



# Science

An update on science, science education, research, and natural resource management affecting the national parks of the San Francisco Bay Area

## Parks for

### Keeping Track of Elephant Seals at Point Reyes National Seashore

In early January of this year, dedicated biologists and volunteers discovered a welcome sight through the spotting scope: an injured elephant seal had returned home.

During one of the surveys of Northern elephant seals (*Mirounga angustirostris*) that researchers conduct twice weekly from November to March, a biologist spotted a female seal with a ringed scar around her neck. They focused on the tag attached to her tail flipper. It was pink, which means that the seal was tagged at Point Reyes National Seashore or the Farallone Islands National Wildlife Refuge. The tag read K343.

Researchers searched the tag database for K343 and found that Seal K343 was originally tagged as an adult seal at North Drakes Beach on January 16th, 2004. On that day the Marine Mammal Center removed a plastic ring caught around her neck that was cutting into her throat. No one had recorded Seal K343 until biologists spotted her near Chimney Rock this January. She still has a prominent scar, but she appeared to be healthy and very active. She was last seen nursing a large pup on February 2<sup>nd</sup> of this year.



Seal K343 is marked by a ring around her neck. The Marine Mammal Center removed a plastic ring from her neck three years ago, and this January she appeared healthy and was last seen nursing a large pup.

Seal K343 was part of the successful 2007 breeding season at Point Reyes. On February 1<sup>st</sup>, biologists recorded the largest number of breeding elephant seals since they began colonizing Point Reyes National Seashore 26 years ago - 1,290 seals. During the breeding season, biologists tagged 232 weaned pups with tags unique to each seal. In subsequent years, biologists will conduct re-sight surveys to construct a life history of each tagged weaned pup - where it colonizes each year, how fecund it is and how long it lives. Tags also let biologists know when success stories happen; when rescued seals like K343 survive.



Kristen Truchinski



Since 1988, biologists at Point Reyes National Seashore have tagged weaned elephant seal pups with unique pink tags. The tags allow biologists to track the life history of individual seals.

#### Feature Articles

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## Working Together Against Weeds

Resource managers, facilities managers and park rangers from western national parks recently met to find ways to work together against weeds. Their conclusion: Visitors can help control invasive plants and solve one of the most pressing issues facing their national parks.



Dense mats of periwinkle (*Vinca major*) can take the place of diverse native plant communities.

Most of the millions of visitors national parks welcome each year are not aware that they have become unsuspecting accomplices to the weeds' evolutionary strategy to produce as many viable offspring as possible. Tiny seeds stuck in the treads of a shoe or a tire hitch a ride to new soil where the seeds dislodge and sprout.

Seeds can even be transported by backpacks, clothing and outdoor equipment. Horseback riders can also unintentionally spread weeds - seeds can stick to a horse's coat and biologists have found viable weed seeds in horse manure in California national parks.

With no native herbivores to control their populations, invasive plants proliferate. They can out compete native vegetation for light, water and nutrients, sometimes forming monocultures in place of diverse native communities. Native plants and animals adapted to growing in these habitats can no longer thrive. Once established, invasive plants are hard to contain.



Yellow starthistle (*Centaurea solstitialis*) is one of California's most invasive weeds.

By far the most cost-effective way of controlling invasive plants is to stop them before they spread. Visitors can help by taking the following simple steps. Before leaving weedy areas, visitors should clean off boots and clothing. Hikers should stay on designated trails and drivers on designated roads. No one should

pick wildflowers because they may be weeds that easily shed seeds.

At Golden Gate National Recreation Area and Point Reyes National Seashore, visitors can volunteer to become "weed watchers". Biologists train weed watchers to identify top-priority invasive plants. The

weed watchers then hike through vulnerable areas and report sightings of newly invading plants. These extra eyes trained on weeds allow resource managers to respond before weeds can degrade new areas.

European beachgrass (*Ammophila arenaria*) and ice plant (*Carpobrotus edulis*) are prime examples of invasive species that degrade habitat. They form dense mats over beach dunes and stabilize the dunes so that they no longer shift with the wind. This new habitat formed by European beachgrass and ice plant makes surviving difficult for species that have evolved to live in the shifting dunes. Snowy Plovers (*Charadrius alexandrinus nivosus*), small federally endangered shorebirds, require beaches sparsely covered with vegetation because chicks are harder for predators to spot in open dune fields. They cannot nest in dunes covered by invasive plants. Myrtle's silverspot (*Speyeria zereue myrtleae*), a federally endangered butterfly, cannot use European beach grass and ice plant for nectar sources. Nectar is the butterfly's food; without food, they die.

Weeds do not just impact plants and animals; they affect our quality of life as well. Eucalyptus (*Eucalyptus globulus*), for example, can change the natural fire regime of coastal ecosystems. The bark strips and leaves that eucalyptus sheds are highly flammable with the potential to fuel large wildfires. Eucalyptus trees also uptake large amounts of water that other plants and animals may need. Weeds cause less immediately obvious damage as well. They can wreck services that native ecosystems provide, like filtering our water and regulating greenhouse gases.

With the help of volunteers, resource managers are actively eradicating these invasive plants and restoring native ecosystems within San Francisco Bay Area national parks. At Abbotts Lagoon within Point Reyes National Seashore, for example, resource managers recently restored 50 acres of dunes. Two federally endangered plants, Tidestrom's lupine (*Lupinus tidestromii*) and beach layia (*Layia carnosa*) now grow in the restored dunes and Snowy Plovers have begun nesting there. Volunteers gave many hours yanking out weeds and planting native seedlings.

Invasive plants currently infest approximately 2.6 million acres of our national parks. By preventing weeds from spreading any further, visitors are helping to conserve their natural heritage.

## Pacific Railroad Surveys: Roots of the San Francisco Bay Area Inventory and Monitoring Program

The NPS Inventory and Monitoring (I&M) program has established a goal to "document . . . at least 90% of the species of vertebrates and vascular plants currently estimated to occur in the parks." However, this was not the first effort by the Federal government to inventory the nation's biota. The Pacific Railroad Surveys commissioned by Congress in 1853 were predecessors of the I&M program.

In the early 1850s the time was right to construct a transcontinental railroad. A major impediment to planning and constructing the railroad was lack of knowledge about the American West, so in 1853 Congress appropriated \$150,000 for the Army's Topographic Bureau to determine the most practical route for the transcontinental railroad. In addition to surveyors, the expeditions included geologists, botanists, zoologists, and artists. Considerable effort was made to collect natural history specimens and ship them to the Smithsonian Institution where they reside to this day. Many of these specimens were subsequently described in the scientific literature and the official report of the expeditions published in twelve volumes between 1855 and 1861.

Volume X "Fishes" by Charles Girard is of particular interest to the San Francisco Bay Area I&M Program. While the collections represent the fauna of the entire West, a significant number of specimens were taken from such localities as the Presidio of San Francisco and Tomales Bay. Ichthyology was a developing science in the 1850's and many species names have been rendered obsolete by later taxonomic revision. The I&M database, NPSpecies, which contains information on taxa found in parks, allows users to trace the original names to the currently accepted name. For example, the kelp greenling (*Hexagrammos decagrammus*) was collected at the Presidio and identified as three separate species. Girard was probably fooled into thinking he was looking at multiple species by the striking sexual dimorphism of the kelp greenling.

One of the strengths of the I&M program is to provide resource managers with a temporal perspective of what species were in the park as well as those currently present.

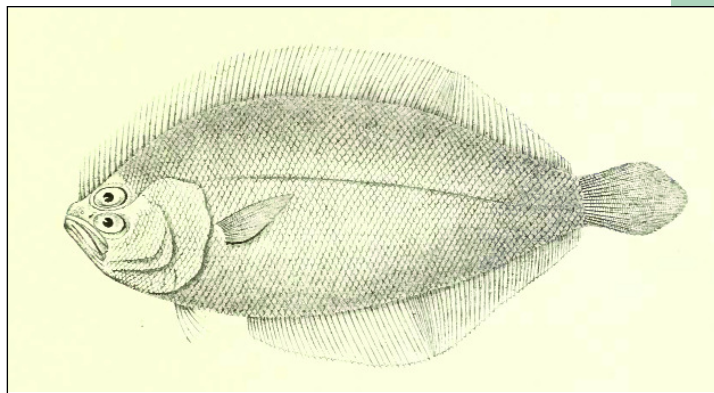


Illustration of the Pacific Sanddab, *Psetichthys sordidus* collected at San Francisco by C.B. Kennerly of the Pacific Railroad Survey. The currently accepted scientific name of this species is *Citharichthys sordidus*.

## New Research Projects at Point Reyes National Seashore

Point Reyes National Seashore hosts over 100 research projects each year that help inform park management, train students and identify future conservation issues. Below is a sampling of some recently approved projects:

Crustal deformation in the San Andreas Fault Zone between the Golden Gate and Bodega Bay from campaign GPS measurements - Gareth Funning, UC Berkeley

Banana slug research in San Francisco Bay Area National Parks - John Pearse, UC Santa Cruz

Control of exotic grasses in natural coastal grasslands using biotic and abiotic factors - Claudia Luke, Bodega Marine Lab

Ecological consequences of polyploidy in the context of rapid environmental change - Patrick McIntyre, UC Davis

Ecological and evolutionary competitive mechanisms driving the *Holcus lanatus* (common velvetgrass) invasion - Adrianna Muir, UC Davis

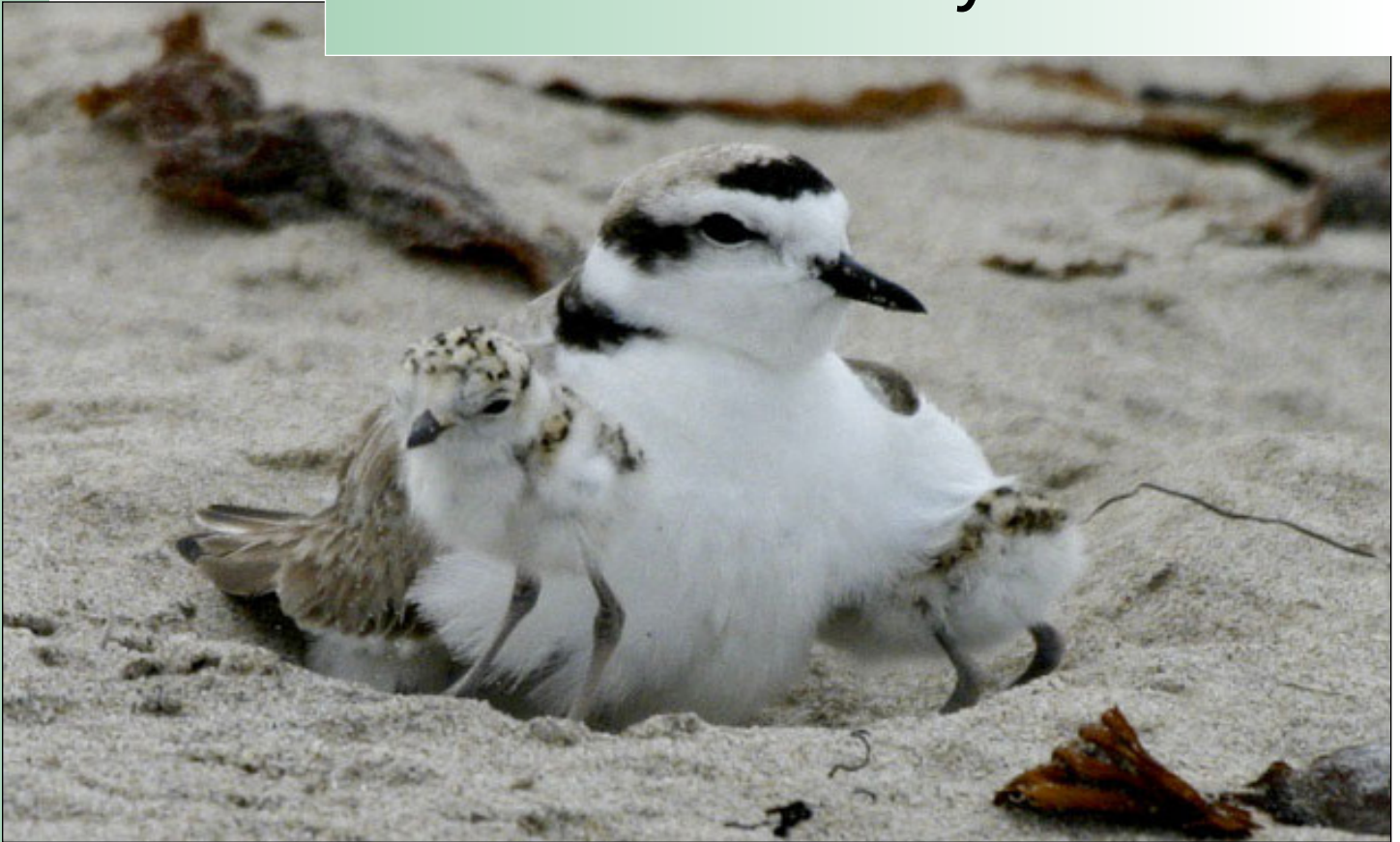
Origin and diversification of the genus *Ceanothus* (Rhamnaceae) - Dylan Burge, Duke University

Planetary biodiversity inventory project for Eumycetozoa (slime molds) - Steve Stephenson, University of Arkansas and Ben Becker, Point Reyes National Seashore

Study of chevron sand deposits at Point Reyes and their possible relation to megatsunami - Jonathan Hagstrum, US Geological Survey

Level I water quality baseline studies for coastal waters of Point Reyes National Seashore and Golden Gate National Recreation Area - John Largier, Bodega Marine Lab

# Protect the Snowy Plover



Callie Bowditch

## *What is a Western Snowy Plover?*

A Western Snowy Plover (*Charadrius alexandrinus nivosus*) is a small, sparrow-sized shorebird with a gray head and back marked with dark patches on either side of its neck and behind its eyes and forehead. This pattern camouflages a Snowy Plover in its native habitat - flat open beaches and dunes. Where there are small depressions in the sand, Snowy Plovers crouch down to take shelter from the wind. Some Snowy Plovers are year-round residents at California, Oregon and Washington beaches; others migrate to the coast from the interior West only to breed.

Snowy Plovers breed from mid-March through mid-September. To build a nest, a breeding pair scrapes back sand into a shallow bowl that they line with pebbles and other debris. The female lays her eggs directly in the scrape. The males and females incubate the eggs for about 27 days. After the eggs hatch, the female finds a new mate and leaves the male to raise the chicks. The chicks can fly in another 30 days.



Callie Bowditch



Callie Bowditch

# And Conserve Our Seashore



Emily Dangremont

## *Why are Snowy Plovers threatened?*



Callie Bowditch

Snowy plovers are threatened by human disturbance, predation and habitat loss. Direct disturbances, like walking too close to nests, cause adult snowy plovers to leave their nests and expose their eggs to wind, sun and rain.

Unleashed dogs can kill or frighten snowy plovers and trample nests. Crows, ravens, harriers, falcons, foxes, skunks, bobcats, raccoons and coyotes also predate on snowy plovers. Loss of habitat from beach development and nonnative plant encroachment leaves less space for snowy plovers to breed, forage and hide from predators.

## Plovers and Your Dog

Dogs are prohibited on snowy plover nesting beaches during the breeding season.

At Point Reyes National Seashore, leashed dogs are allowed at:

- North Beach, from the parking lot south to Lighthouse Beach
- Kehoe Beach, from Kehoe creek north to the cliffs
- Limantour Beach, east of the beach trailhead

## *Why should you care?*

Snowy plovers have lived on California beaches for thousands of years, but currently there are only 1,800 left along the coast. Approximately 490 species of birds visit Point Reyes National Seashore - protecting shore habitat for snowy plovers protects habitat for other animals too. Snowy plovers are a federally threatened species protected by the Endangered Species Act. It is illegal to disturb plovers or their breeding habitat. Visitors who do so can be fined.

## *What can I do?*

Respect the posted habitat areas and stay at least 50 feet away from birds and nests.

Walk near the water line on plover breeding beaches.

Walk dogs only where authorized and always keep them on a leash.

Dispose of garbage properly to avoid attracting predators.

Do not move driftwood on the sand - upright wood makes a perch for bird predators.



**National Park Service**  
**U.S. Department of the Interior**

**Pacific Coast Science and Learning Center**  
 Point Reyes National Seashore  
 Point Reyes, CA 94956



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Parks for Science is published bi-annually to showcase creative and collaborative science, science education, research, and natural resource management supporting science-informed decision making within the national park system and associated academic institutions and partners. The Pacific Coast Science and Learning Center is a part of the San Francisco Bay Area Network of national parks and is located at Point Reyes National Seashore.

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**Volunteer Resources**

**National Park Service, Inventory and Monitoring, Weed Watchers**

[http://www1.nature.nps.gov/im/units/sfan/vital\\_signs/Invasives/weed\\_watchers.cfm](http://www1.nature.nps.gov/im/units/sfan/vital_signs/Invasives/weed_watchers.cfm)

**Point Reyes National Seashore, Snowy Plover Docent program**

<http://www.nps.gov/pore/supportyourpark/volunteer.htm>  
 #CP\_JUMP\_71290

**Point Reyes National Seashore, Habitat Restoration program**

[http://www.nps.gov/pore/supportyourpark/volunteer\\_hrp.htm](http://www.nps.gov/pore/supportyourpark/volunteer_hrp.htm)

**Internships**

If you would like to be considered for a science or science communication internship through the Pacific Coast Science and Learning Center, please contact Ben\_Becker@nps.gov with a cover letter and resumé.

**Newsletter Subscription**

To be placed on the mailing list for “Parks for Science” please contact Christie\_Anastasia@nps.gov and indicate whether you would prefer a PDF or hardcopy.



Kelly Reeves