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PARKS®

February 2009

POINT REYES NATIONAL SEASHORE

A Resource Reassessment



National Parks Conservation Association®
Protecting Our National Parks for Future Generations®

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The National Parks Conservation Association (NPCA) initiated the State of the Parks program in 2000 to assess the condition of natural and cultural resources in the parks, and to determine how well equipped the National Park Service is to protect the parks. The program's goal is to provide information that will help policy makers, the public, and the National Park Service improve conditions in national parks, celebrate successes as models for other parks, and ensure a lasting legacy for future generations.

In an effort to track the conditions of natural and cultural resources through time, the Center for State of the Parks revisits parks periodically. The Center for State of the Parks first evaluated resource conditions at Point Reyes National Seashore in 2002; researchers revisited the park's resources in 2007. Point Reyes National Seashore is the first park to undergo a reassessment by the Center for State of the Parks. Since the initial assessment of Point Reyes National Seashore, the comprehensive, peer-reviewed natural and cultural resource methodologies used by the Center for State of the Parks have evolved. Due to the inclusion of new resource categories and the re-evaluation of existing categories, it is not possible to directly compare the results of the initial assessment to those of the reassessment. It is possible, however, to convey current resource conditions, highlight continuing issues as well as new developments at Point Reyes National Seashore, and report on how the conditions of natural and cultural resources have progressed since 2002.

For more information about the methodology and research used in preparing this report, and to learn more about the Center for State of the Parks, visit www.npca.org/stateoftheparks or contact NPCA, Center for State of the Parks, P.O. Box 737, Fort Collins, CO 80522; phone: 970.493.2545; email: stateoftheparks@npca.org.

Since 1919, the National Parks Conservation Association has been the leading voice of the American people in protecting and enhancing our National Park System. NPCA, its members, and partners work together to protect the park system and preserve our nation's natural, historical, and cultural heritage for generations to come.

- * More than 340,000 members
- * Twenty-five regional and field offices
- * More than 120,000 activists

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A special note of appreciation goes to those whose generous grants and donations made the report possible: MSST Foundation, Dorothy Canter, Ben and Ruth Hammett, Marty and Lee Talbot, and anonymous donors.

Please note: Some of the information in this report regarding Drakes Estero has been updated based on the FY2010 Interior Appropriations bill, which was enacted October 29, 2009. The rest of the information presented here reflects NPCA's knowledge of resource conditions as of February 2009.

Cover photo of Point Reyes National Seashore courtesy of Mark Rasmussen/istockphoto.



INTRODUCTION



MEGAN LOWERY

Point Reyes National Seashore, established in 1962, is the only national seashore on the West Coast. It features windswept beaches, coastal cliffs and headlands, marine terraces, coastal uplands, salt marshes, estuaries, and coniferous forests. Located on the Point Reyes Peninsula, 40 miles northwest of San Francisco, the park encompasses about 71,070 acres, stretched across more than 80 miles of undeveloped coastline. Within the park, 32,730 acres are

designated wilderness or potential wilderness, constituting one of the most accessible wilderness areas in the country, and the only marine wilderness on the West Coast south of Alaska. The staff responsible for maintaining Point Reyes National Seashore also manages the adjacent Northern District of Golden Gate National Recreation Area, which encompasses 19,000 acres.

The Point Reyes Peninsula is situated along

Point Reyes National Seashore's varied habitats support species ranging from endemic plants to endangered marine mammals. Estero de Limantour is pictured here.

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CATHY NORRIS

the San Andreas Fault. The peninsula has shifted more than 186 miles in the last 10 million years and continues to move along the fault in a northwesterly direction at a rate of nearly two inches per year. Due to differing geology and the park's location on a peninsula, the landscape and ecosystems within the park differ dramatically from nearby landscapes and ecosystems in central California. Consequently, the park has a high rate of endemism—species that are found nowhere else. These include mountain beaver (*Aplodontia rufa phaea*) and Sonoma spineflower (*Chorizanthe valida*). Nearly 500 species of birds have been recorded within the park, generating the greatest avian diversity within the entire National Park System. In addition, a third of the world's cetacean species (aquatic mammals such as dolphins, whales, and porpoises) can be found in the park's 22,000 acres of estuarine and marine waters that extend a quarter mile out to sea.

Lands administered by the park's staff, including those within Point Reyes National Seashore and those within the Northern District of Golden Gate National Recreation Area, also encompass a variety of cultural

resources. These include more than 300 historic structures and a variety of archaeological resources, many of which are linked to the Coast Miwok people who inhabited the coast prior to Euro-American settlement. English explorer Sir Francis Drake was the first to visit the region in 1579, when his ship sailed near what is now Drakes Bay. In the centuries that followed, the peninsula has been variously owned and occupied by Spanish missionaries, Mexican land grantees, and American ranchers. During the 19th century, the entire peninsula was subdivided into tenant dairy ranches. Today, beef and dairy operations still exist on 24,000 acres in Point Reyes National Seashore and the Northern District of Golden Gate National Recreation Area.

Each year, more than 2 million people visit Point Reyes to hike the park's 150 miles of trails, camp in the backcountry, attend ranger-led programs, kayak in Tomales Bay, watch wildlife, or participate in a host of other recreational and educational activities. These visitors generate nearly \$90 million each year in local revenue and support more than 2,000 local jobs (non-park staff).

Point Reyes National Seashore offers an array of recreational and educational opportunities. More than 2 million people visit the park each year, generating millions of dollars in local revenue.



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THE POINT REYES REASSESSMENT



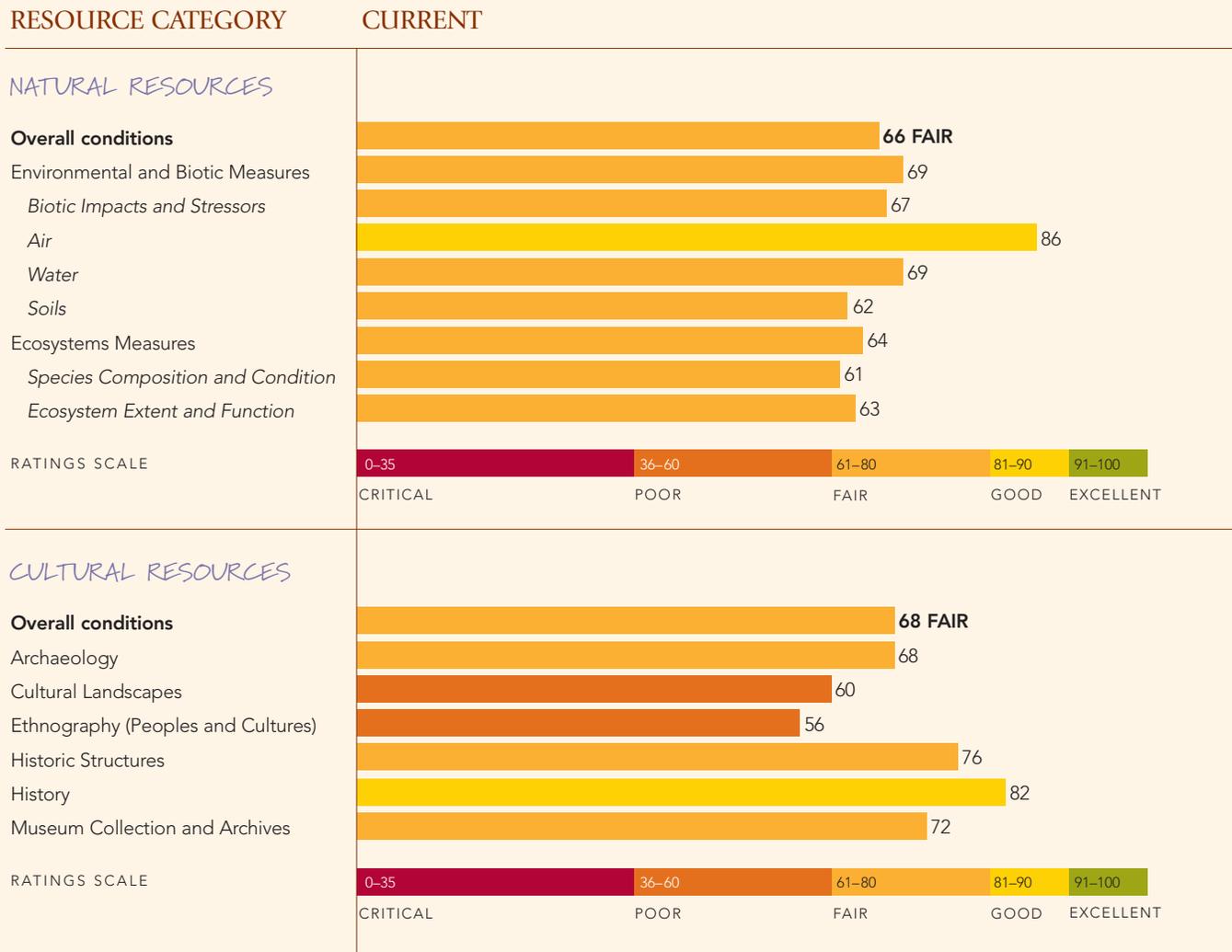
MEGAN LOWERY

Point Reyes is the only national seashore on the West Coast. The park's landscape and ecosystems differ from those on the mainland, largely due to differences in geology and its location on a peninsula.

Center for State of the Parks researchers used established, peer-reviewed methodologies to reassess the conditions of natural and cultural resources within Point Reyes National Seashore. This reassessment of park resources follows initial baseline work conducted by the Center for State of the Parks in 2002. The following pages provide an overview of current natural and cultural resource conditions, highlight continuing issues as well as new develop-

ments at Point Reyes National Seashore, and report on how resource conditions have changed since 2002.

Note: The following scores, based on a 0 to 100 scale, were prepared through a 2007 reassessment of resource conditions at Point Reyes National Seashore, using Center for State of the Parks methodologies (see "Appendix").



The findings in this report do not necessarily reflect past or current park management. Many factors that affect resource conditions are the result of both human and natural influences over long periods of time, in many cases before a park was established. The intent of the Center for State of the Parks is not to evaluate National Park Service staff performance, but to document the present status of resource conditions and determine what actions can be taken to protect them in the future.



Dune restoration benefits the endangered Tidestrom's lupine.

KEY FINDINGS

- Park staff continue to engage in a host of significant restoration projects. They have removed invasive non-native plants, reintroduced endangered plants, and revitalized tidal wetlands. The park is reestablishing access for coho salmon (*Oncorhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*) to approximately 20 miles of streams; both species are protected under the Endangered Species Act. In addition, the park is restoring 560 acres of coastal wetlands to benefit endangered species, reduce flooding, and enhance water quality in Tomales Bay. The park has restored about 50 acres of coastal dunes to benefit species such as the threatened western snowy plover (*Charadrius alexandrinus nivosus*) and the endangered Tidestrom's lupine (*Lupinus tidestromii*).
- Global climate change is a concern in many national parks, and Point Reyes is no exception. According to scientific predictions, Point Reyes will receive increased rainfall, more intense and frequent El Niño events, and a rise in sea surface temperature. Sea level is projected to rise 18.9 to 36 inches by 2100, which will result in shoreline erosion, saltwater intrusion into groundwater aquifers, inundation of wetlands and estuaries, increased rates of cliff erosion and changing use of offshore rocks (e.g., reduced nesting opportunities for birds), detrimental effects on species that depend on the intertidal zone, and threats to cultural resources and infrastructure. Research shows one half of the park's coastline is highly vulnerable to these effects based on six variables: geomorphology, historical shoreline change rate, regional coastal slope, relative sea level change, mean significant wave height, and tidal range. Animals, plants, and other organisms that currently inhabit the park could be forced to find new places to live in response to rising temperatures due to global climate change. Changes in sea temperature could also result in significant changes in seasonal oceanic conditions, resulting in the collapse of food webs dependent on seasonal coastal upwelling.
- In April 2008, Point Reyes National Seashore became a member of the Climate Friendly Parks Network, a joint partnership between the National Park Service and the U.S. Environmental Protection Agency. In order to achieve this designation a park must conduct a greenhouse gas inventory and complete a plan detailing steps to reduce park emissions. Since 2005, the park has reduced its gross emissions by 1,710 metric tons. The park satisfies 14 percent of its needs for electricity and is able to run five park vehicles from solar power. The park is considering using methane digesters to convert manure from the six dairy ranches in the park into electrical energy and heat.
- Although Point Reyes is just 40 miles from the urban San Francisco Bay area, air quality is generally good, owing primarily to westerly winds that keep air from nearby urban areas from inundating the park. Consequently, the park has low exposure to ozone, sulfur, and nitrogen, and there is a low potential for acidification of surface waters from atmospheric deposition.
- The San Andreas Fault separates the Point Reyes Peninsula from the California mainland. Movement along the fault causes the peninsula to shift an average

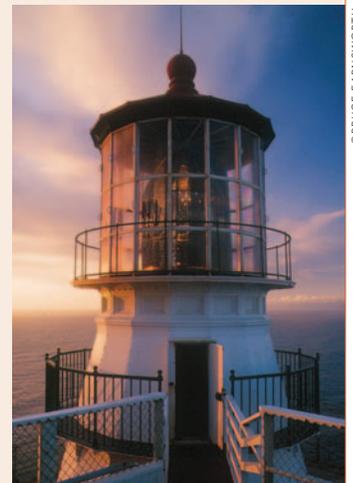
of two inches each year. The U.S. Geological Survey reports that there is a 62 percent chance that the San Francisco Bay Area will experience an earthquake of 6.7 magnitude or larger in the next 30 years. An earthquake of this magnitude could have devastating effects on historic buildings and modern park infrastructure. To prevent and mitigate potential damage to historic structures, the park would like to put together a treatment and design plan aimed at reducing these threats, especially for ranch structures. Funding for the plan is being pursued.

- A pinniped is a carnivorous aquatic mammal with flippers, such as a seal or sea lion. In general, pinniped populations in California are recovering from a period of marine mammal exploitation that came to a close in 1972 with passage of the Marine Mammal Protection Act. Steller sea lion (*Eumetopias jubatus*) populations, however, have yet to recover at the national seashore or statewide. In fact, this federally listed threatened species has not bred at Point Reyes since the 1970s, and the maximum count at the park over the past several years was around 25 individuals. The failure of this species to recover from previous exploitation could be related to numerous factors, including reduced prey availability, contaminants, disease, interactions between humans and fisheries, illegal hunting, changes in sea surface temperature, and changing ocean productivity associated with the Pacific Decadal Oscillation (periodic shifts in Pacific climate detected as changes in Pacific Ocean surface temperatures).
- Drakes Estero, located within Point Reyes National Seashore, is one of several areas in California where commercial oyster

farming takes place. Drakes Estero is important habitat for wildlife, including harbor seals, birds, and fish; it is congressionally designated potential wilderness, and may be restored to natural conditions by the Park Service (i.e., become full wilderness) in 2012 when the oyster farming rights for that location expire.

- In 1999, the park hired a chief of cultural resources and established a historic preservation crew consisting of an exhibit specialist and two carpenters. By 2002, the park had an archivist and part-time museum technician, and a regional archaeologist worked two days a week at Point Reyes. Currently, the cultural resources division has an additional preservation carpenter and an archives technician. Many of the cultural resources positions are partially funded with money from other parks. Point Reyes' cultural resources would benefit from additional staff, primarily a full-time archaeologist to identify and record the location of archaeological sites and a historical landscape architect to document the condition of the park's cultural landscapes (conditions of 26 of the 38 cultural landscapes are unknown).
- The park's historic structures are not receiving the maintenance necessary to preserve them for future generations. At present, the cost of deferred maintenance projects for historic structures is nearly \$17 million. Needed projects go unfunded, sometimes for years at a time. For example, a request to repair and restore the structurally unsound Point Reyes Lighthouse, a historic structure built in 1870, was first submitted in 2002, and the need was reiterated in 2006. Park managers do not know when this high-priority project will receive funding.

The park needs fund to care for historic structures, including the Point Reyes Lighthouse, which was built in 1870.



NEW RESEARCH, RESTORATION, AND PLANNING

Staff at Point Reyes National Seashore work continuously to improve resource management and elevate resource conditions through various planning, research, and restoration projects. Following are examples of work that has been done since 2002.

Volunteerism

- Point Reyes is fortunate to have a strong volunteer base. In 2007, 1,428 volunteers contributed 25,211 hours of service to the park. This is an increase over the 2002 numbers of 1,128 volunteers and 21,576 hours. The park will soon hire a volunteer coordinator with funds from the Park Service's Centennial Initiative, a program focused on celebrating the National Park System's first 100 years (1916–2016) and ensuring resources are protected into its second century and beyond. This position has been vacant for the last five years.

Park Planning

- NPCA's 2002 assessment of resource conditions identified the need for updates to several of the park's management plans. The park completed an updated fire management plan in 2004, replaced the 1998 collection management plan with the 2005 museum management plan, and completed a new integrated pest management plan in 2007. In 2009, the park hopes to complete an updated scope of collections statement as well as a resource stewardship strategy outlining ways to achieve desired conditions for fundamental natural and cultural resources. Point Reyes is a pilot park for testing the effectiveness of resource stewardship strategies, broad-based park planning documents that may replace resource management plans currently used throughout the park system.

Volunteers remove Cape-ivy, an invasive plant, from part of the park. Hours of service donated by volunteers help the park accomplish projects that would not otherwise be possible.



Natural Resources

- New natural resources research and documents at Point Reyes National Seashore that have been completed since NPCA's 2002 assessment include:
 - ~ Assessment of air quality and air pollutant impacts in Class I national parks of California
 - ~ Water quality monitoring plan
 - ~ Inventory and monitoring plan for the national parks of the San Francisco Bay Area Network
 - ~ Trail inventory and condition assessment
 - ~ Assessment of coastal vulnerability to sea level rise
 - ~ Draft resource stewardship report
 - ~ Draft water resources stewardship report
 - ~ Baseline data collection for night sky brightness with a report forthcoming
- Point Reyes is part of the San Francisco Bay Area Network of the Park Service's Inventory and Monitoring Program. Research completed through this program has contributed greatly to the natural resources knowledge base at Point Reyes National Seashore. Inventories and surveys that have been entered into the NPSpecies database have documented 11 amphibian, 20 reptile, 135 fish, 97 mammal (25 of which are marine), 490 bird, and 1,093 vascular plant species within the park.
- In 2002, NPCA reported on the need for a team to target invasive plants within the national seashore. Later that year, the California Exotic Plant Management Team was established. This team is stationed at Point Reyes National Seashore and serves 13 California parks. Between 2002 and 2007, the park received substantial Park Service



funds to remove 100 acres of iceplant (*Carpobrotus edulis*), 25 acres of Cape-ivy (*Delairea odorata*), and many additional acres of other top-priority invasive plants. The park has developed an invasive plant prioritization system, and it implemented an early detection and rapid response program in 2008.

- The Pacific Coast Science and Learning Center (PCSLC), one of 17 such centers across the National Park System, facilitates about 100 research projects in the park each year, providing researchers overnight housing and access to other park facilities. The Tomales Bay All Taxa Biodiversity Inventory is a large component of the PCSLC. This program has identified more than 2,500 species within the Tomales Bay watershed, including species new to science such as the small marine crustacean *Nebalia kensleyi*. The program has also detected the invasive species *Didemnum lahillei*, a sea squirt previously unknown to the bay, and conducts surveys of algae, diatoms, fishes, invertebrates, and phytoplankton.

Point Reyes National Seashore is home to 25 species of marine mammals, including elephant seals.

Youth volunteers pose with a pile of non-native iceplant they helped to remove from the park's dunes. Restored dunes provide habitat for rare plants and animals.



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- With the help of volunteers, park staff restored 50 acres of sand dunes from 2001 to 2006. They removed non-native plants such as iceplant, European beachgrass (*Ammophila arenaria*), European searocket (*Cakile maritima*), and New Zealand spinach (*Tetragonia tetragonioides*). Today, nine species of native dune plants, including rare plants such as Tidestrom's lupine and beach layia (*Layia carnosa*), have begun to naturally recolonize the restored dunes. The western snowy plover, a federally listed threatened bird species, has also benefited. Prior to dune restoration, the habitat was not suitable for this bird; today, plovers nest and raise chicks in the newly restored dunes. Park staff plan to build on the success of this project by restoring 300 additional acres of dunes in 2009.
- The park is working to identify and restore populations of rare, threatened, and endangered plant species. In 2002, staff introduced more than 500 endangered Sonoma alopecurus (*Alopecurus aequalis* var. *sonomensis*) plants to four sites. In 2004, the San Francisco Bay Area Network of the Park Service's Inventory and Monitoring Program completed an inventory of rare plants within Point Reyes National Seashore. Staff now have baseline information on the location and population status of rare plants. In 2005, researchers from Washington University in St. Louis, Missouri, partnered with park staff to establish a rare plant population ecology program to study priority species for park management. In 2006, park staff planted 135 seedlings of the endangered Tidestrom's lupine, and in 2007 they began seeding trials to reintroduce the extirpated endangered showy Indian clover (*Trifolium amoenum*).
- In 2002, NPCA reported on the importance of restoring tidal wetlands at Tomales Bay, which were eliminated by tide gates and levees built in the 1940s. These lands are part of the Giacomini Ranch, which the Park

Service acquired in 2000. In 2006, the park released a report detailing the environmental impacts associated with removing levees, tide gates, and culverts to restore natural hydrologic processes. Restoration will allow Lagunitas Creek and its tributaries to overflow into their historic floodplain, thereby reducing flooding in the local community (Point Reyes Station), and sediments, nutrients, and pollutants will be filtered and transformed by the restored wetlands. Completion of the project will also improve water quality in Tomales Bay, provide wildlife habitat and food, and enhance recreational opportunities.

- In 2004, staff finished restoring the Horseshoe Pond area. Built in the 1940s by damming an existing lagoon, the pond was part of the D-Dairy Ranch, which operated from 1862 to 1998. Restoration efforts included removing an earthen dam and concrete spillway, as well as work adjacent to the pond to promote restoration on a landscape level, such as rehabilitation of the quarry where original fill for the dam was obtained, closeout of former ranch roads, and enhancement of former farm ponds for wildlife habitat. As evidence of the success of this project, the eastern channel of the restored lagoon quickly filled with deposited beach sand and the western channel now conveys tidal flow.
- Dams and culverts leading into Drakes Estero have altered natural hydrological processes for decades. To restore these processes and benefit rare anadromous fish such as steelhead trout, the park has been engaged in a coastal watershed restoration project that includes removing or replacing dams and culverts within the Drakes Bay watershed. Replacement of culvert crossings with bridges and removal of dams to restore tidal marsh plain habitat was completed in 2008.

- Point Reyes National Seashore staff have participated in California's process to design, assess, and designate marine protected areas (MPAs) off the north-central California coastline. In 2008, the preferred alternative proposal for a network of MPAs was presented to the California Fish and Game Commission by the Marine Life Protection Act North Central Coast Regional Stakeholder Group, of which the park is a member. The network proposal included MPAs within Point Reyes National Seashore, including Point Reyes Headland, Drakes and Limantour Esteros, and Duxbury Reef. The commission will make a final decision in 2009. Once sites are approved the seashore will coordinate with the California Department of Fish and Game in a pre-assessment of the resources within the MPAs and in monitoring the areas after implementation. In an effort to inform the public about the MPA process and the state of the oceans, the Pacific Coast Science and Learning Center, Cordell Bank National Marine Sanctuary, and the park's interpretation division collaborated to bring a broad-based ocean education and outreach program to Point Reyes National Seashore.

Western snowy plovers, federally listed as threatened, nest and raise chicks in the park's restored dunes.



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Cultural Resources

- In 2006, park staff installed fencing in several locations along Home Ranch Creek in an effort to prevent livestock from grazing and lounging in the wet meadows adjacent to the creek, protecting water quality and mitigating stream bank erosion. Staff have also installed fences at 17 other sites to protect cultural resources by excluding cattle, as grazing can contribute to the erosion and loss of archaeological sites.
- A wide range of cultural resources research has been completed or is currently under way at Point Reyes National Seashore. A joint archaeological overview and assessment by Point Reyes National Seashore, Golden Gate National Recreation Area, and Sonoma State University was completed in November 2003, with plans to update the document already in the works. An environmental history of Tomales Bay was completed in 2007. An administrative history of the park, which includes a discussion of early inhabitation of the Point Reyes Peninsula, Euro-American settlement, the history of the area as a unit in the National Park System, and a detailed legislative and operational history of the seashore, also was completed in 2007. A cultural landscape report for Point Reyes Ranches Historic District is under way. A cultural landscape report for the Marconi/RCA wireless communication sites was funded in 2008. The park is also currently considering additional historic resource studies exploring the themes of environmental history, agriculture, and fire management, as well as oral and labor history projects.
- Six National Register nominations or determinations of eligibility for historic properties within Point Reyes National Seashore were reviewed by the California State Historic Preservation Officer (SHPO) in 2008. The SHPO concurred with the park that four of the six properties are eligible for the register. In addition, a nomination prepared by Sonoma State University for a Coast Miwok heritage district containing 60 to 70 indigenous archaeological sites will be submitted to the keeper of the National Register in Washington, D.C., in spring 2009. The Federal Preservation Office in Washington, D.C., is reviewing the National Historic Landmark nomination prepared by the Drake's Navigators Guild, a nonprofit advocacy group, for the landing site of 16th-century explorer Sir Francis Drake.

The Point Reyes Peninsula has a long ranching history. Park visitors can take self-guided tours around the renovated Pierce Point Ranch, established in 1858.



- When NPCA first assessed resource conditions at Point Reyes in 2002, just 8 percent of the park's acreage had been surveyed for archaeological resources, and the condition of many of the 124 known archaeological sites could not be determined due to inadequate data. Furthermore, 20 percent of the known sites were threatened by severe erosion or ranching operations. Sonoma State University researchers have completed an archaeological overview for Point Reyes National Seashore and Golden Gate National Recreation Area, and many of the park's archaeological sites are currently being monitored through the California Archaeological Site Stewardship Program. However, due to funding limitations, no additional park acreage has been surveyed for archaeological resources.
- Within the last five years, Point Reyes National Seashore has completed additional cultural landscape research. The park has identified 31 additional cultural landscapes for a total of 38 listed in the Cultural Landscape Inventory, a Park Service-wide computerized database. Efforts to interpret the park's cultural landscapes have also expanded as staff have partnered with ranchers to produce a visitor center exhibit that tells the story of ranching operations from the mid-19th century to the present.
- Within Point Reyes National Seashore, there are 296 historic structures; in addition to these, park staff manage 78 historic structures within the Northern District of Golden Gate National Recreation Area. The park used temporary project funds to hire a historic preservation crew that includes an exhibit specialist and two carpenters. This staff increase has resulted in an increase in the number of historic structures that are in good condition (from 84 to 139) and a decrease in the number of structures in poor condition (from 35 to 14). Over the last five years, the preservation crew has completed 104 projects, including rehabilitation and stabilization of ranch structures, assisting ranch hands with repairs, and training ranchers in simple preservation treatments (i.e., installing wood shingles). The preservation crew works closely with ranchers and maintains excellent relationships with them; ranchers often call the crew for assistance with various projects.
- Management of the park's museum collection and archives has improved significantly since NPCA's initial resource condition assessment. In 2002, Point Reyes created the MARS program—Museum, Archives, and Research Services—which brought collections previously stored in various locations throughout and outside the park into permanent storage in the Red Barn museum collections storage facility. Staff also inventoried 100 percent of the collection. The park has decreased its cataloging backlog below the national average, and the park's *Checklist for the Preservation and Protection of Museum Collections* reports that 176 of the 204 applicable standards (86 percent) were met, showing an increase of 26 percent since NPCA's initial assessment.
- While Point Reyes National Seashore still does not have an official ethnography program in place, the condition of ethnographic resources has improved as park staff have worked to build productive relationships with the Coast Miwok people—organized and recognized by the federal government as the Federated Indians of Graton Rancheria, or FIGR—and ranchers on the peninsula. For example, park staff are working with the FIGR to revise and update their reburial agreement, which outlines the procedures for addressing the inadvertent discovery of human remains.



Sudden oak death has infected oak trees at Point Reyes National Seashore, leaving behind dead and dying trees, as shown here. Resulting decreases in acorn production have the ability to cause cascading effects up the food chain.

CONTINUING CHALLENGES

In 2002, the Center for the State of the Parks reported on significant threats to resources at Point Reyes National Seashore. A number of these concerns continue to challenge park managers, as described below.

Natural Resources

Point Reyes National Seashore harbors 27 federally listed threatened and endangered species, as well as 24 animal and 52 plant species of special concern. These species continue to present management challenges to the park because their protected status necessitates certain management actions and restrictions. Some of these species are doing remark-

ably well within park boundaries while others exist only thanks to park protection. For example: One of the largest remaining populations of endangered coho salmon resides in Lagunitas and Olema Creeks. The park also supports one of the largest populations of threatened California red-legged frogs (*Rana aurora draytonii*). The endangered California freshwater shrimp (*Syncaris pacifica*) found in Lagunitas and Olema Creeks likely represent the healthiest existing population. Point Reyes harbors five of the six remaining populations of the endangered perennial grass Sonoma alopecurus. The endangered tidewater goby (*Eucyclogobius newberryi*) was thought to be lost to the park until 2002, when it was identified in the Tomales Bay watershed. And the endangered Sonoma spineflower, an endemic forb, was thought to be extinct until a remnant population was discovered in 1980. This plant existed as a single population on disturbed sandy soil, dependant on grazing disturbance from both native ungulates and livestock to reduce competition with other plants. Between 1988 and 2002, the park experimented with direct seeding Sonoma spineflower and established a second population two miles from the original site. An invasive grass currently surrounds the original population and is crowding it.

When NPCA initially assessed resource conditions at Point Reyes National Seashore, sudden oak death (SOD) was a looming threat to the park's oak trees. It has since infested oak trees, especially tanoak (*Lithocarpus densiflorus*), leaving behind dead individuals within the oak-bay, Bishop pine, Douglas fir and redwood forests of Point Reyes. The various species of oak trees provide a vital food source for wildlife, especially small mammals and deer. Decreases in acorn production have the ability to affect entire populations of small mammals, which could indirectly affect important species such as the federally listed northern spotted owl (*Strix occidentalis*). Dead trees also provide

a significant fuel source and may contribute to a devastating wildfire. The park is actively working with the U.S. Forest Service and various academic institutions to better understand and mitigate the effects of SOD. Another potential threat to park forests is pine pitch canker, which has been affecting Monterey pines (*Pinus radiata*) and has recently spread to stands of Bishop pine (*Pinus muricata*). This disease causes infected branches to die and leads to a general decline in a tree's health. In addition, cankers on the main stem of a tree cause it to produce copious amounts of resin.

Marine resources are threatened by a host of factors, including various harvesting methods of commercial and recreational fishers. Boat lights at night contribute to light pollution, while noise from boats can disturb marine organisms. Marine animals have been entangled in fishing gear, resulting in mortality of seabirds, marine mammals, and a sea turtle at the park in the past. In addition, poaching of abalone and marine algae is a problem. The Park Service works with the California Department of Fish and Game to apprehend poachers, and some have been caught. Shipwrecks at Point Reyes have injured park resources by damaging rocky intertidal habitat and associated species, by disturbing wildlife during the wreck and rescue, and by contaminating waters with oil and other pollutants.

While the park boasts relatively good air quality, park waters continue to suffer: In 2000, Tomales Bay and Lagunitas Creek were listed by the San Francisco Regional Water Quality Control Board (SFRWQCB) under the Clean Water Act 303(d) because of high levels of sediment, nutrients, and pathogens. Tomales Bay also has high levels of mercury.

According to the Environmental Protection Agency's regulations, a total maximum daily load (TMDL) report must be completed for each of the above impairments. A TMDL report details the amount of a particular pollutant that a water body can handle without violating water

quality standards, as well as how to mitigate sources of the pollutant. The SFRWQCB completed a TMDL report for pathogens in Tomales Bay in 2005. The report identified a number of pollution sources, including recreational use (primarily boaters dumping sewage in park waters), livestock grazing, dairy operations, equestrian use, and on-site septic systems, and it identified performance measures to address pathogen loading.

As part of a federal Clean Water Act 319(h) grant, the park conducted surveys of all rangelands to document water quality pollution source areas. As a result of the surveys, the park prioritized and completed implementation and monitoring of ten water quality best management practices within the Tomales Bay watershed. Successful completion of the project demonstrated the effectiveness of these practices and facilitated additional project implementation through other grant sources. The park will continue to implement best management practices at priority sites on park agricul-

Point Reyes boasts an incredible diversity of birds—nearly 500 species have been documented in the park. Several are protected under the Endangered Species Act, including the northern spotted owl (fledgling and adult female shown here).



tural lands to improve water quality and reduce sedimentation into creeks.

The restoration of the natural hydrologic process through the Giacomini Wetland Restoration Project at the head of Tomales Bay will not only improve conditions within the heavily managed dairy ranch, but potentially within the entire Tomales Bay (outlined in “New Research, Restoration, and Planning”). Studies indicate that more than two-thirds of the freshwater inflow—and potential pollutant source—to Tomales Bay enters the system just upstream of the Giacomini Ranch, and levees have constrained most of the flows to Lagunitas Creek, funneling them directly into the Bay itself. According to recent studies, removal of levees, tide gates, and other hydrologic impediments will increase floodwater retention in the Giacomini Ranch during smaller flood flows by as much as 2,000 percent and could decrease downstream delivery of sediment and pollutants by as much as 19 percent.

TMDLs for the remaining impairment listings in Tomales Bay and Lagunitas Creek are currently under development.

Cultural Resources

Management of the park’s museum collection and archives has improved substantially since 2002, but threats still remain according to the standards in the *Checklist for the Preservation and Protection of Museum Collections*, including mouse, moth, and beetle infestations, mold damage, and excessive light and temperatures that promote chemical and molecular deterioration. An integrated pest management plan, completed in 2007, addressed the threats of rodents, insects, and mold. Other issues noted in the checklist will be addressed as funding becomes available.

The park has made significant strides in protecting and preserving archaeological resources since 2002, but erosion and grazing remain significant threats. Livestock grazing on several of the park’s working ranches contributes

to the loss of stabilizing vegetation, adding to natural erosion processes caused by the extreme coastal weather. This erosion can expose and even wash away archaeological artifacts and sites. Virtually all archaeology work in the park is reactive, ensuring other park activities are in compliance with the National Historic Preservation Act. Proactive archaeological study—often the most valuable for understanding and protecting resources—is not being done.

The coastal environment’s high winds and salt content are harsh on the park’s historic structures. Many do not receive the regular maintenance needed to prevent damage, while others are harmed by work that does not adhere to the secretary of the Interior’s standards for the preservation of historic structures. Many ranchers who lease park lands do not have the means to maintain their structures to Park Service standards. To keep these structures in good condition, the park must provide regular maintenance, but funding shortfalls prevent this work.

NON-NATIVE DEER DAMAGE PARK RESOURCES

Two species of non-native deer inhabit Point Reyes. Axis deer (*Axis axis*) are native to India and Sri Lanka, while fallow deer (*Dama dama*) are native to Asia Minor and the Southern Mediterranean region. A local landowner purchased eight axis deer from the San Francisco Zoo in 1947, and 28 fallow deer were purchased and released between 1942 and 1954 on the western slope of Inverness Ridge for sport hunting. The seashore was closed to hunting in 1971, though rangers continued to cull deer herds until 1994.

Axis and fallow deer populations can grow at an annual rate of 17 percent and 10 percent, respectively. Approximately 250 axis and 860 fallow deer were estimated to exist within the park in 2003, and the populations were projected to grow and expand east, outside of park boundaries. As stated in the park’s 1999 resource management plan, the original goal for

Native black-tailed deer blend into the hillsides of Point Reyes National Seashore.





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deer management was to control and maintain the non-native deer at a population of 350 individuals of each species; however, research shows that non-native deer compete with native ungulates for habitat and forage, and they damage ecosystems as a whole. They heavily browse riparian areas, dig, and thrash vegetation with their antlers during the breeding season. These activities destroy habitat for federally protected species such as the California red-legged frog, coho and chinook salmon (*Oncorhynchus tshawytscha*), and steelhead trout. They harm water quality by destroying streamside vegetation, increasing erosion, turbidity, and nutrient input. They also disturb and compact soils, spread the seeds of invasive plants, damage livestock fencing, and consume supplemental livestock feed. In addition, they carry the organisms that can cause paratuberculosis and pediculosis

(louse infestation), both potentially fatal diseases of native black-tailed deer (*Odocoileus hemionus*) and tule elk (*Cervus elaphus nannodes*). Therefore, the park's 2006 non-native deer management plan calls for complete removal of these species.

The park is moving forward with eradication of the non-native deer. Since the park initiated this project, the majority of the non-native deer have been eliminated, and much of the meat has been donated to food banks and California condor recovery programs throughout the state. The removal of all non-native deer may take as long as 15 more years to complete.

Tule elk, a subspecies of elk endemic to California, were hunted nearly to extinction in the mid-1800s. They were successfully reintroduced to Point Reyes National Seashore in 1978. The presence of non-native axis and fallow deer in the park threatens the elk, partly because these non-native animals carry organisms that can cause fatal diseases in elk.

OYSTER OPERATIONS IN CONGRESSIONALLY DESIGNATED POTENTIAL WILDERNESS

One commercial oyster business currently operates within the boundaries of Point Reyes National Seashore in Drakes Estero. More than 98 percent of the oysters produced in California (including those produced in Drakes Estero) are the non-native Pacific oyster (*Crassostrea gigas*), originally from Japan. Oyster cultivation is not a new endeavor to the park—commercial operations began in the late 19th century—though continued operations have been a politically charged issue recently.

Abandoned oyster bags are evidence of the commercial oyster farming currently occurring in Drakes Estero. The Park Service is considering restoring the estuary in 2012, when the one-time 40-year commercial operating rights expire.

Drakes Estero was designated a wilderness area in 1976 with the Point Reyes Wilderness Act, making it the only marine wilderness on the West Coast. But a pre-1976 reservation of occupancy for the oyster operation prevented the full wilderness designation at that time, and, therefore, Drakes Estero received a potential wilderness designation. The one-time 40-year reservation of occupancy expires in 2012, and the Park Service is currently considering

whether to restore this estuary to natural conditions through full wilderness designation, or allow continuation of the oyster operations. Recently, however, there has been some controversy surrounding the expiration of the reservation of use in Drakes Estero. The current business owner would like the Park Service to authorize extended use, though the Park Service has long-standing restoration goals guided by policy.

The commercial oyster farming in Drakes Estero alters and impacts the natural ecosystem by providing unnatural habitat in the form of permanent wooden structures, upon which the oysters grow. These wooden racks accommodate invasive species, such as the sea squirt, and reduce the amount of sunlight available to submerged vegetation, such as eelgrass. The propellers of boats used during oyster operations tear up eelgrass and further damage this important marine habitat. Drakes Estero supports about 7 percent of California's eelgrass beds, and according to Park Service estimates, motorboats in the estero have damaged roughly 50 acres. Additionally, oyster farming activities may disturb wildlife, such as the tens of thousands of shorebirds, waterbirds, and seabirds that migrate through and spend the winter there each year. Disturbance may cause birds to fly from feeding and roosting sites. Drakes Estero also supports one of the largest colonies of harbor seals in the state of California. Disturbance may cause seals to leave the shore and enter the water, which could lead to the abandonment of pups. Finally, the more than 9 million non-native oysters in the estero feed on phytoplankton and nutrients that would otherwise be available to native invertebrates and fish.



GRAZING—PROTECTING NATURAL AND CULTURAL RESOURCES PRESENTS CHALLENGES

The Point Reyes Peninsula has a long ranching history dating back to the Spanish period (1769-1821). When California became a territory of the United States in 1848, Mexican landowners were displaced and American settlers began to establish dairy and beef ranches. This is still an important industry on the peninsula, and Point Reyes National Seashore's enabling legislation allows for ranching operations to continue at the discretion of the secretary of the Interior. The park values its relationships with the ranching families who have lived and worked on the peninsula for several generations, and collaborates with them to preserve this important heritage.

Livestock currently graze about 24,000 acres within Point Reyes and the Northern District of Golden Gate National Recreation Area, while an additional 1,000 acres are cultivated as silage feed for livestock. About 6,000 cattle reside year-round on the six dairies and 24 beef ranches that operate within the park. These ranches provide a vital source of income for the local community.

This historic activity has not come without ecological costs, many of which are typical throughout the state and resulted as European and American settlement displaced indigenous peoples. Livestock grazing has fundamentally altered ecosystems and continues to present difficult resource management issues to park staff. For instance, grazed lands were once dominated by vigorous native perennial bunchgrasses. Grazing and seeding practices have resulted in the replacement of native grasses and shrubs with non-native grasses. Coastal prairie, a unique and formerly abundant plant community, continues to exist in patches across the landscape; park staff are working to identify and improve the condition of these patches and the rare plant species that thrive within them. Loss of shrub habitat may have resulted in a decline

in breeding, nesting, and foraging habitat for native birds such as the wren (Chamaea fasciata), orange-crowned warbler (Vermivora celata), Bewick's wren (Thryomanes bewickii), and spotted towhee (Pipilo maculatus).

Due to past overstocking combined with more than 200 years of grazing, livestock have contributed to the loss of soil-stabilizing vegetation and have compacted soils, resulting in increased runoff, erosion, and sedimentation, and restricted plant rooting depth and water infiltration. In addition to water-quality degradation, accelerated erosion can uncover archaeological resources, leaving them vulnerable to loss or damage. The park works with ranchers to minimize these impacts, particularly erosion, by ensuring a minimum of residual dry matter, or plant material, remains in grazed areas. This plant material is essential in providing organic matter, sheltering seedlings from sun and wind, slowing runoff, enhancing infiltration, and providing soil protection by reducing the impact of rain splash. Ecosystems would also benefit from the implementation of added erosion control in areas used heavily by livestock.

Resource managers at Point Reyes National Seashore strive to manage ranches within the park to preserve the cultural landscape associated with historical ranching activities, while also ensuring natural resources and cultural features such as archaeological sites are protected. Maintaining the economic viability of ranching operations on the peninsula in the face of landscape and resource preservation remains a complicated issue at Point Reyes. The park and ranchers have yet to find adequate and appropriate solutions to this problem, and this issue will continue to provide a management challenge in the future.



Habitat for native birds such as the orange-crowned warbler (shown here) may have declined as shrub habitat was lost due to grazing. Park staff work with ranchers to minimize impacts from grazing and to ensure natural and cultural resources are protected.



APPENDIX: METHODOLOGY

To determine the condition of known natural and cultural resources at Point Reyes National Seashore and other national parks, the National Parks Conservation Association developed a resource assessment and ratings process. The assessment methodology can be found online at NPCA's Center for State of the Parks website: www.npca.org/stateoftheparks.

Researchers gather available information from a variety of research, monitoring, and background sources in a number of critical categories. The natural resources rating reflects the assessment of more than 120 discrete elements associated with environmental quality, biotic health, and ecosystem integrity. Environmental quality and biotic health measures address air, water, soil, and climatic change conditions, as well as their influences and human-related influences on plants and animals. Ecosystems

measures address the extent, species composition, and interrelationships of organisms with each other and the physical environment.

The scores for cultural resources are determined based on the results of indicator questions that reflect the National Park Service's own *Cultural Resource Management Guideline* and other Park Service resource management policies.

For this report, researchers collected data and prepared technical documents that summarized the results. The technical documents were used to construct this report, which was reviewed by staff at Point Reyes National Seashore prior to publication.

NPCA's Center for State of the Parks represents the first time that such assessments have been undertaken for units of the National Park System. Comments on the program's methods are welcome.

Point Reyes National Seashore offers abundant scenery, such as views of Tomales Bay.



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For more information about the
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