



## Sky Stories

As earthbound humans, we tend to think more about the land under our feet than the sky over our head. In this issue, however, we look up—up at the fog that cascades over the Marin Headlands like rivers of smoke, at the stars that pattern the heavens, and at blue skies accented by the hang gliders' colorful wings. We also look up to determine what we may be missing; currently, light pollution inhibits roughly one in five people in the world from seeing the Milky Way at night. Start with "Weather at the Edge" (page 3), and learn how and why it's possible to take a short walk almost anywhere in the vast Golden Gate National Parks and change your environment entirely!

### From the Superintendent

It is eight in the morning. At Rodeo Beach in the Marin Headlands, it is a foggy 57 degrees under lowering gray skies. Just four miles away at Fort Baker, the sun is shining brightly and the temperature is 65 degrees.

Our park has been called "the park that makes its own weather," a consequence of its unique geography and the microclimates that geography creates. Harold Gilliam—in his small and useful book, *Weather of the San Francisco Bay Region*—says "If you don't like the weather, walk a few blocks." In the parks, a short hike or bike ride is an

equally effective way to change your environment.



The sky above the Golden Gate National Parks is a montage of quick-moving marine layers that, depending on the season, will be burned off by

the sun to reveal a cloudless, brilliant-blue sky. Coastal winds provide a steady source of lift for Fort Funston's hang gliders or Crissy Field's windsurfers. Inland, protected areas in Tennessee Valley, at Muir Woods, or in Olema Valley have stretches so sunny and windless that you need a hat to prevent sunburn. Across the parklands, bird-watchers scanning the sky with binoculars are frequently rewarded for their efforts.

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### You're Invited to a Star Party

Amateur or professional, if you're interested in the stars, there are plenty of places to indulge your curiosity in the Bay Area.

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# Behind the Scenes

Golden Gate National Recreation Area comprises over 75,500 acres of land, and protects more than 1,250 historic structures, 27 rare and endangered species, and many small “islands” of threatened habitat. NPS staff, volunteers, and partners work hard to take care of the park’s treasures for the millions of people who visit each year, and for future generations.

## Same Partner, New Name

This spring, our nonprofit partner, the Golden Gate National Parks Association, becomes the Golden Gate National Parks Conservancy. As the organization launches its third decade of service to the Golden Gate National Parks, Conservancy managers and trustees felt that the new name more clearly signaled its environmental purpose and its deepening role in working with the NPS to conserve the parklands for future generations.

While its name is changing, the Conservancy’s commitment to the parks endures. Whether serving park visitors, enlisting volunteers, or improving park sites, the Conservancy works side-by-side with the NPS to ensure that our parks are preserved and open for all to enjoy. To find out how you can help support our national parks at the Golden Gate, visit the Conservancy at [www.parksconservancy.org](http://www.parksconservancy.org).

## Ocean Beach Lifeguards Begin Their Fifth Season

Since 1999, Ocean Beach lifeguards have been kept busy defending visitors from the wild waters west of the city. During their tenure, no drownings have been recorded at the beach. Last season (their fourth), lifeguards effected thirteen aquatic rescues, dozens of cliff rescues, and thousands of safety contacts. Swimmers were not the only ones saved—fifteen sea lions and 150 oiled birds were also rescued by lifeguards. Cooperative efforts with the U.S. Coast Guard rounded out 2002 and made it the busiest year yet for the lifeguards.

## Volunteer Numbers Crunched

Golden Gate National Parks volunteers have kept their place as the most dedicated in the National Park Service, with an astronomical 365,495 hours donated during 2002. More than 14,000 community members joined park staff to restore habitat, greet visitors, monitor wildlife, lead outings, and perform clerical work. A very sincere thanks to each person who give time and effort to the park. To join this generous crowd, call 561-4755.

## Introducing Trails Forever

This spring, the park and its nonprofit partner, the Golden Gate National Parks Conservancy, are launching an exciting new initiative designed to help everyone discover and enjoy the Golden Gate National Parks. Known as *Trails Forever*, the initiative focuses

on revitalizing, expanding, and maintaining the parks’ vast collection of trails, trailheads, overlooks, benches, picnic areas, and interpretive exhibits.

The initiative will also serve as a vehicle to train students and volunteers to be future stewards of our national parklands, preserve native habitats, link natural corridors, and reach new constituencies through outreach programs. Many *Trails Forever* projects are already underway, ranging from extension of the Bay Trail from the west end of Crissy Field to the Golden Gate Bridge to trail restoration plans at Muir Woods and installation of 24 new interpretive waysides and kiosks along trails throughout the parks.

This spring and summer, we’ll be in the parks at various trailheads, celebrating our park pathways and introducing you to *Trails Forever*. We’ll be



Trails appropriate for every age and interest are available in the Golden Gate National Parks. The *Trails Forever* initiative now getting underway will revitalize this vast and varied network, which laces together the parks’ hills, valleys, and grasslands.

sponsoring some special hikes and rallying community enthusiasm to lend a hand to the trails. We’re at the “trail-head” of this new program—a program that will eventually journey to many destinations within our parks. To learn more, visit [www.parksconservancy.org](http://www.parksconservancy.org) and watch for notices of upcoming activities.

## Big Lagoon Wetland and Creek Restoration Planning Underway

In cooperation with the San Francisco Zen Center (owner of Green Gulch Farm) and the California Department of Fish and Game, the National Park Service is kicking off the planning and environmental analysis process for the Big Lagoon Wetland and Creek Restoration project. This project will restore wetland and creek ecosystem function and will benefit threatened fish (especially coho and steelhead), red-legged frogs, and numerous other native wildlife species. The project will also improve trails, visitor facilities, and parking in the NPS Muir Beach area. Look for opportunities to participate in shaping this project; public meetings, workshops, and site walks will take place over the next eighteen months. For more information, visit the project website—[www.nps.gov/goga/admin/planning](http://www.nps.gov/goga/admin/planning)—or contact project managers Jennifer Vick (561-4942) or Carolyn Shoulders (331-0771).

## Kodak and National Park Foundation Help “Visualize” the Parks

Thanks to a grant from the National Park Foundation through the generous support of the Kodak, Proud Partner of America’s National Parks, we now have the capacity to make the Golden Gate National Parks even more visible (and visual) to the American public. Using equipment donated by Kodak—a Kodak Ektapro 7020 projector, AV35 Kodak Ektagraphic IR remote control, 2 DX3900 zoom digital cameras and Easy Share camera docks, document scanner, and RFS 3600 film scanner—we can make new information available in close to real-time via our web site ([www.nps.gov/goga](http://www.nps.gov/goga)), as well as enhance our publications and handouts and provide documentation to law enforcement and resource managers. Thanks, Kodak and the National Park Foundation!

[Continued from Page 1]

At night, away from the lights of San Francisco, stargazing programs bring people into the park to view prominent stars, planets, and galaxies, and perhaps even an occasional comet or meteor shower. For those inspired by the moon, the Sunset Full Moon Walk to Point Bonita Lighthouse is an unforgettable experience. Visiting Muir Woods by moonlight presents a whole new perspective on the old-growth forest.

Anyone who has taken the Alcatraz Night Tour can testify to the effect of the city’s sparkling lights when seen from the island’s quiet vantage points. Surrounded by the black waters of the bay and punctuated by the lighthouse’s rhythmically rotating beam, Alcatraz at night is a dramatic place. (*San Francisco Magazine* recently named its night program as the “Best tour in the Bay Area.”)

This issue of *ParkNews* focuses on the skies over the Golden Gate National Parks. By day or by night, they provide the backdrop for some intriguing sights. So, go out and look up—you’ll find something new each time!

Brian O’Neill  
Superintendent



National Park Service  
U.S. Department of the Interior

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Aerial view of the fogswept Golden Gate Bridge and Marin Headlands; photo courtesy Robert Campbell

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**Experience Your America**



# Weather on the Edge

Warren Blier, Ph.D., Science and Operations Officer, National Weather Service

“The coldest winter I ever spent was a summer in San Francisco.”

—Mark Twain

The weather in the Golden Gate National Parks can be as dramatic as the scenery itself. Where rugged land and vast ocean meet at the edge of the North American continent, strong influences are exerted on temperature, wind, clouds, and rain. The complex terrain, replete with ocean bluffs, steep ridges, and protected valleys, can produce dramatic variations in weather conditions across short distances.

On many a summer day, visitors to the coast bundle up against the cold ocean winds and fog, while just a few miles inland—say, in Olema Valley or at Phelger Estate—sunshine and warm temperatures prevail. Why does this happen? Let’s begin with an overview of the weather and climate of the greater San Francisco Bay Region.

## THE SEASONS

Our Mediterranean climate (“climate” simply means long-term average weather conditions) is among the rarest and most desirable on Earth. Its key attributes are a dry summer and a wet, mild winter; fall and spring are periods of transition.

During the winter, the jet stream across the Pacific Ocean becomes stronger and generally shifts southward, thus enabling rain and wind-producing weather systems to periodically sweep through the area. As summer approaches, however, the jet stream weakens and shifts far to the north as a large and strong area of high pressure develops over a broad region of the eastern Pacific Ocean offshore from California.

Air spiraling out from the center of the high results in persistent northwest winds along the northern and central California coast. Interaction between this flow and the underlying coastal ocean surface brings cold bottom water up to the surface, a very different situation than along the eastern edge of our continent, where the Gulf Stream transports warm surface water northward from the tropics. Thus, although the Golden Gate National Parks are at about the same latitude as the Virginia coast, eastern beach-goers enjoy much warmer summer water temperatures. While not so pleasant

for human swimmers, the native plants and animals of our coastal waters thrive in this cold and nutrient-rich water.

## FOG AND STRATUS

Above the vast offshore summer high-pressure system, air slowly sinking from aloft heats by compression. The closer to the earth it gets, the warmer and drier it becomes. At the same time, the surface air is being cooled and moistened by the cold ocean water. A sharp boundary develops, usually about 1,000 to 2,000 feet above the ocean, between these two air masses.

Fog and low clouds (“stratus”) develop in the cold, damp air trapped below and are blown into the coast and the lower slopes of the coastal hills by prevailing northwest winds—hence our foggy, cool summer days. At the same time, in the higher hills (those that extend above the level of this marine air boundary) and in inland areas protected from the influence of these cold ocean winds, days can be quite hot.

## MICROCLIMATES AND MORE

Under such circumstances, typical seasonal weather conditions can vary dramatically across very short distances (despite the fact that the climate of the region as a whole is generally classifiable as Mediterranean). The term “microclimates” is used to refer to small-scale subregional areas of characteristically different weather conditions. The microclimate of the coast is different than the microclimate of protected coastal valleys. Within the distance of a short drive, or even along the course of a single hike, late spring and summer visitors can experience a wide range of weather conditions.

Microclimates are also in evidence during the winter season. As a cooler air mass and less sunshine are more generally prevalent over the region during this time of the year, less variation tends to be found in the temperatures. The situation is quite different, though, regarding rainfall from passing storms.

The rain is typically accompanied by moderate to strong southwest winds, which enhance the rain on the windward slopes of the coastal mountains; much less rain tends to fall on the coastal plain and in lee-side valleys. In the Golden Gate National Parks, long-term average annual rainfall varies widely, from only about 20 inches per year at Ocean Beach in San Francisco to over 60 inches per year in a small area on the slope of Mt. Tamalpais in Marin County.

## WEATHER FORECASTS

The National Weather Service (NWS) Forecast Office for the greater San Francisco and Monterey Bay Regions,

including the Golden Gate National Parks, is located in Monterey, California, about 90 miles south of San Francisco. Operating 24 hours a day, 365 days a year, and utilizing state-of-the-art technology ranging from Doppler weather radar and networks of automated surface weather observing stations to the latest supercomputer-based numerical weather forecast model output, the NWS continuously monitors and forecasts weather conditions throughout the region. Comprehensive current NWS weather data and forecasts can be found at the web site <http://www.wrh.noaa.gov/Monterey/> or by listening to NOAA Weather Radio.

## Trapped in Springtime Fog, the *Tennessee* Runs Aground

Marcus Combs, Interpretive Ranger, Muir Woods

Weather and currents combine to make the San Francisco Bay one of the worst ship graveyards in the nation. Over the years, nearly one hundred ships have come to grief on the rocks here. One, the SS *Tennessee*, lent its name to what is now one of the Golden Gate National Parks: Tennessee Beach.

The SS *Tennessee* shuttled passengers and cargo between the Isthmus of Panama and San Francisco. On March 6, 1853, laden both with cargo and 551 passengers, she began her entry into the bay. The fog was thick, and though Captain Mellus was confident, he chose to proceed slowly through what he thought was the Golden Gate. Through the haze, rocks appeared on the right side of the ship. Assuming these were the rocks off Lands End, the captain kept on until a cry of “Breaker ahead!” rang out. The captain ordered a quick turn to

port (left), but he was too late. Though the *Tennessee* missed the rocks, she beached herself on the sand of the cove that now bears her name. Fortunately, there was time for the passengers and crew to scramble to safety, and to remove some of the cargo. By the time notification reached the city and the cold and wet passengers and crew were rescued, 24 hours had passed.

In 1853, neither the Lifesaving Service nor Coast Guard existed. In fact, there wasn’t a single operating lighthouse on the West Coast. Ironically, at the time of the *Tennessee* wreck, San Franciscans had been lobbying for a lighthouse on the Marin side of the Golden Gate. News of the wreck helped cut through the red tape and in 1855, the first Point Bonita Light was constructed (see the Summer 2002 issue for the whole Point Bonita story).

Today, while strolling along this seashore at the lowest tide, you can still see parts of the old *Tennessee*. On March 6, join a ranger-led program and hear more about the *Tennessee*’s story (see the Park Programs calendar for details).



The steamship *Tennessee*, lithograph, ca. 1850

PARKS CONSERVANCY



# You're Invited to a Star Party!

## Indulge Your Sense of Wonder

Bill Stepka, San Francisco Amateur Astronomers

Of all the wonders of the Bay Area, let us not ignore those that are free and found overhead each evening. In the San Francisco Bay Area, with its wealth of astronomical knowledge and stargazing opportunities, the general public has a plethora of professional and amateur astronomers willing and able to share their time and their knowledge of the wonders of the universe. This confluence of great universities, astronomical observatories, and a very strong group of amateur and professional astronomical societies allows anyone interested in the cosmos endless means to indulge that interest. Somewhere near you, a public “star party” is taking place. In the Golden Gate National Parks, look for such parties between February and October at Lands End, hosted by the National Park Service and the San Francisco Amateur Astronomers.

Whether your interests include the planets of our Solar System or the further reaches of theoretical cosmology (the study of the origins of the universe), you will find a professional astronomer speaking on your topic several times a year.

### IN SAN FRANCISCO

The Morrison Planetarium (750-7141, [www.calacademy.org/planetarium](http://www.calacademy.org/planetarium)) in Golden Gate Park hosts the Benjamin Dean Lecture Series of eminent astronomers each year. Our own San Francisco Amateur Astronomers (566-2357, [www.sfaa-astronomy.org](http://www.sfaa-astronomy.org)) meets there on the third Wednesday of the month. The SFAA also hosts many famous lecturers, such as the internationally acclaimed extrasolar planet finder, Dr. Geoff Marcy.

For public telescope viewing on the city's sidewalks, check out the San Francisco Sidewalk Astronomers (289-2007, [www.sfsidewalkastronomers.org](http://www.sfsidewalkastronomers.org)). NASA Ames Research Center at Moffet Field ([www.arc.nasa.gov](http://www.arc.nasa.gov)) also encourages its scientists to do public outreach and provides speakers to clubs and universities.

The Astronomical Society of the Pacific (415-337-1100, [www.astrosociety.com](http://www.astrosociety.com)), founded in 1889, is the oldest amateur and professional nonprofit organization in the United States. Working to increase the public's understanding and appreciation of



The June 2002 partial solar eclipse star party on Harrison Street in San Francisco was sponsored by the Sidewalk Astronomers.



More than 25 members of the San Francisco Amateur Astronomers brought telescopes to the most recent Mt. Tam Star Party.

astronomy, they publish *Mercury*, a popular bimonthly magazine that is as good as (and often better than) the more widely available monthlies. This year's annual ASP meeting at UC Berkeley drew more than a thousand people and featured such famous astronomers as Drs. Alex Filippenko and David Morrison.

The San Francisco Amateur Astronomers assisted the ASP in hosting a Star Party at Mt. Tam (which holds star parties near the time of the new moon in the summer months) after a public lecture by nationally known author David Levy. The ASP has also matched amateur and professional astronomers with science teachers to bring the excitement of astronomy to the classroom. Anyone with astronomical curiosity is encouraged to join the ASP and support this grand old San Francisco institution and its good works.

### EAST BAY, SOUTH BAY

Another local institution is Oakland's Chabot Space and Science Center (510-336-7300, [www.chabotspace.org](http://www.chabotspace.org)), located at 10000 Skyline Boulevard. Set on 13 parkland acres, it is home to a state of the art planetarium, theater, science museum, education center, and observatory complex. Their 20-inch refracting telescope is open to the

Luncheon and Discussion Association ([www.nchalada.org](http://www.nchalada.org)), which meets quarterly in Chabot's boardroom. Travel to the South Bay for a visit to the Lick Observatory (831-459-2513, [www.ucolick.org](http://www.ucolick.org)). Founded in 1888 by the eccentric millionaire James Lick, it is located 20 miles east of San Jose and managed by the University of California. This observatory is open daily and offers tours of the historic 36-inch Great Lick Refractor and the 120-inch reflecting telescope.

### ON THE WEB

Check these websites for further information. Fremont Peak Observatory Association ([www.fpoa.net](http://www.fpoa.net)), San Jose Astronomical Association ([www.sjaa.net](http://www.sjaa.net)), and Peninsula Astronomical Society ([www.fda.edu/ast/pas](http://www.fda.edu/ast/pas)). For the San Mateo County Astronomical Society and many other contacts, investigate the resources at the Astronomical Association of Northern California ([www.aanc.astronomy.org](http://www.aanc.astronomy.org)).

The Bay Area offers a wealth of astronomical opportunities. Whatever your interest, you will find someplace to satisfy your curiosity and sense of wonder. If you have never looked through a telescope, find a star party and experience the beauty of the night sky for yourself.

*Bill Stepka is past president of the San Francisco Amateur Astronomers and also proud member of the Astronomical Society of the Pacific and the Eastbay Astronomical Society. He spent two of the best weeks in his life as a student in residence at Mt. Wilson Observatory near Pasadena using the historic 60-inch reflecting telescope.*



Stargazing at Hume Observatory, the California Academy of Sciences observatory in Sonoma County.



# Seasonal Sights

Tim Doherty, NPS Biological Science Technician

“Blossom by blossom, spring begins.”

—A. C. Swinburne



After winter solstice, the sun takes a higher path through the sky each day. By the vernal equinox—which this year is March 21—it is visible for exactly 12 hours. The vernal equinox also marks the first day of spring. These freshening months are times of heightened activity for the many species of plants and animals that inhabit the park.

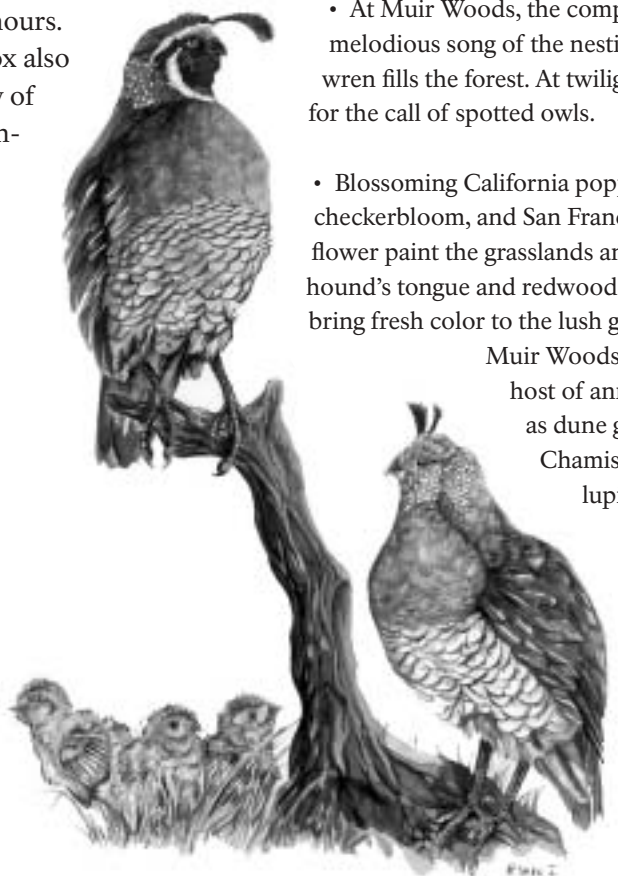
- An early-spring hike in the Redwood Creek watershed will reward you with the sound of gurgling water rushing toward Muir

Beach and the Pacific Ocean. With luck, you'll see coho salmon and steelhead trout juveniles in Redwood Creek.

- At Muir Woods, the complex, melodious song of the nesting winter wren fills the forest. At twilight, listen for the call of spotted owls.
- Blossoming California poppies, checkerbloom, and San Francisco wallflower paint the grasslands and ridges; hound's tongue and redwood violets bring fresh color to the lush greenery of Muir Woods; and a host of annuals such as dune gilia (blue), Chamisso's lupine (purple), seaside daisy (lavender), and sea

pink (pink) accent the Presidio and Fort Funston dune strands.

- In the Marin Headlands and at Milagra Ridge, watch for the mission blue butterfly as it feeds on lupine blossoms.
- Bank swallows return to Fort Funston's coastal bluffs. Listen and watch for California quail, red-tailed hawks, and white-crowned sparrows—vocal species that use their songs to attract mates.
- Point Bonita and the Cliff House overlooks are fine spots to scan the ocean's horizon for California gray whales heading north with their calves, which were born in the warm waters of Baja California.
- Many of the parks' mammals can be seen feeding with their young in the open grasslands. Cottontail rabbits and black-tailed deer are frequently spotted this time of the year.



The California red-legged frog (*Rana aurora draytonii*) is the largest frog native to the western United States. Its historic range covered much of California, including portions of the Sierra Nevada range. It is also believed to be the type of frog described by Mark Twain in his short story, “The Jumping Frog of Calaveras County.”

Numerous factors led to the decrease in California red-legged frog numbers, including the effects of gold mining, habitat fragmentation and degradation, human predation—during the late 19th and early 20th centuries, nearly 80,000 frogs are estimated to have been harvested for food in the San Francisco Bay Area and the Central Valley—and the introduction of the bullfrog (*Rana catesbiana*). Today, the red-legged frogs, which have been eliminated from 70 percent of their historic habitat, range from Sonoma and Butte counties in the north to Riverside County in the south; larger populations can be found along the coast.

Throughout their life span, red-legged frogs utilize both riparian and upland habitat. They require aquatic habitat to breed; if water is available, they will remain active throughout the summer. In cooler months, the frogs search for burrows or other shelters in which to hibernate. The Golden Gate National Parks provide the red-legged frogs with the variety they need.



All illustrations by Ryan Jones

## Do You Enjoy the Parks? JOIN US!

More than ever before, the Golden Gate National Parks need the support of people like you. By joining the Conservancy—the parks' non-profit partner—you'll become part of the effort to preserve the national parks at the Golden Gate.

Your support helps restore native habitats, maintain miles of trails, preserve historic landmarks, and develop park education programs for young people.

Join the Parks Conservancy and you'll receive:

- ☞ Two membership cards plus a special gift.
- ☞ *Gateways*, the quarterly membership newsletter filled with news of the parks and tips on special places.
- ☞ *ParkAdventures*, the quarterly calendar of NPS and special membership programs and events, delivered to your home.
- ☞ Free monthly email newsletter.
- ☞ Invitations to members-only walks, talks, and excursions.
- ☞ Discounts at park bookstores.
- ☞ Free use of the Alcatraz and Fort Point audio tours.

Yes, I would like to join the Parks Conservancy. Enclosed is my membership contribution of:

- \$35 Park Partner Receive the award-winning book, Guide to the Parks
- \$50 Park Sponsor Receive a cotton twill cap
- \$100 Park Steward Receive a cotton sweatshirt

Donations are tax-deductible. For information, visit our website [www.parksconservancy.org](http://www.parksconservancy.org).

To join by phone, call the Parks Conservancy at (415) 561-3000.

NAME \_\_\_\_\_

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DAY PHONE (INCLUDE AREA CODE) \_\_\_\_\_ TOTAL ENCLOSED \$ \_\_\_\_\_

Make check or money order payable to Golden Gate National Parks Conservancy

Charge to:  Visa  Mastercard \_\_\_\_\_

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### THE GOLDEN GATE NATIONAL PARKS CONSERVANCY—OUR MISSION

The mission of the Parks Conservancy is to engage the community in the preservation, education, enjoyment, and improvement of the Golden Gate National Parks. A nonprofit organization founded in 1981, we support the National Park Service by enlisting volunteers to restore native habitats, publishing educational materials about the parks, funding and managing projects to improve park open space and landmarks, supporting scientific studies, and establishing visitor centers.

Over the course of two decades, the Conservancy has provided the National Park Service with more than \$64 million in aid. The Conservancy's funding sources include contributions from more than 12,000 individual members, foundations, and



# Starry, Starry Night

## A Thing of the Past?

Judy Rocchio, NPS Air Quality Coordinator and Tamara Williams, GGNRA Natural Resources Management

“The stars awaken a certain reverence, because though always present, they are inaccessible.”

-Ralph Waldo Emerson



A satellite image of the United States reveals areas with the highest levels of light pollution. Each night, the sky is washed with a flood of artificial light, which not only restricts astronomers' ability to study the universe, but may also have negative biological consequences for Earth's plants and animals.

The stars of the Milky Way have fascinated humans for millennia. Ancient mariners guided everything from outriggers to sailing ships using this galactical road map. But it is quite possible that future generations of children will not be able to see the galaxy they live in, or the wondrous canopy of stars that has inspired poets, philosophers, and dreamers for centuries. The flood of artificial light that washes the stars from the sky today has left one in five human beings unable to see the Milky Way at night, according to a new study of the global effects of light pollution.

A 2001 global satellite study conducted by scientists at the University of Padua, Italy, and the U.S. National Oceanic and Atmospheric Administration (NOAA) measured for the first time how light degrades the view of stars in specific places around the globe.

“The rapid increase in light pollution is one of the most dramatic changes occurring in our natural environment,” noted the Royal Astronomical Society, which published the study. The survey shows that truly dark, starry skies are unavailable to two-thirds of the world's population, including 99 percent of people in the continental United States and Western Europe. The report describes regions of the world where true night never occurs

because it is blocked by lights from cities and towns. In night's darkest places, far from city lights, about 2,000 stars are typically visible. In major cities, that number shrinks to a few dozen at most.

### DARKNESS FOR HEALTH

Scientists have now discovered that darkness optimizes health. Only when it's really dark can the human body produce the hormone melatonin. Melatonin fights diseases, including

breast and prostate cancer. “It turns off the cancer cells from growing,” says Joan Roberts, a photobiologist.

But if there's even a little light around your bed at night, melatonin production switches off. “So there may be this natural way that Mother Nature has given us, that is, dark night to keep certain cancers under control,” Roberts says. Nature needs darkness, too; the immune systems of animals grow weak when they're exposed to artificial light at night.

### A RECOVERABLE RESOURCE

Unlike some natural resources that are unrecoverable once lost—species extinction or clear-cut old growth forests—night sky darkness is potentially recoverable in many places. Lights that glare into the sky and wipe out the stars can be shielded and focused with reflectors to make them more efficient and to reduce light trespass. Or, lights can simply be turned off.

Pointing light where it doesn't need to go also wastes energy. For example, by “going dark” nightly, some office buildings and school systems are saving as much as \$1 million a year in energy costs. Police report that dark-

ness is often safer, partly because neighbors soon learn to alert police if they see lights in a building.

### CHANGING PRACTICES

National Park Service policy dictates that parks must, to the extent possible, manage to preserve, protect, or enhance the night skies. This requires implementation of best management practices within their boundaries and working outside the park with local communities to promote night-lighting ordinances.

Here in the Golden Gate National Parks, we are implementing sound lighting practices by avoiding and eliminating unnecessary night lighting, and by using shielded light fixtures and low-intensity lights. Nationwide, the NPS will be partnering with local groups to develop measures to reduce light trespass from sources outside the parks. With your help, we can bring starry nights back to our parks.

If you'd like information on what you can do to help restore dark night skies, visit the International Dark Sky Organization website at [www.darksky.org](http://www.darksky.org).



Light pollution is not just a problem in North America, as can be seen in this satellite image of the world; industrialized and/or heavily populated areas can be easily identified from a long way up!



# Flying with Birds

## Hang Gliding at Fort Funston

Mike Carlyle

Visitors to Fort Funston enter a unique natural wind zone in which glider pilots soar with hawks and seagulls in flights lasting hours. One of the best ridge-soaring sites in the world, Fort Funston has served as an incubator for national hang glider design and flight technique.

### EXTENDING THE GLIDE

In its late-1960s infancy, the sport consisted of a few daredevils who attached themselves to aerodynamically and structurally risky wings and attempted launches from slopes and hilltops. Although many flights were traumatic, the successes were both exhilarating and encouraging.

By the late 1970s, the early homemade bamboo, plastic sheeting, and rope contraptions had been superseded by reliable designs constructed of aircraft tubing, steel wire, and Dacron sailcloth. Novice pilots, who once had to teach themselves, were instructed by certified teachers usually associated with hang gliding equipment shops.

Hang glider performance, as measured by “glide ratios”—the number of feet of forward travel per foot of descent—improved from 3:1 in 1970 to 7:1 in 1980; today, some gliders boast a glide ratio of 18:1. With the advent of mountain thermal flying in the mid-1970s, hang glider pilots began exploring dramatically greater altitudes and distances. Today, thermal pilots can sometimes gain over 10,000 feet of altitude and fly cross country more than 100 miles; the cross country record is in excess of 400 miles.

### LIKE A BIRD

The soaring of hang gliders on the coast is made possible by sea “breezes,” cool marine air drawn toward hot, low pressure, inland val-

leys. These westerly winds are generally smooth and laminar (flowing parallel with the surface). When this moving air encounters the coastside hills and bluffs, it is pushed up the face of the land mass. This upwardly moving air creates an area of lift in which a bird—or glider—may achieve buoyancy and remain airborne or soar for extended periods of mechanically powerless flight.

The strength of the coastside lift zone depends primarily upon the speed, direction, and temperature of the wind and the height and steepness of the cliff or hillside the air is climbing. Coastal hang glider pilots frequently fly south from Fort Funston to the face of Westlake; rising 600 feet from the beach, this hill provides the highest and widest accessible zone of lift. Gliders flying above the beach at Westlake frequently reach altitudes of over 1,000 feet.

### DOWN TO EARTH

Controlled in a manner similar to that used with bicycles—weight shift—hang gliders soar in the lift and descend slowly when flown out of the lift. Landings are achieved by gradually losing altitude in a manner calculated to end at the point of one’s choice. Correctly executed, the pilots’ full stall of his wing stops the glider’s forward motion and returns pilot and equipment safely to earth with a “tiptoe” ending to another good flight.



The headlands rising up from the sea beyond Fort Funston interrupt the flow of air off the ocean, pushing it upward and providing hang gliders with the lift they need to soar.

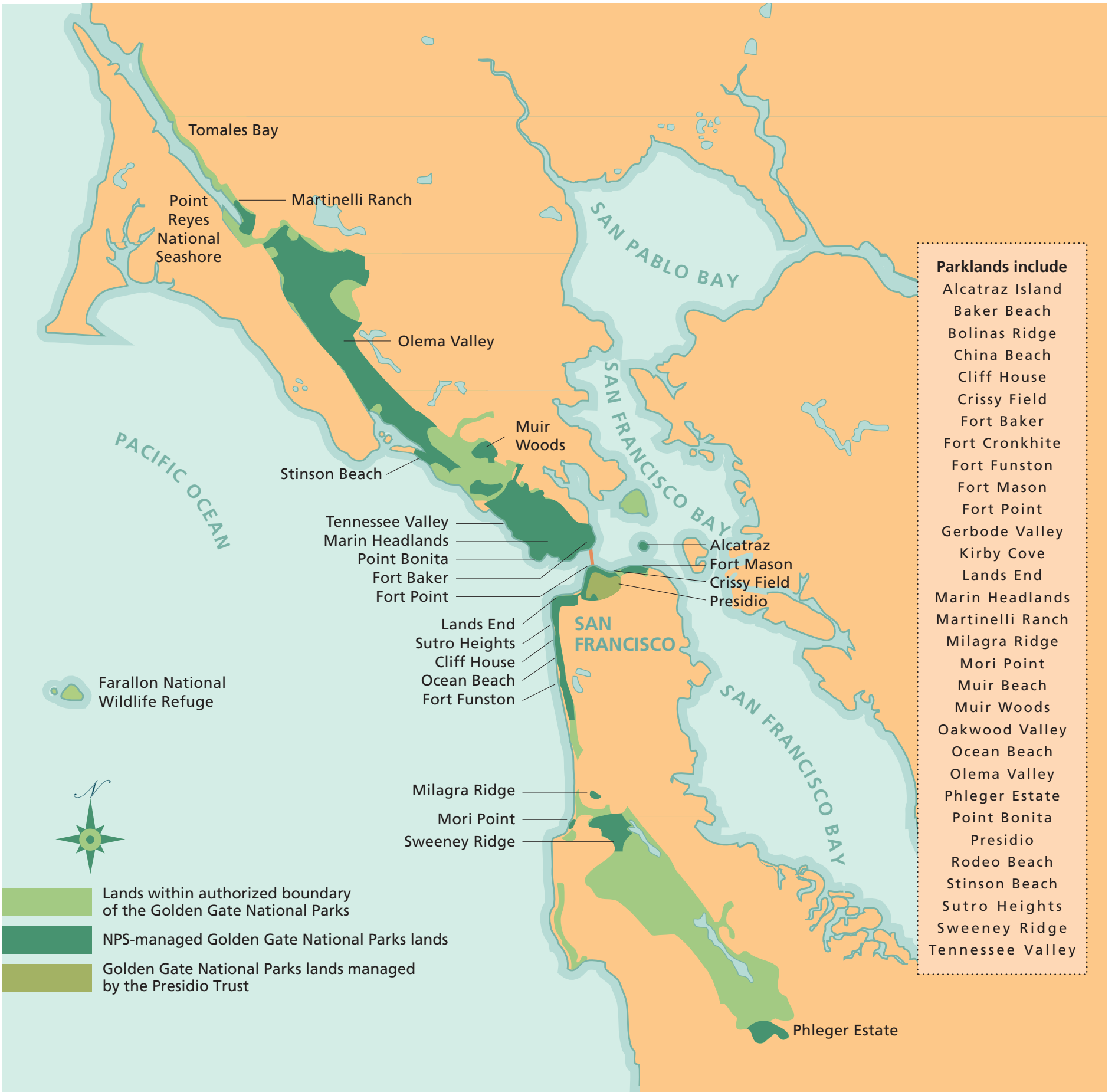


A birds-eye view of the sea and the land can be achieved by combining a brisk ocean wind, an aerodynamically suitable set of wings, a high headlands perch from which to launch, and an adventurous human.



Looking like a cluster of brightly colored butterflies, earthbound hang gliders litter the cliffs at Fort Funston. Technological advances have resulted in gliders that are lighter and more durable than the early-1960s models.

# The National Parks at the Golden Gate



## Golden Gate National Recreation Area (GGNRA)

This 75,500-acre national park is located where the Pacific Ocean meets San Francisco Bay. Extending north and south of the Golden Gate, the park offers a spectacular blend of natural beauty, historic features, open space, and urban development as well as a vast coastal preserve along its shoreline. Muir Woods National Monument, Fort Point National Historic Site, and the Presidio of San Francisco are within GGNRA's boundaries and are managed as part of GGNRA.

### EMERGENCY (POLICE, FIRE, AMBULANCE).....911

#### Park Visitor/Information Centers

(area code 415 unless otherwise noted)

Crissy Field ... 561-7761 (Center) ..... or 561-3040 (Warming Hut)  
 Fort Funston ..... 239-2366  
 Fort Mason/GGNRA Headquarters (Monday-Friday) ..... 561-4700  
 TDD/V ..... 556-2766  
 Fort Point ..... 556-1693  
 TDD ..... 561-4399  
 Marin Headlands ..... 331-1540  
 Muir Woods ..... 388-2596  
 Pacifica ..... (650) 355-4122  
 Presidio ..... 561-4323

TTY ..... 561-4314

If the park destination you wish to visit or learn more about does not have a corresponding phone number listed on this page, please phone GGNRA Headquarters at 561-4700 (Monday through Friday) and park staff will assist you.

### ADDITIONAL USEFUL NUMBERS

(area code 415 unless otherwise noted)

Alcatraz Program Information 561-4900  
 Beach Chalet Visitor Center, Golden Gate Park ..... 751-2766  
 Camping Reservations ..... 331-1540 (backcountry sites) ... or 800-365-2267 (Kirby Cove)  
 Crissy Field Center ..... 561-7690  
 Fort Mason Center ..... 441-3400  
 Golden Gate National Parks Conservancy ..... 561-3000  
 Golden Gate Raptor Observatory ... 331-0730  
 Gulf of the Farallones National Marine Sanctuary ..... 561-6625  
 Hyde Street Pier ..... 556-1917  
 J. Porter Shaw Memorial Library ..

556-9870

NPS Volunteer Information ... 561-4755

Nike Missile Site ..... 331-1453  
 Park Archives and Records Center . . 561-4807

Point Reyes National Seashore 464-5100

Presidio Habitat Restoration Team . . 561-4848

San Francisco Maritime National Historic Park, National Maritime Museum ..... 556-3002 ..... or 556-6435

Special Park Uses Group 561-4300  
 Stinson Beach Weather .. 868-1922

### NATIONAL PARKS ON THE INTERNET

Golden Gate National Recreation Area ..... www.nps.gov/goga  
 Alcatraz ... www.nps.gov/alcatraz  
 Fort Point ..... www.nps.gov/fopo  
 Muir Woods .. www.nps.gov/muwo  
 Nike Missile Site ... www.nps.gov/goga/mahe/nimi  
 Presidio ..... www.nps.gov/prsf

### ADDITIONAL PARK-

### RELATED SITES

Crissy Field Center ... www.crissy-field.org  
 Golden Gate Club .. www.goldengate-club.com  
 Golden Gate National Parks Conservancy ..... www.parksconservancy.org  
 Golden Gate Raptor Observatory ..... www.ggro.org  
 Gulf of the Farallones National Marine Sanctuary ..... www.farallones.org  
 Presidio Trust ..... www.presidiotrust.org

The National Park Service Web page at www.nps.gov includes ParkNet, an online magazine providing natural and cultural history, travel and tourism information, and basic information on all national park sites.

### GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY

The sanctuary comprises 948 square nautical miles of the Pacific Ocean off the California coastline, west and north of San Francisco and includes the Gulf of