour average ozone concentration (80 ppb) was exceeded in the park five times in 1997, eight times in 1998, six times in 1999, three times in 2000, and ten times in 2001. While peak concentrations can periodically be high for a few hours, the average daily levels are usually 35–40 ppb and well within the "good" range on the ozone health index. Cumulative seasonal ozone concentrations are relatively low, and the park has shown an improvement in daily maximum ozone levels over the years 1990–1999. Research conducted by the park indicates some particularly sensitive vegetation (such as broadleaf aster, quaking aspen, and jack pine) may experience injury at typical ambient ozone concentrations found at Acadia National Park (NPS 2001).

Acid Precipitation - Rain, snow, or fog can be acidified through chemical reactions in the atmosphere involving sulfur dioxide and nitrogen oxides. These gases are emitted from the burning of petroleum products from both stationary and mobile sources. Although mobile sources in the vicinity of the park may contribute a minor amount of sulfur dioxide or nitrogen oxides, by far the largest contributors come from industrial and urban sources upwind of the park. Based on National Atmospheric Deposition Program (NADP) modeling, pH in rain and snow at the park has averaged 4.5 since 1982, with a range of 3.2–7.0 (NPS 2001). Unpolluted precipitation has a slightly acid pH of about 5.6 (Schindler 1988). Since 1990, there has been a significant reduction in sulfate deposition (largely due to emissions controls required by Clean Air Act amendments), and a slight improvement in nitrate concentrations. Testing

TABLE 4. FORMER NAVY BUILDINGS WITH GREATER THAN 1% ASBESTOS
(Source: NSGA 2000)

Building No.	Building Name	Risk Assessment Code
1	Rockefeller	3
3	Chapel	3–4
9	Gate House	4
10	Administration	3–4
39	Commissary	4
45	Generator House	4
105	Galley	4
137	Transportation/Fire House	4
138	Gymnasium	3–4
143	Schooner Club	4
148	Medical Clinic	4
164	Child Development Center	4
165	Gas Station	4
184–191	Schoodic Shores Housing	4
223	Storage	3

of lakes, ponds, and streams in the park show that most are non-acidic, although some short-term acidification occurs during spring melt or during high periods of runoff (NPS 2001). Fog, which is not measured by the NADP, tends to be more acidic than rain or snow, and may be a major source of acidity to park vegetation (NPS 1999a).

Mercury - Elevated mercury concentrations in freshwater fish throughout Maine have led to statewide consumption advisories and research into the source of the problem and its ecological impacts on park resources. The source is most likely atmospheric and originating some distance from the park. No activities proposed in any of the alternatives would affect mercury levels; it is mentioned only to understand cumulative impacts to the air quality at Schoodic.

Indoor Air Quality - Radon is naturally occurring in the bedrock underlying Schoodic. In late 1994, the U.S. Navy tested radon levels in several of the housing structures at the base and found levels higher than the Environmental Protection Agency recommended action guideline of 4.0 picocuries/liter (pCi/l) in buildings 84, 184–186, 191. Radon mitigation systems were installed in these units, and indoor air quality was subsequently measured from 12/08/97 to 6/24/98. Results indicated the mitigation was successful in lowering radon levels to well below the Environmental Protection Agency standard. All results were in the range of 1.2–1.9 pCi/l (NSGA 2000).

A 1992 survey found several buildings containing more than 1% asbestos. Most were classified as posing a risk of 3 or 4 on a scale of 4 to 1, with 1 posing the highest risk. Some posed a higher risk, and the U.S. Navy removed asbestos in buildings 39, 138, and 148 before turning the base over to the National Park Service. Buildings posing a risk of 3 or 4 will be monitored and the risk managed, but asbestos will not be removed unless disturbed by rehabilitation or other activities (Table 4).

WATER RESOURCES

Issues Associated with Water Resources

- Reuse of the navy base could result in changes in the demand for water or in the amount of wastewater treated and discharged by the park; continued effluent discharge from the wastewater treatment plant at the former navy base into Arey Cove may create long-term water quality problems and impact the intertidal zone of the cove.

- Increased exploration of the base and peninsula by students and visitors could result in damage to the hydrologic characteristics, water quality, or riparian vegetation of ephemeral or perennial streams or watersheds.

- Activities associated with building removal could result in damage to streams or riparian areas.

Water Resources in the Study Area

Water and Wastewater - Water is currently supplied to base personnel from a 150-foot well at Schoodic Head. The well is sized to produce 140,000 gallons per day and service up to 500 people. Sodium hypochlorite is added at the water treatment plant to disinfect it before pumping it to a 150,000-gallon water tower for storage. Treatment problems include the presence of radon, which is naturally occurring in groundwater in the area, and the leaching of metals such as lead and copper from the water distribution system at the base. Radon is treated with a bubbler/stripper effective enough to reduce levels averaging 7,000pCi/L to near zero. The likelihood of stripping of metals from water pipes is lessened by adding a chemical (zinc orthophosphate) at the water treatment plant which inhibits corrosion.

The wastewater treatment plant was constructed in 1980. The plant is sized at about 65,000 gallons per day, but is designed to handle a maximum flow of 45,000 gallons under normal conditions. Wastewater is collected not only from all occupied buildings, but from miscellaneous floor drains and oil/water separators, as well. Wastewater receives standard secondary treatment, including biological contact, clarification, aeration, and chlorination. Under a Maine Department of Environmental Protection permit, effluent is discharged into Arey Cove between the east coast of Big Moose Island and the west shore of Little Moose Island. Solids that settle during the wastewater treatment process are currently treated in an outdoor reed bed. In other areas along the New England coast, discharge from septic systems or wastewater treatment plants have resulted in increased nitrogen discharge to coastal waters, with resulting algal blooms, periphytic algae, and declines in eelgrass abundance (NPS 1999a).

Storm water is collected and drains directly into the Atlantic Ocean.

Streams and Hydrology - Most of the park's drainages are small, short, and steep. The average distance between headwaters and stream outflow to the ocean is 3 miles (NPS 1999a). The Schoodic Peninsula has few streams and no defined hydrologic sub-basins. A year-round stream, Frazer Creek, drains into Mosquito Harbor at the entrance to the Schoodic District. While no perennial surface streams exist on Big Moose Island, seeps, springs, and artesian springs are present and contribute to the wet forests in some parts of the property. Soils are generally thin and poor at holding moisture, so runoff following storms occurs quickly and does not last long. Frequent sea fogs help to maintain water levels for much of the year, but stream flows are low during late summer and early fall.

Soils are also poorly buffered and acidic in nature. Rain and snow become weakly acidic during runoff, and can contribute to the acidity of streams, ponds, and lakes. The low buffering ability means surface waters in the park are less able to neutralize acids leached from the soil or deposited from atmospheric sources. Seasonal upland streams are particularly vulnerable to episodes of acidification during runoff from storms or snowmelt (NPS 1999a). The park's freshwater resources tend to be nutrient poor, unproductive, and highly transparent.

Groundwater - Groundwater occurs in surface deposits and in cracks and joints in bedrock at the park. Yields from wells installed on the surface deposits, such as in glacial till, fluvial deposits or alluvium, tend to be low and on the order of 0–10 gallons per minute (gpm).

Although the yield from groundwater in bedrock varies, it tends to be much higher, and in the range of 0.5–100 gpm, with an average of 10 gpm. The well supplying the base produces 100 gpm. Groundwater quality tends to be generally good and of sufficient quality for domestic use.

SOILS

Issues Associated with Soils

- Activities associated with the reuse of the navy base could result in the removal, compaction, or other changes to soils in previously undisturbed areas.

- Reuse of the navy base creates the potential for soil contamination through spills, leaking of gasoline or fuel oil, and other unintended releases.

- Development and other human activities are limited by thin soils in the region.

Soils in the Study Area

Soils on the Schoodic Peninsula are a function of the area's geology and vegetation. Some of the rocks in the park are ancient schists more than 500 million years old. These have been eroded, covered by the ocean, and buried with accumulated sand and mud which in turn formed sandstone and shale. Over many millions of years beginning about 420 million years ago, molten granite intruded, and the overlying rock was weathered away. Today, the granite is exposed or covered with a thin soil, and is the bedrock underlying most of the park. Subsequent intrusive activity injected diabase into the granites—these are the "dikes" or veins of dark rock, found at Schoodic Point.

Many types of granites have been mapped at the park. While Mount Desert Island is primarily underlain by a pink coarse-grained type, Schoodic bedrock is finer-grained granite, which is highly chemically resistant. This resistance, which causes rapid runoff, means most surface water in the park has low alkalinity and low nutrient concentrations.

For the most part, soils in the park are relatively young. This is primarily due to the scouring of a series of glaciers, with the most recent beginning its retreat about 14,000 years ago. The glaciers left behind extensive areas of bare rock, and a thin veneer (6–20 inches) of surficial glacial/soil material on the park's upland areas, ridges, and along much of the shoreline. The surface soil is gravelly, fine sandy loam that is easily blown away if it is exposed.

Naskeag soils are found in depressions between shallow ridges in wet areas. They are moderately deep, usually level or gently sloping and poorly drained. The surface is fine sandy loam and gravelly loamy sand. The top layer of soils forms slowly as the fallen needles of dominant vegetation, spruce and fir, are difficult for microorganisms to break down. Soils tend to be acidic, and are characterized by accumulated iron, aluminum, and organic matter.

Soils have been excavated and manipulated to accommodate the development and operation of the navy base, including the construction of buildings, roads, antennas, recreational facilities, and other infrastructure. All together, this development has probably removed or disturbed 80–100 acres of soil during the 67 years of the U.S. Navy's use of the site. The U.S. Navy has classified most of the soils at the base as "2d," that is, they pose a slight erosion hazard and moderate constraint on the use of heavy equipment. Trees growing on these soils may be exposed to winds, and have a moderate likelihood of uprooting from wind. Some soils near the northern central part of the base are classed "2x," which is similar to 2d except equipment limitations are slight. Other soils on the base are considered "excessively thin," and unable to support most vegetation (NFAC 1987).

The U.S. Navy has used hazardous fuels and chemicals at the base and has had some spills and leaks associated with underground storage tanks. In 1993, the U.S. Navy moved six underground storage tanks and filled a seventh tank in place. The leaking tanks had contaminated about 450 cubic yards up to 14 feet below ground with gasoline. A non-point source located well down-gradient from the spill was found to contain very small amounts of MTBE, a fuel additive. Because MTBE levels were lower than those determined by the Maine Department of Environmental Protection remediation standards, no action was taken. The base has 11 underground fuel storage tanks and 20 above-ground tanks. Most have been replaced in the last decade, and all are double-walled tanks (NSGA 2000).

Several small spills of petroleum products (fuel oil, gasoline, diesel fuel, etc.) have been documented, most in the 1–5 gallon range and all less

than 25 gallons. Between 1994 and 1998, 14 such spills were recorded. Soils on site also contain abandoned underground coaxial antenna cable. The U.S. Navy removed approximately 5,000 feet of the cable in 2002, but thousands of feet are likely to remain just below the surface. Soils also contain buried pressurized cylinders and possibly a landfill at the ball field consisting of construction and demolition debris (sections of brick walls, pieces of concrete, and metal pipes and wire) that do not constitute an environmental hazard (Weston 2002).

The base also had short-term storage facilities on site for other hazardous waste, such as medical waste, maintenance chemicals, etc., which is kept for up to 90 days before it is removed to a licensed hazardous waste facility. No spills or accidents involving these wastes have been reported.

VEGETATION

Issues Associated with Vegetation

- Activities associated with the removal and reuse of the buildings could adversely affect wetland values.
- Vegetation may be removed, thinned, or replaced with landscaping to create a more campus-like feel at the former navy base.
- Removal of some of the existing buildings in the study area, and in particular on the base, could create suitable conditions for regrowth of vegetation.
- Increased exploration by students or visitors of fragile or rare vegetative communities, such as riparian areas, unusual woodlands, or habitat of rare plants, could result in impacts to soils, hydrology, or the plants themselves from trampling, collecting specimens, sliding soils, etc.

Vegetation in the Study Area

The park lies in a broad transition zone between southern deciduous and northern coniferous forests, and so has several plant species and vegetative communities which are existing at the northern or southern edge of their range. This also makes for a more diverse flora than areas to the north or south of this part of coastal Maine.

The Maine Natural Areas Program (MNAP), which is administered by the Maine Department of Conservation, offers a comprehensive source of information on the state's important natural features. MNAP collects, interprets, and disseminates information on rare or exemplary natural communities, and rare, threatened, and endangered plant species. MNAP has identified 144 natural communities in Maine.

The Schoodic District contains two state-designated "Rare or Exemplary Natural Communities": Jack Pine Woodland and Maritime Shrubland. The Jack Pine Woodland is located on the east slope of Schoodic Head and consists of approximately 100 acres, which is significantly larger than the average stand of 40 acres found in Maine. The Jack Pine Woodland is rare (20–100 occurrences) in Maine because the dominant tree species, jack pine (*Pinus banksiana*), is at the southeastern limit of its range.

The southern half of Little Moose Island contains an exemplary Maritime Shrubland community, which is a shrub-dominated habitat along seaside bluffs exposed to onshore winds and salt spray. Although MNAP describes the rarity of the Maritime Shrubland community in Maine as "apparently secure," two rare plants (i.e., marsh felwort and blinks) occur within the area designated on Little Moose Island.

Upland Forests - The most abundant vegetative community on the peninsula is the Maritime Spruce and Fir Forest, which exists on glacial till and exposed bedrock in locations exposed to cool coastal temperatures, higher humidity, and frequent fogs. The most common species is red spruce, and associated trees species include primarily balsam fir, paper birch, and white spruce. Some of the more common species in the understory include blueberry, mountain cranberry, mountain ash, starflower, Canada mayflower, bunchberry, and wild raisin. On islands in the study area, as well as at the navy base, white spruce occurs in higher percentages than red spruce (Mittelhauser et al. 1996, NFAC 1987). Coastal forests consisting primarily of white spruce are rare in Maine, and resemble full development of the boreal forest in northwest Canada (Drury 1980). For the most part, the herb and shrub layer in these forests is poorly developed, and it is mosses instead

which are abundant in the understory, especially where the microclimate is humid and cool.

Of note are a few small stands of Northern White Cedar Seepage Forest community on the northern side of Big Moose Island. These relatively rare forest communities are found on gentle slopes where the forest floor is saturated with cold groundwater (Maine Department of Conservation 1998). In some cases, this seepage of groundwater can form rivulets or small spring-fed brooks, or it may remain under the surface of a thick layer of peat mosses and shade-tolerant ferns. Twelve species were found in the understory of the cedar seepage forest stands on Big Moose Island, including starflower, sarsaparilla, and common currant. While 62% of the basal area of the forest is represented by mature northern white cedar, no seedlings of this species were recorded. Instead, thousands of red spruce seedlings were documented (Mittelhauser et al. 1995), indicating a change in the composition of these forests. The presence of old-growth cedar and spruce (180–200-year-old trees) indicate the stands of this species are particularly worthy of monitoring and protection from impact.

Mixed hardwood-conifer forests are also found in the study area, including one significant stand on Little Moose Island. This forest type is transitional between spruce/fir and northern hardwood forests. Common tree species include spruce, red maple, paper birch, balsam fir, northern red oak, and yellow birch. Understory includes shrubs of currants and blueberry, and is low in herbaceous material, but high in leaf litter (Glanz et al. 1999).

Vascular Plants - A two-year study of vascular plants of the Schoodic Peninsula reported 343 species, including 75 non-native species (Mittelhauser et al. 1995, Spencer-Famous and Perera 1999). These include 265 species on the Schoodic Peninsula, 136 species on Pond Island, 139 species on Schoodic Island, and 174 species on Little Moose Island (Rolling Island was not a part of the study) (Mittelhauser et al. 1996).

Although surveys in the mid-1990s found 75 species of non-native plants in the study area, none were considered common or aggressive enough to pose a significant threat to native plant species or plant communities (Mittlehauser et al. 1995). Purple loosestrife, an aggressive non-native species found in many wetlands in the eastern United States, has not been found in the Schoodic District.

As discussed above, the Maine Natural Areas Program (MNAP) collects, interprets, and disseminates information on rare, threatened, and endangered plant species. MNAP has documented five rare plant locations on the southern portion of the Schoodic Peninsula, including two on Little Moose Island (Table 5).

Bryophytes - Because bryophytes (i.e., mosses and similar vegetation) are often an integral part of the forest understory in this area, they have been surveyed on the peninsula, and results of the survey are summarized in this environmental impact statement. A recent survey (Spencer-Famous and Perera 1999a) found 131 bryophyte species in the study area. Of these, 81 were mosses. Most species were found in terrestrial communities and 65 were found only in these

TABLE 5. PLANTS OF STATE CONCERN LOCATED WITHIN THE SCHOODIC DISTRICT
(Source: Maine Natural Areas Program 2003)

Species	State Rank	State Status*	Proposed State Status**
Screwstem *(Bartonia paniculata)*	S1	Endangered	Threatened
Marsh felwort *(Lomatogonium rotatum)*	S2	None	Threatened
Blinks *(Montia fontana)*	S2	None	Special Concern
Fragrant cliff wood-fern *(Dryopteris fragrans)*	S3	None	Special Concern
Sea-beach sedge *(Carex silicea)*	S3	None	Special Concern

* based on 1988 data
** based on current 1998 data

communities. Some were in both upland and wetland communities, and seven were found only in wetlands. Upland habitats where bryophytes were more common included vertical rock cliffs, spruce fir forests, upland shrubs and developed areas on filled wetland or upland. Palustrine (wet forests or shrublands) habitats included shrub swamps, spruce/fir swamps, and swales dominated by sedges and grasses. Bryophyte species were also common in the small, steep gradients associated with first order rocky streams in the study area.

Four bryophytes of special interest were found in the study area. *Isothecium eumyosuroides* is rare because it is only found in a specific type of habitat associated with a restricted maritime range. Two species, *Dicranum majus* and *Diplophyllum albicans*, are maritime species found at the southern limit of their range at Schoodic. *Sphagnum pylastii* exists in the spray zone, suggesting some tolerance of salinity, and is an extremely rare *sphagnum* species (Spencer-Famous and Perera 1999a).

Freshwater Wetlands - Wetlands provide an important habitat for a variety of wildlife, including amphibians, fish, and waterfowl. They also help improve water quality through pollution abatement, sediment removal, and chemical and nutrient absorption. Wetlands are classified into five major groups. Three of these are freshwater wetlands: palustrine (isolated wet areas, including marshes, swamps, and bogs), lacustrine (associated with lakes), and riverine (associated with rivers and streams). The other two types of wetland, marine and estuarine, are discussed in the "Coastal Resources" section. The Schoodic District does not contain lacustrine or riverine wetlands, but palustrine wetlands are common (Spencer-Famous and Perera 1999a, NPS 2002). Forested palustrine wetlands are the most abundant wetland class in the park and constitute the majority of the mapped wetlands. They are located along streams, in isolated depressions, and in conjunction with other types of wetlands. Forested palustrine wetlands can be dominated by hardwoods, evergreens (especially red spruce, black spruce or northern white cedar), or a mixture of the two.

COASTAL RESOURCES

Issues Associated with Coastal Resources

- Increased exploration of the shoreline by visitors could result in human-related impacts to intertidal plants and animals.

Coastal Resources in the Study Area

The marine environment at the Schoodic District consists of the rocky intertidal zone and estuarine systems. The Schoodic Peninsula is bounded to the west by Frenchman Bay and to the east by the Gulf of Maine.

Marine System - The Gulf of Maine watershed encompasses 43,000 square miles of land in Maine, New Hampshire, and Massachusetts. Rivers in Maine alone add about 250 billion gallons of fresh water to the Gulf each year. The gulf is productive and contains large shoal areas where water is well mixed from tidal influences and ocean currents. The greatest productivity occurs in the summer over Georges Bank, where ocean depths are 9 feet or less in many places, and sunlight can easily penetrate (U.S. Fish and Wildlife Service 2001, NPS 2000). Many marine mammals inhabit waters off the Schoodic Peninsula, including harbor porpoise, minke whale, finback whale, and harbor seal.

Rocky Intertidal Zone - The intertidal zone is the stretch of coast that lies between high and low tide. The average tidal range at Schoodic is 8–12 feet (NPS 2000). At the high end of the intertidal zone, in an area covered only during the highest tides, barnacles, diatoms, and green algae are common. Slightly further down are brown algae, including bladderwrack and knotted wrack, which attach by root like holdfasts to the rocks. Many intertidal organisms occupy this rockweed zone. Tide pools occur throughout the intertidal zone's levels. In the high intertidal zone, spiral wrack (*Fucus spiralis*) and brown seaweed (*Fucus distichus*) are abundant at Schoodic. Beds of blue mussels, smooth periwinkle, and dog whelks are common especially in lower areas of the tidal zone. The low intertidal zone is dominated by red algae (e.g., Irish moss) and sea anemones, and the sub-tidal zone hosts many species of sponges, kelps, red algae, brown algae, worms, sea stars, urchins, and fish. Young lobsters grow in the kelp beds in the sub-tidal zone.

The cool climate and nutrient-rich waters of the Gulf of Maine, a relatively high tidal amplitude, and a rocky shoreline full of microhabitats have created an intertidal zone with diverse marine life. In some areas of coastal Maine, up to 40 species of invertebrates may occupy a particular location (Maine State Planning Office 1989). The rocky intertidal zone is divided into several subzones depending on the degree to which they are influenced by tidal waters. Factors that define subzones include wave energy and site exposure, tidal range, slope, and substrate texture. The highest zone is above the spray zone and constitutes the upland forest described above. However, at its very edge, nutrient-rich water can collect in rocky hollows and host green algae blooms, which die as the water dries. The spray zone is the transition between upland areas and the ocean. Only drought-tolerant species can survive here, and they must be able to withstand the force of wind, salt, surf, summer drying, and winter freezing. The most common organism in the spray zone is *Xanthoria*, a crusty yellow lichen (NPS 2000).

Estuarine Systems - Estuarine systems are defined as tidal rivers and adjacent wetlands that are inundated by seawater that is measurably diluted with fresh water from land drainage. Two notable estuarine systems are located in the study area. One is the remnant of a marsh that once separated Big Moose Island from the rest of the Schoodic Peninsula. When the Schoodic Loop Road was built in 1933-1935, a portion of this marsh was diked as a causeway to complete the road (Berger & Assoc., Inc. 1999). Now, brackish water wetlands sit both to the northwest and southeast of the road in West Pond and East Pond coves. A palustrine wetland lies along the road and between the two brackish coves (NPS 2002). A steep slope leads up from the wetland and separates it from Big Moose Island near the northeast boundary of the U.S. Navy's property on Big Moose Island (Berger & Assoc., Inc. 1999). Mosquito Harbor, which is fed by Frazer Creek, is also classified as an estuarine system (National Wetlands Inventory 2002). The majority of this cove is a marine subtidal environment and remains submerged even at low tide. The perimeter of the cove is an intertidal mud flat, which is occasionally used for clamming and possibly for collecting marine worms (G. Mittlehauser, personal communication, September 2002).

WILDLIFE

Issues Associated with Wildlife

- Frequency and duration of disturbance by visitors could impact wildlife in habitat that is now experiencing little or no human presence.
- Visitors could trample vegetation or otherwise degrade habitat for wildlife.
- Research on wildlife may disturb or displace species and degrade habitat during exploration.
- Noise associated with construction may disturb and temporarily displace wildlife within hearing distance.
- Removal of some unused buildings at the base and restoration of habitat may result in the reoccupation of these areas by wildlife.

Wildlife in the Study Area

Prior to 1994, information on even the basic biological resources at Schoodic was scarce. A preliminary inventory of plants and animals on the peninsula was started in 1994 and continued through 1996 (Mittelhauser et al. 1995, Mittelhauser et al. 1996). This work coincided with similar inventorying on the park's small islands, including three of the four in the study area (Rolling Island was privately owned at the time and not included in the study). The studies identified several species of concern (e.g., bats, birds, and small mammals) that use the Schoodic Peninsula during migration and the summer. Importantly, no state or federally threatened or endangered amphibians, reptiles, or mammals were found to inhabit the Schoodic Peninsula based on these studies.

Maine's Endangered Species Act (1975) includes provisions to protect "Essential Wildlife Habitat," which are areas that currently or historically provide physical or biological features essential to the conservation of state endangered or threatened species. According to the Maine Department of Inland Fisheries and Wildlife, these areas may require special management considerations to perpetuate conditions that are favorable to endangered or threatened species. The state designated "Essential Wildlife Habitat" in the Schoodic District recognizes the importance of Schoodic and Rolling islands as bald eagle nesting sites.

Maine's Natural Resources Protection Act (1998) includes provisions to protect "Significant Wildlife Habitat," which are areas designated to prevent further degradation or destruction of certain natural resources of state significance. The "Significant Wildlife Habitats" in the Schoodic District include migratory shorebird staging (i.e., feeding and roosting) areas; seabird nesting islands with 25 or more nests, or with one or more seabirds that is a state endangered or threatened species; and tidal waterfowl and wading bird areas (e.g., emergent wetlands, mudflats, and eelgrass beds) used for breeding, feeding, and roosting (Table 6).

Invertebrates - Invertebrates can be important for several reasons, including their position as an essential part of both the upland and aquatic food chain. They are also responsible for the release of nutrients through decomposition. Mites are particularly important in this regard in evergreen forests such as those that cover much of the study area. Springtails, beetles, fly larvae, sow bugs, snails, and slugs are other abundant invertebrates that live in forest soils.

Aquatic invertebrates of note in the park include dragonflies, damselflies, and mayflies; the latter is important because mayflies are sensitive to low pH and can be used to monitor changes in water quality. Freshwater rotifers have been thoroughly inventoried on Mount Desert Island, and researchers have found 449 species of rotifera in the park. Freshwater mussel species, including some that are rare enough to qualify for listing as threatened or endangered, may also live in the park, but have not been inventoried (NPS 1999a).

A number of invertebrate species are of concern because they may disrupt natural systems, destroy park buildings or artifacts, or affect human health. Many—but not all—are non-native species. Forest pests that NPS has monitored or managed include gypsy moth, hemlock looper, spruce budworm, spruce bark beetle, and hemlock wooly adelgid. Other common insect pests include carpenter ants, yellowjackets, and wasps. The NPS usually does not treat native insects unless they threaten the mission of the park or present a significant human health or safety risk. In most cases, native pests and their hosts evolved together; these insects are considered an important part of the natural environment.

When pest treatment is necessary, integrated pest management (IPM) is used to address pest management issues. This approach is based on a thorough knowledge of the biology of the pest species and seeks to minimize chemical means of control. IPM includes setting an injury threshold for treatment, monitoring population levels of the pest, using preventative strategies and alternative treatments, evaluating the effectiveness of treatments, and good record keeping.

Some native invertebrate species not actively managed by NPS are considered pests outside the park boundaries when they interfere with land management objectives of private landowners or other governmental agencies. Managing

TABLE 6. WILDLIFE HABITATS OF STATE CONCERN LOCATED WITHIN AND BORDERING THE SCHOODIC DISTRICT

(Source: Maine Natural Areas Program 2003)

Area	State Designation	Habitat Type
East Pond	Significant Wildlife Habitat	Shorebird, Tidal Waterfowl/Wading Bird
Frazer Creek	Significant Wildlife Habitat	Shorebird, Tidal Waterfowl/Wading Bird
Rolling Island	Essential Wildlife Habitat	Bald Eagle
	Significant Wildlife Habitat	Tidal Waterfowl/Wading Bird
Schoodic Point	Essential Wildlife Habitat	Bald Eagle
	Significant Wildlife Habitat	Shorebird, Tidal Waterfowl/Wading Bird, Seabird Nesting
Schoodic Point	Significant Wildlife Habitat	Shorebird, Tidal Waterfowl/Wading Bird
West Pond	Significant Wildlife Habitat	Shorebird, Tidal Waterfowl/Wading Bird

TABLE 7. AMPHIBIANS AND REPTILES FOUND ON THE SCHOODIC PENINSULA

(Sources: Mittelhauser et al. 1996, Glanz and Connery 1999)

Species	Big Moose Island	Schoodic Peninsula
Spotted salamander (*Ambystoma maculatum*)	X	X
Red spotted newt (*Notophthalmus viridescens*)		X
Redback salamander (*Plethodon cinereus*)	X	X
Spring peeper (*Pseudacris crucifer*)	X	X
Green frog (*Rana clamitans*)	X	X
Wood frog (*Rana sylvatica)*	X	X
Smooth green snake (*Opheodrys vernalis*)		X
Eastern garter snake (*Thamnophis sirtalis)*	X	X

for different objectives may create conflicts between the park and its neighbors. The NPS attempts to work with neighbors to help resolve pest issues in a way that addresses local concerns while still protecting park values.

Amphibians and Reptiles - Eight species of amphibians and reptiles have been found at Schoodic (Table 7). These species are common in Maine coastal habitat and associated with freshwater wetlands.

Redback salamanders and common garter snakes were also found on Little Moose and Schoodic islands. Some garter snakes found on Schoodic Island showed characteristics of a maritime subspecies. No reptiles or amphibians were found on Pond Island (Mittlehauser et al. 1996).

Birds - As with plants, some birds occur at their southern range limit in the vicinity of Acadia National Park. For example, the Schoodic Peninsula is home to boreal species like blackpoll warbler, boreal chickadee, spruce grouse, and gray jay (Famous 1999). Bird species in the area include residents, short-distance migrants, and neotropical or long-distance migrants. Short-distance migrators such as finches, sparrows, jays, wrens, crows, and chickadees travel to the park in the spring to breed, and arrive about 3–6 weeks ahead of neotropical species. Many are omnivorous (eat both insects and vegetation), but depend heavily on fruit and seed production during their fall and spring migrations. Neotropical migrants, which include flycatchers, swallows, vireos, warblers, and other insect-eating species, winter in Central and South America.

Common resident or short-distance migratory species include white-throated sparrow, golden-crowned kinglet, hermit thrush, mourning dove, black-capped chickadee, cedar waxwing, robin, dark-eyed junco, and American crow. The most common neotropical migrators include black-throated green warblers, common yellowthroat, Nashville warbler, magnolia warbler, alder flycatcher, and Swainson's thrush (Famous 1999).

Although information specific to Schoodic on non-migratory species of birds is not as complete, the park is known to be home to a variety of birds. For example, wetland species include Virginia rail, great blue heron, and wood duck; forest species include ruffed grouse, gray jay, winter wren, and spruce grouse; and species that occupy brushy habitat include cardinals, white-throated sparrow, and eastern meadow-lark (NPS 1997, Northern Prairie Wildlife Research Center 1998).

The Maine coast has a significant population of seabirds, including the double-crested cormorant, great black-backed gull, common tern, and black guillemot. The Maine Natural Areas Program lists Schoodic Island as a "Significant Wildlife Habitat" because it provides important habitat for nesting seabirds, including American black ducks, herring gulls, and common eiders. Maine is the only one of the lower 48 states with a substantial population of breeding common eiders since this is the southern extreme of their breeding range in North America. Schoodic Island is one of 49 sites in Maine considered a significant breeding site for this species (Klein, undated).

A variety of raptors inhabit the Schoodic Peninsula, including osprey, sharp-shinned hawk, northern goshawk, broad-winged hawk, and merlin. The bald eagle (*Haliaeetus leucocephalus*) is the only federally listed wildlife species known to inhabit the study area. The State of Maine has listed the bald eagle as endangered under Maine's Endangered Species Act (1975). Schoodic and Rolling islands have bald eagle nests, which have been occupied on and off since at least 1965. Although bald eagles have been proposed for delisting, they remain a federally threatened species. The population in the Frenchman Bay area has remained below the identified recovery plan target of one chick per breeding pair annually, which may be the result of increased permanent and temporary human disturbances.

The islands in the Schoodic District may also act as refuges for other species of birds whose populations in the area have fallen because of human disturbance. Purple sandpiper (*Calidris maritima*) is one such species with no federal or state protected status, but whose use of the Schoodic Peninsula may be the result of being displaced from other locations due to human activities. (B. Connery, NPS, personal communication October 2001).

Mammals - A multi-year inventory of mammals in the study area found that 41 species, including 6 species of bats, occurred on the Schoodic Peninsula (Table 8). The study also found evidence of several larger species of mammals including moose, bobcat, and fisher. The presence of these mammals in the study area is likely due to the relatively undisturbed nature of Schoodic, as well as less developed or human populated areas to the north of the park, which provide habitat and a migration corridor onto the peninsula (Glanz 1999).

The most common of the species noted or collected during this study were small, such as deer mice and meadow voles. In wetland or semi-wet areas, masked shrews were captured most frequently. Meadow voles, which were not captured at all during one year of the study, were found in many habitats and in abundance in another year. Meadow vole habitat included coastal shrublands, broken-canopy forest, and grassy trails.

Species found over a wide range of the study area and in a variety of habitats, often including developed areas, include raccoons, coyotes, skunks, and many small mammals. Upland forest species found in the study area include red squirrel, fisher, white-tailed deer, porcupine, long-tailed weasel, coyote, hare, and black bear. Signs of bobcat were common in lowland forests with dense understories and high prey populations. Species in open country, such as meadows or shrublands, include meadow jumping mice, red fox, and meadow vole. Wetland species include several species of shrews (masked, smoky, water, pygmy, short-tail), bat, raccoon, mink, river otter, muskrat, Southern bog lemming, and beaver. Otter will use the shoreline and water for traveling to new freshwater habitats, as well as for occasional hunting. Mink scat has been found in on the southern and western shores of the Schoodic Peninsula.

A separate study of bats was completed in 1997, because many of the bat species in Maine are being considered for state-listing. Nearly 70% of passes recorded by a bat detector during this study were found over ponds and wet areas, and in particular in pools near where the Schoodic Loop Road crosses from the peninsula onto Big Moose Island (Zimmerman 1999). The bat population in the study area is dominated by two species: little brown bat and northern long-eared bat, which are abundant in much of the state. The small-footed bat was also documented in the study area, making the Schoodic Peninsula the northeastern-most point at which this species has ever been recorded. The big brown bat was also recorded, which is also locally rare because there are few suitable roosting sites (i.e., large caves).

TABLE 8. MAMMALS FOUND ON THE SCHOODIC PENINSULA

(Sources: Glanz and Connery 1999, Mittelhauser et al. 1995, Zimmerman 1999)

Species	Schoodic Peninsula	Big Moose Island
Mashed shrew *(Sorex cinerus)*	X	X
Smokey shrew *(Sorex fumeus)*	X	X
Water shrew *(Sorex palustris)*		X
Pygmy shrew *(Microsorex hoyi)*		X
Short-tail shrew *(Blarina brevicauda)*	X	X
Black bear *(Ursus americanus)*	X	X
Raccoon *(Procyon lotor)*	X	X
Long-tailed weasel *(Mustela frenata)*	X	
Mink *(Mustela vison)*	X	X
River otter *(Lutra canadensis)*	X	
Striped skunk *(Mephitis mephitis)*	X	
Red fox *(Vulpex vulpex)*	X	
Coyote *(Canis latrans)*	X	X
Bobcat *(Felis rufus)*	X	
Eastern chipmunk *(Tamias striatus)*	X	X
Red squirrel	X	X
Gray squirrel	X	
Northern flying squirrel	X	X
Muskrat	X	
Deer mouse	X	X
Northern long-eared bat *(Myotis septentrionalis)*	X	X
Small-footed myotis *(Myotis leibii)*	X	
Hoary bat *(Lasiurus cinereus)*	X	
Red bat *(Lasiurus borealis)*	X	
Big brown bat *(Eptesicus fiscus)*	X	
White-footed mouse	X	X
Southern Bog lemming		X
Boreal red backed vole	X	X
Meadow jumping mouse	X	X
Woodland jumping mouse	X	X
Porcupine		X
Snowshoe hare	X	X
White-tailed deer	X	X
Moose	X	X
Meadow vole	X	X
Hairy-tailed mole	X	X
Fisher	X	
Beaver	X	
Little brown bat *(Myotis lucifugus)*	X	X

CULTURAL RESOURCES

Issues Associated with Cultural Resources

- Grading, digging, or other construction and building removal activities may unearth or disturb archeological or historic resources.
- Historic buildings may be eligible for listing in the National Register of Historic Places, dictating the range of exterior and interior changes NPS is able to make to accommodate planned future uses.
- Any actions that involve resources that may be eligible for the National Register of Historic Places are subject to review to ensure that they are not adversely impacted.
- A thorough archeological survey of the Schoodic District has not been completed; therefore, NPS lacks knowledge on possible locations and conditions of archeological resources, which is necessary to protect them.

Cultural Resources

Archeological Resources - Archeological sites in the study area are primarily shell middens (i.e., waste piles of shells from clams, oysters, and other shellfish), which indicate American Indians occupied the Schoodic Peninsula at least seasonally to gather shellfish and other marine resources. An additional site outside the study area to the west shows evidence of long-distance trade relationships, and another shows evidence of semi-subterranean house pits (Berger & Assoc., Inc. 1999).

These sites are from the Ceramic Period (3,000 to 500 years ago), which derives its name from the earliest evidence of the production and use of fired pottery. Coastal groups living during this period were separate from interior groups in what is now Maine. The diet of these coastal groups was diverse and showed seasonal variations as food abundance changed. Although tribes were primarily nomadic and followed food sources, evidence suggests the possibility that some coastal people occupied sites year round, especially in areas accessible by boat (Berger & Assoc., Inc. 1999). Evidence of earlier occupation of areas of Maine and the rest of New England dates from as far back as 11,500 years ago when ice began to withdraw from the Gulf of Maine region.

An archeological reconnaissance study of Big Moose Island indicated that the probability of significant archeological sites on the former navy base property is low because the area does not have any of the features likely to have attracted native people year-round (Berger & Assoc., Inc. 1999). These include shelter from wind and waves, proximity to a mudflat, a location on gently sloping ground, adjacent to a beach, or near a travel route.

Historic Buildings and Cultural Landscapes - The proposed Schoodic Peninsula Historic District, which does not include the 100-acre former navy base property or coastal islands, is eligible for listing in the National Register of Historic Places as a significant cultural landscape. The NPS has documented its eligibility in a draft National Register nomination dated June 2001. The following historic contexts are relevant to the significance of the Schoodic Peninsula Historic District: Community Development and the Origins of Acadia National Park (1890–1937); John D. Rockefeller, Jr. and the Development of the National Park System (1913–1950); and Rustic Design (1890–1958). The latter includes a sub-theme Rustic Design in NPS. Some of the eligible properties are associated with more than one historic context.

The proposed Schoodic Peninsula Historic District is historically significant because it was conceived and designed as a park and recreation area beginning in the late 19th century. Initially, John G. Moore, a Maine native and Wall Street financier, purchased most of the peninsula and constructed the first scenic road. Later conservation efforts by local citizens and the Hancock County Trustees resulted in the addition of the Schoodic Peninsula to Acadia National Park in 1929. Largely due to efforts by John D. Rockefeller, Jr., NPS initiated a rush of major construction in the 1930s to accommodate the relocation of the navy base from Mount Desert Island to Schoodic.

Many of the park facilities at Schoodic were built in the signature NPS rustic style and are representative of the design standards that NPS

TABLE 9. PROPOSED SCHOODIC PENINSULA HISTORIC DISTRICT CONTRIBUTING RESOURCES

(Source: National Park Service 2001)

Contributing Resource	National Register Property Type	Date Built
Developed Areas:		
Schoodic Head	Site	ca. 1930–34
Entrance Road	Structure	ca. 1930
Summit Loop	Structure	ca. 1930
Ranger Station*	Building	1931 (altered post-1984)
Garage	Building	1934
Retaining Wall	Structure	ca.1930
Schoodic Point	Site	ca. 1934–40
Entrance Road	Structure	ca.1934
Parking Area	Structure	ca.1934
Restroom	Building	ca. 1940
Pumphouse	Structure	ca. 1940
Service Road	Structure	post-1933
Moore Plaque	Object	ca.1937
Trail to Restroom	Site	ca.1940
Blueberry Hill	Site	ca. 1935–40
Entrance Road	Structure	ca. 1935–40
Parking Area	Structure	ca. 1935–40
Roads:		
Schoodic Loop Road	Structure	1933-35
Gravel Pull-Offs (3)	Structure	pre-1935
West Pond Causeway	Structure	ca.1934
Arey Cove Causeway	Structure	1935
East Pond Causeway	Structure	1935
CCC Truck Trail	Structure	ca. 1937
Service Roads (3)	Structure	ca. 1935
Hiking Trails:		
Anvil	Site	ca. 1937
Alder	Site	pre-1930
East	Site	1933–40
Schoodic Head	Site	ca. 1937

* The ranger station is a non-contributing resource because it has lost integrity of design, feeling, and workmanship due to its non-historic exterior material. The ranger station was constructed in the NPS rustic design style; however, the building was altered sometime after 1984, when the original board-and-batten siding was removed and replaced with gray-stained plywood. If the building is restored with the replacement of the board-and-batten siding, the ranger station could become a contributing resource to the Schoodic Peninsula Historic District.

developed during that period (Table 9). These plans were implemented primarily using labor and funding from the New Deal programs. The developed areas in the Schoodic District illustrate the major contribution made by these programs, particularly the Civilian Conservation Corps, in the shaping of the park landscape. The roads and hiking trails are excellent examples of NPS mission to provide public access while seeking to preserve the natural beauty of the parks. These resources exhibit a careful selection and placement of routes to provide dramatic vistas with minimal impact on the landscape. Related structures and engineering features were constructed of local or natural materials to enhance the overall harmonious effect. The Schoodic Loop Road is also significant as an example of Rockefeller's ongoing collaborative efforts with NPS during that period, and it shares many of the design elements used on his carriage roads on Mount Desert Island.

The Rockefeller Building (20,612 square feet) and powerhouse (1,175 square feet) are the only two buildings located within the former navy base that are eligible for listing in the National Register of Historic Places. The U.S. Navy completed National Register nominations for the buildings in September 2001. The buildings are historically significant because they are closely associated with important persons and events concerning the development of Acadia National Park and establishment of the U.S. Navy radio station. The buildings also embody distinctive characteristics of design and construction that possess high aesthetic qualities.

Noted architect Grosvenor Atterbury (1869–1956) designed the Rockefeller Building and powerhouse for NPS in 1933. Atterbury designed the buildings in the French Norman Revival style, which he had used around the same time in the design of carriage road gate houses located within Acadia National Park on Mount Desert Island. Using federally appropriated funds, NPS completed construction of the buildings by 1935.

The Rockefeller Building is a steel-frame apartment building with an exterior of differently textured and colored bricks and stones framed by cypress half-timbering. The building's interior features and finishings are typical of the 1930s, with the exception of modern upgrades to the kitchens and bathrooms.

The powerhouse is a small utility building immediately adjacent to the Rockefeller Building with a similar architectural style. The powerhouse was expanded in 1943 with a matching roof and brick/stone work so as not to detract from its original design. Of the original five buildings on the base, the Rockefeller Building and powerhouse are the only ones to have survived largely intact.

The former navy base was not included within the boundaries of the potentially eligible Schoodic Peninsula Historic District due to its lack of association with significant themes of the proposed district (community development, origins of Acadia National Park, John D. Rockefeller, Jr., development of the National Park System, and rustic design architecture (see discussion above). The Rockefeller Building and its associated powerhouse are the only identified NRHP-eligible cultural resources on the base. Their significance is related to their association with important persons and events related to the development of Acadia National Park.

Groups of buildings at the base were evaluated for the possibility of creating a historic district; however, no assemblages of historic buildings meeting the criteria for listing were found. The base exhibits "a distinctly late-20th-century character," preventing its National Register qualification as a "distinguishable entity" (Berger & Assoc. 1999).

Appendix D (Tables 1–3) lists buildings at the base and their proposed uses under each alternative.

VISITOR EXPERIENCE

Issues Associated with the Visitor Experience

Reuse of the former navy base may increase visitation to the Schoodic District and impact the quiet, natural visitor experience.

Visitor Experience in the Study Area

The University of Vermont completed the Schoodic Peninsula, Acadia National Park, Visitor Study 2000–2001 (Manning et al. 2002), to gather information to assist NPS in developing a new management plan for the Schoodic District of Acadia National Park. The objectives were to collect information on the number and type of visitors and to gain information that will help formulate standards of quality for visitor experiences. The study methods included two surveys of park visitors conducted during the summers of 2000 and 2001. The first survey was conducted on 10 randomly selected days in July and August of 2000; trained surveyors distributed questionnaires to people in 740 vehicles prior to their leaving the park. Of these, visitors completed 581 questionnaires. The same methodology was applied in the 2001 portion of the survey, and 640 visitors completed questionnaires. The study also included counts of cars and people at the following sites: the information kiosk, Frazer Point picnic area, Stacked Rock pullout, Ravens Nest, West Pond Cove, Schoodic Point, Little Moose Island pullout, Blueberry Hill parking area, and Rolling Island pullout. The counts were conducted on an hourly basis on the same 10 randomly selected days as the surveys. The results presented in the following pages reflect information gathered during both years of the study.

While a range of people visit the Schoodic District, most visitors share some common characteristics, including age, group size and composition, and prior knowledge of the area. Average visitors to the Schoodic District are about 50 years old and come from the Northeast. These visitors typically come in pairs or small groups of family and friends. The numbers of male and female visitors are approximately equal. Most visitors learned of the Schoodic Peninsula by word of mouth, and over half had visited the area before participating in the survey. Almost 50% of all visitors to the Schoodic Peninsula cite it as their primary destination. Less than 15% of all visitors to the Schoodic Peninsula cite the Mount Desert Island portion of Acadia National Park as their primary destination.

Average visitors spend approximately one day in the Schoodic District, remaining in the park for less than three hours. They visit several places in the park, the most common being Schoodic Point, the Blueberry Hill parking area, and Frazer Point. Most visitors enter the park between 10:00 a.m. and 2:00 p.m. Visitor and automobile counts indicate that peak visitation occurs at the selected count sites between 1:00 p.m. and 4:00 p.m. In the Schoodic District, the primary activities for typical visitors are watching the surf and driving on the scenic loop around the end of the peninsula. Other common activities include photography, observing nature, and picnicking. However, the most enjoyed pastime is taking in the natural scenic beauty. Most visitors find nothing they dislike about the experience.

The most frequently cited positive qualities of the Schoodic Peninsula are the pristine natural beauty and scenery coupled with the quiet atmosphere and low levels of visitation. People come to Schoodic with the expectation that it will be more peaceful, less crowded, and less littered than the Mount Desert Island portion of Acadia National Park. Most visitors leave the Schoodic District with their expectations fully met. Those who are not fully satisfied cite overcrowding at Schoodic Point as a problem.

Although most visitors do not feel that they negatively impact the Schoodic District, a few visitors mentioned litter, trail erosion, crowding, and traffic as problems. Despite these concerns, most visitors feel that the current management practices adequately maintain the most important features of the peninsula, and therefore no improvements or changes are necessary.

It should be noted that at the time of the surveys, visitors had no access to the navy base and most were not familiar with it. Even in 2001 when it was in full operation it was not perceived as having negative impacts on the park.

SOCIOECONOMIC ENVIRONMENT

Issues Associated with Socioeconomic Environment

- A large percentage of workers at the Naval Security Group Activity Winter Harbor were local civilians who may be looking for new employment opportunities in the area. Some of the employment lost due to the naval base closing may be replaced by employment opportunities related to the proposed reuse alternatives. New jobs would likely be in the service sector and the education and research sectors, serving visitors at the former navy base. An undetermined number of these jobs could be available to Hancock County residents and others in the region.

- The alternatives at Schoodic could generate spinoff impacts in the local community in addition to direct employment.

- There would be cumulative economic impacts to the area with the reuse of the navy housing in Winter Harbor and operations site in Corea. Some impacts might represent economic losses, while others might be long-term gains.

Socioeconomic Environment in the Study Area

Hancock County has been selected as the region of influence (i.e., geographic area) on which the analysis of socioeconomic impacts of the proposed alternatives are based. Hancock County is where the Naval Security Group Activity Winter Harbor was located and where the majority of economic impact occurred. This region of influence is the same area the U.S. Navy selected for its environmental assessment of the former navy base's Winter Harbor housing and Corea operations sites, which are not a part of the study area.

Regional Economy - The coastal area of Hancock County is rural in nature. Nearly one-third of the county's residents reside in the towns of Bar Harbor, Bucksport, and Ellsworth. Many of the county's towns have from 1,000 to 2,000 residents (Department of the Navy 2002). In 2000, the population in Hancock County was 51,791, growing by 10.3% during the 1990s. The growth took place in coastal communities, and projections indicate that coastal communities will continue growing through 2015. As of 2000, Winter Harbor and Gouldsboro had populations of 988 and 1,941, respectively. Both towns have significant summer populations.

Year-round employment in Hancock County was 34,400 in 1998, with Ellsworth and Bar Harbor employing 9,800 and 6,900, respectively. The fastest–growing segments of the economy have been the service sector and the self-employed sector. Leading employers in Hancock County are The Jackson Laboratories, in Bar Harbor, and Maine Coastal Memorial Hospital, in Ellsworth. Hancock County saw a significant increase in year-round and summer employment during the 1990s. This trend is expected to continue in coastal areas with good access to the state's highway system.

Retirement and second homes for baby boomers will help drive growth. Employment growth in Bar Harbor has been influenced by recreational visitation to Acadia National Park, which is expected to experience continuing growth.

With the closing of the Naval Security Group Activity Winter Harbor, the economy of the Winter Harbor–Gouldsboro area is mainly related to fishing and logging, and the resort economy, including tourists, seasonal homeowners, and retirees. Winter Harbor has approximately 200 year-round homes and 120 seasonal homes, and Gouldsboro has a large concentration of retirees. Fishermen in the area are harvesting less from groundfish stocks in the ocean, but are still enjoying profitable lobster catches near shore. There are several fish processing and canning operations in the area. A major export are sea urchins for the Japanese market.

The unemployment rate in Winter Harbor and Gouldsboro was 5.7% in 2000, compared to the Hancock County rate of 4.5% and the statewide rate of 3.5%. The per capita income of Hancock County in 2000 was $26,648, compared to $25,623 for the State of Maine.

The State of Maine's 2001 Economic Development Strategy recognizes the need to

spur economic development in areas of the state, like the Schoodic Peninsula, which have undergone economic setbacks like the naval base closing. The state economic development strategy includes among its economic development strategies expanding Maine's market as a premier tourist destination, and encouraging research and education.

Naval Security Group Activity Winter Harbor - In 1997, the Naval Security Group Activity Winter Harbor employed 505 enlisted and civilian personnel, with over 300 living in nearby towns, including military housing in Winter Harbor. The total payroll of the naval facility was $10,900,000. According to a study, *Economic Impacts of Winter Harbor Naval Base Closure on Hancock County, ME*, by Todd M. Gabe and Thomas G. Allen, of the University of Maine, the indirect impact of the base closing includes the decrease in spending by the U.S. Navy at local businesses and subsequent decreases in purchases made by these businesses at other enterprises in Hancock County. This amount was estimated to be $1,823,351 annually. The induced economic impact results in a decrease in personal income to other workers in Hancock County, which was estimated to be $3,957,206 annually. According to the University of Maine study, Hancock County is facing a total economic impact of $16,680,557 due to the closing of the navy base (Gabe and Allen, 2000).

Acadia National Park - In 2001, recreation visits to Acadia National Park totaled 2.52 million, with the Schoodic District receiving approximately 10% of the park's total recreation visits. By 2015, an additional 406,000 recreation visits are projected for Acadia National Park, with the bulk of visitors arriving in the summer and visiting the park on Mount Desert Island.

According to *Economic Impacts of Selected National Parks; Update to Year 2001* (Stynes and Sun 2002), local day visitors contributed 5% of overall recreation visits, day visitors from other regions 25%, and visitors staying at lodges and campsites were 60% and 10%, respectively. The 2.52 million recreation visits were converted to 820,000 party days (the number of days each visitor party spends in the local region based on an average of three people per visitor party), which was the spending unit in the MGM2 analysis.

On average, visitors spent $165 per party per day at the local area. Total visitor spending was estimated to be $134.85 million in 2001.

The $134.85 million spent by visitors to Acadia had a direct economic impact of $116.02 million in direct sales, $41.05 million in personal income (wages and salaries), $61.60 million in value added, and 2,830 jobs. Among all direct sales, $50.65 million was from the lodging sales, $29.17 million from food and drinking places, $11.86 million from admission fee and $12.97 million from the retail trade. As visitor spending circulates through the local economy, secondary effects created additional $19.64 million personal income and 765 jobs. In summary, visitors to Acadia spent $134.85 million in 2001, which supported a total of $170.12 million in direct sales, $60.69 million in personal income, $95.52 million in value added (the sum of employee compensation, proprietary income, and indirect business tax), and 3,594 jobs (Stynes and Sun 2002).