Lands in Motion

This year marks the centennial of the great earthquake and fire that so dramatically changed the face of San Francisco. In this issue, we explore the history, mystery, and consequences of our geologic underpinnings, examples of which can be found throughout the Golden Gate National Parks. For the last 25 million years (give or take a few million), our national park neighbor to the south, Pinnacles National Monument, has crept closer to us, carried northward along the west flank of the San Andreas Fault. Meanwhile, our park neighbor to the north, Point Reyes National Seashore, continues to drift away from us aboard the Pacific Plate. For more about what it means to ride a major faultline, start with “Hiking the Seafloor,” p. 3.

Our thanks to Roxi Farwell, NPS Interpretive Ranger, Marin Headlands, who contributed to this introduction.

The Geology of Fort Funston
Walk to the Farallones? Millennia ago, that would have been possible. Today, Fort Funston’s cliffs allow us to read the geologic record of San Francisco’s shifting shoreline.

The Camp No One Used
After the earthquake of 1906, all the city’s residents suffered, but some received much less help than others. Greed and prejudice fueled a shameful episode in San Francisco’s postquake history.

Historical Tidbits
A potpourri of earthquake- and geology-related Q & A.
Behind the Scenes

Golden Gate National Recreation Area consists of 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.

It Can Happen Again

Earthquakes are common here along the California coast. The “big ones”—like those that occurred in 1906 and 1989—make history, and according to the US Geological Society, we should expect another “big one” sometime in the next few decades. For information on how to prepare for an earthquake (or other major disaster), visit www.72hours.org.

Epicenter of Earth

San Francisco State, Sonoma State, and Yosemite Institutes, NPS staff members have designed a park-based geology unit that can be integrated into Science Methods courses. The next step will be to collaborate with George Lucas Educational Foundation and other partners to design a website that will enrich the park experience.

Stay in Touch

Public involvement is the cornerstone of a well-managed, protected, preserved, balanced, safe, and user-friendly national park. To facilitate this involvement, GG N R A will hold a public meeting on Tuesday, May 16, at 7 PM in Marin County to update the public on key park-related issues and provide an opportunity for public comment. Agendas and locations for all meetings can be found at www.nps.gov/goga under “Public Meetings.” To be added to the mailing list for meeting notices and agendas, contact Michael Feinstein, Public Affairs, at (415) 591-4733.

Whole Lot of Planning Going On!

NPS staff and partners—the Golden Gate National Parks Conservancy, California State Parks, Marin County; and others—are working on several important planning projects. Among them, restoration planning at Muir Beach (coastal wetland and creek restoration), trail and habitat improvement planning (Mori Point Trail and Restoration Plan, Dias Ridge and Coast View Trails Rehabilitation and Access Improvement Project), and park maintenance facility moves (Park Maintenance Facilities Interim Relocation Project). Expect to see requests for input this year as the Environmental Assessments (EAs) and Environmental Impact Statements (EISs) move forward. Stay in touch with what’s happening by visiting the park’s website (www.nps.gov/goga) and a new NPS site, National Park Service Planning, Environment and Public Comment (PEPC). To access, go to www.parkplanning.nps.gov/goga and use the pull-down menu to select Golden Gate NRA and the projects that interest you. This site provides information on current plans, environmental impact analyses, and related documents available for public review, and also accepts public comments.

Help Us Imagine the Future

Help kick-off the new GGNRA General Management Plan Process by participating in one of three “open houses” planned for the week of April 20 through 27. The General Management Plan (GMP) provides the “big picture,” long-range vision for park management, and the open houses are opportunities for the public to meet with park managers and the planning team and let us know what’s important from your perspective. Comments can also be offered at the May 16 public meeting at the park’s San Francisco headquarters at Fort Mason. For more information, check the park’s website (www.nps.gov/goga), or www.parkplanning.nps.gov; use the pull-down menu to select Golden Gate NRA, then click on “General Management Plan.”

Marin Headlands–Fort Baker Draft EIS Announcement

The Marin Headlands–Fort Baker Transportation Management Plan Draft Environmental Impact Statement (DEIS) is due to be released for public review in late spring. The plan consists of roadway, parking, and trail improvements; new transit service; and other transportation management actions proposed to be implemented by the National Park Service over several years starting in 2007. For more information, please contact Paul Bignardi, NPS Transportation Planner at (415) 591-4733 or by email at paul_bignardi@nps.gov.

Welcome to the Golden Gate National Parks

Golden Gate National Recreation Area’s mission is to preserve and enhance the natural and cultural resources of the coastal lands north and south of the Golden Gate for the inspiration, education, and recreation of people today, and for future generations. We also work to protect the integrity of our parks’ fragile resources in the challenging context of an urban setting. Finally, we are committed to forging partnerships with the community to strengthen the parks’ relevance to our metropolitan neighbors and to engage the public in stewardship of the parks’ history and lands. We welcome your visit, and encourage you to take advantage of the many recreational opportunities the parklands offer, as well as to become involved as a volunteer at a favorite site.

Dedicated to One We Love

This issue dedicated to US Park Police Sergeant Pepper Karasick, the first female USPP Officer in San Francisco and the first female officer to pass the Horse Mounted Training in Washington, D.C. and be assigned here in the San Francisco Field Office. Oh yes, and first in our hearts.
The Marin Headlands
Hiking the Seafloor

Roxi Farwell, NPS Interpretive Ranger, Marin Headlands

It's a recurring phenomenon in the Marin Headlands. Dozens of geology students from local colleges arrive and take up positions on Conzelman Road, notebooks and compasses in hand, to give the rocks a close examination. Their field trips provide unique opportunities not only to view the richly layered layers of deep-ocean radiolarian chert and dark, bulbous pillow lavas from submarine volcanoes, but also—in clear weather—to gaze across the Golden Gate at the enigmatic, bluish-green serpentinites of the Presidio. These students are the latest participants in a long-standing geologic pilgrimage.

**ASSEMBLAGES AND TRINITIES**

In 1892, two geologists stood in the same area, surrounded by the same rock formations. One, Andrew Lawson, was just beginning a sixty-year career at the University of California, Berkeley. It would be Lawson who named the perplexing suite of rocks he studied in the Bay Area the Franciscan Assemblage. He would also apply the name San Andreas Rift to the “remarkably straight line” extending from Point Arena to Mount Pinos (Ventura County), along which he mapped the destructive movement of the Earth’s plates in 1906.

The other geologist was Gustav Steinmann, from Germany. His specialty was the structure of the tortured layers of rock within the Swiss Alps. Steinmann’s rock sequence of serpentinites, pillow lavas, and radiolarians eventually would be named the Steinmann Trinity. (Outstanding geo-scientists continue to earn the prestigious Gustav Steinmann Medal, honoring their achievements in geology.)

Imagine Steinmann’s reaction when Lawson showed him the dramatic scenery of the Golden Gate. Here was the same rock sequence he’d examined in the high peaks of Switzerland and Italy!

Steinmann’s Trinity and the Franciscan Assemblage record the formation and migration of great slabs of ancient seafloor. The emergence in the 1960s of plate tectonics, the unifying theory of modern geology, helps us realize how the same sequence of seafloor rocks can appear deep within mountain ranges, along some coastlines, and on the summits of the Himalaya. Plate tectonics helps explain many of the features of the Earth’s crust and the patterns of geologic convulsion such as earthquakes and volcanoes. It also reminds us of Earth’s dynamic nature. We are on a constant journey as our tectonic plate creeps across the planet, sliding by or crashing into other tectonic plates, or being consumed in one of the Earth’s great subduction zones.

**SEAFLOOR SCRAPINGS**

Most seafloor rocks are fated to be consumed in a subduction zone, as newly formed ocean crust is pushed away from a mid-ocean ridge and pulled downward as a cold, wet slab into the hot mantle below. Some bits of seafloor, however, manage to resist subduction and, instead, are scraped off along the continent’s edge. The Marin Headlands and much of the Bay Area are made up of such scrapings.

The rocks of the Marin Headlands offer a brilliant showcase for plate tectonics, and Conzelman Road provides a dazzling display. The seafloor rocks found in roadcuts of the Sierra highways may be hard to understand clearly, but the geologic landscape of the Marin Headlands appears on a big screen, in high definition. Stand atop Hawk Hill and look northwest toward Mount Tamalpais. The weather-resistant chert forms strong ridges, bounded on one side by softer, more easily weathered pillow basalt, and on the other by even softer graywacke sandstone.

Detailed analysis of the radiolarian plankton fossils found in the chert shows that each ridge is a part of the same great piece of seafloor, with nearly identical fossil sequences of tropical origin. Such stacking of repeated sequences of seafloor rocks, called imbricate layering—think “stingles on a roof”—is common to the geologic structure of subduction zones (described by Clyde Wahrhaftig, source of many substantial contributions to local geology). These stacked slices of chert help create the dramatic landscape of the Marin Headlands ... and make a level trail very rare!

After exploring the Franciscan rocks along Conzelman Road, take time to visit a different geologic hotspot, the Point Bonita Lighthouse, to view another part of Steinmann’s Trinity: pillow lavas from ancient underwater eruptions. Like the Conzelman cherts, the pillow lavas at Point Bonita attract the interest of 19th-century geologists. Leslie Ransome, a student of Andrew Lawson, produced what is likely the earliest professionally drawn, detailed geologic map of any locality in California when he published his article and map for the University of California's Bulletin of the Department of Geology in 1893.

Ransome’s meticulous descriptions of the rocks and their placements along the trail remain unsurpassed. However, in 1893, it was inconceivable that such well-preserved pillow structures could have erupted anywhere except nearby. Geochemical and palaeomagnetic studies from the 1980s suggest otherwise. The Point Bonita basaltic rocks were part of a seamount originally formed about 3,000 km offshore, whereas the basalt rocks found in the rest of the Marin Headlands originated in deeper water, at a seafloor spreading center (similar to the Mid-Atlantic Ridge) about 5,000 km to the south-west.

The third element of Steinmann’s Trinity, serpentinite, is harder to find in the Marin Headlands, although diligent explorers will observe some of the soapy, slick state rock in landslides along Rodeo Beach and underfoot on the Marinello Trail. To see textbook serpentine landscapes, visit the parklands just south of the Golden Gate. At Fort Point and throughout the Presidio, the blaky rock is well exposed, along with the rare plants that eke out an existence on the unusual serpentine soils.

**SAMPLE THE STEW**

An exploration of the Franciscan rocks in the Marin Headlands provides us with the opportunity to take a hike on the seafloor and look inside underwater volcanoes while surrounded by uncountable numbers of fossilized plankton. Our explorations also give us a chance to reflect on the many years of contributions to the science of geology that have occurred in our parklands. Geologist Clyde Wahrhaftig often described this jewel of seafloor scrapings as a “tectonic stew”: On your next visit to the park, relish the rocks!

See page 7 for more on Clyde Wahrhaftig.
The Geology of Fort Funston
Earthquakes, Glaciers, and Beaches

Will Elder, NPS Interpretive Ranger, Presidio

Walking along the beach at Fort Funston, with the sound of the waves, the smell of salt, and the ocean breeze ruffling your hair, have you ever pondered what stories the cliffs towering over your head may tell? How long have they been there? Where did they form? What are these crumbly rocks? Geologists have managed to coax many stories from the rocks, answering these and numerous other questions.

So do the cliffs of Fort Funston have anything to do with the 1906 San Francisco earthquake? Well, for one, both the earthquake and the cliffs were born from the San Andreas Fault, the infamous fracture in the Earth’s crust that separates the North American and Pacific plates. The fault lies less than 2 miles offshore of this popular beach and recreational area. As a matter of fact, Fort Funston was the closest landfall to the 1906 earthquake epicenter. Although the fault moved more at Point Reyes—over 20 feet—the first point to break along the fault was off Fort Funston. The 1906 earthquake epicenter lies at, perhaps not coincidentally, an apparent sharp right bend in the San Andreas, to which the rocks of the cliffs, known as the Merced Formation, may owe their existence.

Preserved in the cliffs today you can see beach and shallow ocean rocks, sand dunes, bay floors, stream beds, and ancient soils. Because these rocks are so young and only slightly buried, they are barely held together by the sand and mud from which they are made.

Reading the Rocks
If you walk the four miles of beach from Mussel Rock in the south, where the oldest part of the Merced Formation appears, to its top near Lake Merced, in the north, you will walk across a mile-thick pile of rock that spans the Pleistocene glacial period. In the south, the older rocks are mostly of shallow ocean origin, but as you hike northward, you see a larger proportion of rocks that were formed around the basin subsided, Over the last 3 million years, as the land beneath the north end of the Farallones to its modern-day location about 8,000 years ago.

The easiest access to Merced rocks is by taking the beach trail down from the observation deck at the Fort Funston parking lot and then walking north. The trail descends a large landslide, but as you go north, the first solid rock you’ll see at the cliff base was formed in a shallow bay and contains many burrows and fossil clams. Farther north, you’ll see different types of bedding in the rock, indicating different depositional settings, including small parallel beds formed near a bay or beach, beds steeply tilted in different directions deposited in sand dunes, and areas with colorful clay layers and pebbly zones that were once soils and stream beds.

What other stories do these rocks tell? Here are a few more: In the cliffs south of the Fort Funston parking lot, sand particles derived from granite and volcanic rocks of the Sierras suddenly appear in the Merced Formation. Their appearance marks the creation of today’s Sacramento/San Joaquin river system as it first flowed through the Golden Gate. The new river system was created when a huge lake covering the Central Valley overtopped a low ridge near modern-day Stockton and cut (perhaps catastrophically) the Carquinez Straits. The lake, which was at times as large as Lake Michigan, formed after an earlier drainage system flowing into Monterey Bay was blocked by the rising Diablo Range. A short distance above the sediment change, near the Daly City sewer outfall, you can see a prominent white ash layer formed by a volcanic eruption near Lassen Peak. Radiometric dating of the ash shows it to be about a half-million years old, which tells us that the new river system is slightly older.

BEACHWALK THROUGH TIME

So the next time you need some fresh air and want to take a walk, head to the beach at Fort Funston and have some fun exploring the rocks. It is best to go near low tide, and please stay on the beach, since the cliffs are crumbly and not safe for climbing. If you want to learn more about the rocks of Fort Funston, the park offers a monthly docent-led geology walk. Check the Park Programs calendar for dates and times.

More information is available through this USGS online publication:

Beachwalk through time. The San Andreas is a right-lateral fault, so-called because when looking across it, the opposite side is moved to the right. When a right-lateral fault bends to the right, the two sides of the fault pull apart across the bend, forming a hole. Merced Formation rocks fill the hole, or basin, that formed behind this bend, which is slowly moving northward with the Pacific Plate.

Over the last 1 million years, as the ground beneath the basin subsided, sediments from many environments along the ocean’s edge piled up. The rocks reveal this rising and falling sea level in their repeated cycles of shallow marine sediments overlain by beach, dune, bay, or stream deposits.

Hang-gliders have a bird’s-eye view of Fort Funston’s stratified bluffs, which provides one of the best continuous exposures of 2 million years of California geologic history.
We Hold the Rock
In 1969, a group of Native American Indians began a highly publicized nine-month occupation of Alcatraz Island, marking the beginning of the modern Indian movement by America’s indigenous people. This award-winning permanent exhibit includes photographs, music, video clips, and contemporary interviews with former occupants. Ranger-led programs are offered daily. Ask at the dock-level ranger station for times, locations, and topics. Following are some examples:
- Alcatraz in Hawaiian Land
- Escapes
- Fortress Alcatraz
- The Natural Side of the Rock
- 200 Years on the Rock
- US Penitentiary Alcatraz Island

Alcatraz Night Tour
Feel a chill run down your spine as you venture into dark corners of the old prison. Limited to just a few hundred visitors per evening, Alcatraz Night Tours explore topics, tours, and activities not offered during the day. For more detailed information, visit www.parksconser.org. Boat tickets well in advance, as they sell out quickly. For tickets, phone 705-5555.

For program information, phone 561-4946.

Alcatraz Kids Tourz
Looking for something fun, unusual, and educational to do with your family? For more information, visit www.parksconser.org. Buy boat tickets well in advance, as they sell out quickly. For tickets, phone 705-5555. For program information, phone 561-4946.

Creative Escapes (5/13)
Learn about creative and unusual Alcatraz escape attempts. For kids ages 9 and their families. Buy tickets for 4:20 PM Night Tour boat.

The Kids of Alcatraz (4/15)
Find out why growing up on Alcatraz was such fun! For kids ages 6 to 12 and their families. Buy tickets for 4:20 PM Night Tour boat.

On Duty at Fort Alcatraz (5/12)
Join a Civil War soldier at Fortress Alcatraz. For kids ages 6 to 12 and their families. Buy tickets for 4:20 PM Night Tour boat.

CLIFF HOUSE
Enjoy the views of the Pacific Ocean and Seal Rocks from the public outdoor terraces of the Cliff House. The newly rehabiliated Cliff House Restaurant is open seven days a week for lunch and dinner and the Camera Obscura on the lower terrace is open seven days a week, weather permitting.

CRISSY FIELD CENTER
The Center, open Wednesday through Sunday, 9 AM to 5 PM, is operated cooperatively by the National Park Service and the Golden Gate National Parks Conservancy and is dedicated to viewing the environment through multicultural perspectives in partnership with communities. Located in Building 603 at the corner of Mason and Halleck streets in the Presidio, it offers a full roster of interpretive, educational, and environmental programs as well as drop-in labs and multicultural events. Programs are free and suitable for all ages unless otherwise noted. For a complete quarterly catalog and registration and scholarship information, please phone 561-7690 or visit www.crrsyfield.org. Following is a partial listing of programs. All Crissy Field Center programs require reservations, phone 561-2374 to register. Programs meet at the Center unless otherwise noted.

Come to Your Senses at Crissy Field (5/2)
Experience the sights, sounds, smells, and flavors of Crissy Field on an easy 1-mile walk at the Crissy Field marsh. Look for crabs, taste strawberry treats, listen to cultural legends, smell a seashore habitat, and touch the sands of Crissy Field. Bring your lunch, sand toys, walking shoes, layers of clothes, and love of nature. For families with children ages 4 to 9. Meet Ranger Fatima Coleman at the Center.

Crispy Field Aviation Walk (4/8)
Explore Crissy Field and learn about its role in early aviation history on this easy 1-mile walk. Meet Docent Don Gray at the Warming Hut, end of Mason Street.

Ecological Restoration of the Waterfront (5/9, 4/15, 5/2)
Experience Crissy Field’s living tidal salt marsh! On this easy 2-mile walk, we will savour the wind, tides, sand, plants, and people who affect this ecosystem. Rain cancels. Meet Docent Bob Halsey in front of the Center.

History, Heroes, and Houses (5/13)
Explore the heart of the Presidio and learn about this former army post’s rich history on an easy 1-mile walk. Rain cancels. Meet Docent Bob Bowen at the NPS Visitor Center inside the Presidio Officers’ Club, 50 Moraga Avenue.

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<th>Park Programs</th>
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**SUNDAY**
- **MARIN HEADLANDS**: Begins near the NPS Visitor Center for young park visitors. The walk begins near the NPS Visitor Center and ends at El Polin. For families with children ages 5 to 9. Meet Ranger Will Elder at the Center.

**MON**
- **FORT POINT**: During the retrofit of the Golden Gate Bridge, the fort will be open on Friday, Saturday, and Sunday only, 10 am–12:30 pm. Shown throughout the day and then let you try your luck with some of the ships that perished on the rocky cliffs of the Golden Gate. Meet Docent Jim Hyde at the ranger station. Reservations required; phone 239-4247.

**TUESDAY**

**WEDNESDAY**
- **CRISPY FIELD CENTER**: (3/25, 4/8, 4/22; 4/29) “Building the Golden Gate Bridge” Video made by Bethlehem Steel Company on the construction of this national engineering landmark.

**THURSDAY**
- **CANNON LOADING DEMONSTRATIONS**: During a Civil War artillery drill, learn how soldiers were taught to load and fire a Napoleon 12-pounder cannon.

**FRIDAY**
- **CANNON LOADING DEMONSTRATIONS**: During a Civil War artillery drill, learn how soldiers were taught to load and fire a Napoleon 12-pounder cannon.

**SATURDAY**
- **CANNON LOADING DEMONSTRATIONS**: During a Civil War artillery drill, learn how soldiers were taught to load and fire a Napoleon 12-pounder cannon.

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**Program Information**

**JUANA BRIONES: A LEGEND, A WOMAN**
- **CRISPY FIELD CENTER**: Juanita Briones: Una Leyenda Una Mujer 1–3 pm
- **MARIN HEADLANDS**: Nike Missile Site Open House 12:30–3:30 pm
- **MUIR WOODS**: Muir Beach Bird Walk 9–10:30 am
- **OCEAN BEACH**: Adopt-a-Beach Clean-up Day: Doyal Street 10 am–12:30 pm
- **CROSSY FIELD CENTER**: The Last Gun 11 am–3 pm

**MARIN HEADLANDS**:
- **BEGINNING BIRDING**: 8:30–11:30 am
- **MUIR WOODS**: Geology Hike 10 am–1:30 pm

**MUIR WOODS**:
- **ALICE EASTWOOD CENTENNALE HIKE**: 10 am–12 pm
- **THE EARTH SHOOK THE SKY BURNED**: 1–2:30 pm

**MARIN HEADLANDS**:
- **BEGINNING BIRDING**: 8:30–11:30 am
- **MUIR WOODS**: Geology Hike 10 am–1:30 pm

**PRESIDIO**:
- **NATIONAL CEMETARY WALK**: 10 am–12:30 pm

**CRISPY FIELD CENTER**:
- **Juanita Briones: A Legend, A Woman 1–3 pm**
- **NATIONAL CEMETARY WALK**: 10 am–12:30 pm
- **ECOLOGICAL RESTORATION OF THE WATERTF**: 10:30–12 pm
- **ARE YOU THERE YET?**: Army and the Refugees 1–3 pm

**ALCATRAZ**:
- **ALCATRAZ KIDS TOURS: KIDS OF ALCATRAZ**: 2–3:30 pm

**FORT FUNSTON**:
- **FORT POINT OPEN HOUSE**: 10 am–12:30 pm
- **GREEN TEAM**: Free. 10 am–12:30 pm

**MARIN HEADLANDS**:
- **SMASHING PLATES AND ELECTRIC ROCKS**: 9–2 pm
- **WILDFLOWER FLOWERS**: 10 am–12:30 pm
- **CRISPY FIELD CLEAN-UP**: 8 am–12 pm

**MARIN HEADLANDS**:
- **WILDFLOWERS OF WOLF RIDGE**: 2–3 pm
- **SPRING FAMILY CAMP**: 11 am–12:30 pm

**FORT POINT**:
- **GREEN TEAM**: 11 am–12:30 pm

**MARIN HEADLANDS**:
- **TENNESSEE VALLEY RAMBLE**: 11 am–12:30 pm

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<th>SUNDAY</th>
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<td><strong>ALCATRAZ</strong>&lt;br&gt;Alcatraz Kidz Tour: Creative Escapes 4:30–7:30 pm</td>
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<td><strong>MARIN HEADLANDS</strong>&lt;br&gt;Mother’s Day Wildflower Hike&lt;br&gt;10 am–1:30 pm</td>
<td><strong>PRESIDIO</strong>&lt;br&gt;Buffalo Soldiers at the Presidio 1–2 pm</td>
<td><strong>CRISPY FIELD CENTER</strong>&lt;br&gt;Come to Your Senses at Crispy Field 10–1:30 pm</td>
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<td><strong>MARIN HEADLANDS</strong>&lt;br&gt;Smashing Plates and Elastic Rocks 9–2 pm</td>
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<td><strong>MARIN HEADLANDS</strong>&lt;br&gt;Bones, Bones, Bones 10 am–1:30 pm</td>
<td><strong>PRESIDIO</strong>&lt;br&gt;Patriotism and Prejudice 1–2 pm</td>
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**Program Information**

**US National Park Service - Marina Headlands**

- **MAY**
  - **Sunday, May 3**
    - **Point Bonita Lighthouse**
      - **Time:** 10:30 AM - 11:30 AM
      - **Details:** Guided tour of the lighthouse and grounds.
  - **Monday, May 4**
    - **Point Bonita Lighthouse**
      - **Time:** 10:30 AM - 11:30 AM
      - **Details:** Guided tour of the lighthouse and grounds.
  - **Tuesday, May 5**
    - **Point Bonita Lighthouse**
      - **Time:** 10:30 AM - 11:30 AM
      - **Details:** Guided tour of the lighthouse and grounds.
  - **Wednesday, May 6**
    - **Point Bonita Lighthouse**
      - **Time:** 10:30 AM - 11:30 AM
      - **Details:** Guided tour of the lighthouse and grounds.

**HOURS**

- **Open Daily:** 9:30 AM to 4:30 PM
- **Location:** 3500 Visitacion Avenue, San Francisco, CA 94132
- **Contact:** 415-561-4643
- **Website:** [Visitacion Avenue](http://www.nps.gov/goga/maka)

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**Point Bonita Lighthouse**

- **Open Daily:** 9:30 AM to 4:30 PM
- **Location:** 3500 Visitacion Avenue, San Francisco, CA 94132
- **Contact:** 415-561-4643
- **Website:** [Visitacion Avenue](http://www.nps.gov/goga/maka)

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**Alcatraz**

- **Open Daily:** 9:30 AM to 4:30 PM
- **Location:** 3500 Visitacion Avenue, San Francisco, CA 94132
- **Contact:** 415-561-4643
- **Website:** [Visitacion Avenue](http://www.nps.gov/goga/maka)
Earthquakes are a fact of life in Northern California. We get literally thousands of earthquakes a year and while not all of them are serious, scientists say a big one is a certainty. Unfortunately, they can’t predict when it will strike. But you can take preventative measures now to prepare yourself for an earthquake later.

Here’s a checklist of things to do to prepare for an earthquake.

• Assemble an emergency supply kit. Supplies should include flashlight, extra batteries, portable battery-operated radio, gas shut-off tool, first-aid kit and first-aid manual, canned food, at least three gallons of water per person, non-electric can opener, essential medicines (including prescription medications), protective clothing and rainwear, sleeping bag or blanket, and sturdy shoes.
• Learn how to turn off gas, water, and electricity in case the lines are damaged.
• Know the danger spots—windows, mirrors, hanging objects, fireplaces, tall furniture.
• Know the safe spots in each room—under sturdy tables or desks, against inside walls.
• Secure heavy items of furniture and appliances using flexible mount furniture straps.
• Secure water heaters with two-strap kits.
• Secure breakables and collectibles with Quake putty, wax, or museum gel.
• Secure TVs and monitors with adhesive buckle kits.
• Keep flammable or hazardous liquids such as paints, pest sprays, or cleaning products in cabinets or secured on lower shelves.
• Learn Cardiopulmonary Resuscitation (CPR).
• Always know the possible ways to exit your house and workplace in emergency situations.
• Decide where your family will reunite if separated.
• Choose an out-of-state friend or relative whom family members may call after an earthquake to report whereabouts and conditions.

More than ever before, the Golden Gate National Parks need the support of people like you. By joining the Conservancy—the parks' nonprofit 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 audiences in the national parks at the Golden Gate.

JOIN THE PARKS CONSERVANCY AND YOU’LL RECEIVE:

- Invitations to members-only walks, talks, and excursions.
- Free use of the Alcatraz and Fort Point audio tours.
- Free monthly e-mail newsletter.
- Two membership cards plus a special gift.
- Gateways, the quarterly membership newsletter filled with news of the parks and tips on special places.
- Park Adventures, the quarterly calendar of NPS and special membership programs and events, delivered to your home.
- Free monthly e-mail newsletter.
- Invitations to members-only walks, talks, and excursions.
- Discounts at park bookstores.
- Free use of the Alcatraz and Fort Point audio tours.
- Gateways prepare for an earthquake.
- There is no way to predict when an earthquake will strike. But you can take preventative measures now to prepare your- self for an earthquake later.

LEARN MORE ABOUT EARTHQUAKES

The Parks Conservancy has published an informative book and produced two sets of educational playing cards for those who want to learn more about California’s geology and earthquakes. To purchase them, visit the Conservancy’s online store at www.parksconservancy.org or stop by one of the Conservancy’s nine park stores. Store addresses are listed on our website.

LIVING IN EARTHQUAKE COUNTRY

1906 EARTHQUAKE QUIZ

QUESTIONS:
What was the magnitude of the 1906 earthquake?
Where was the earthquake’s epicenter?
How many residents were left homeless after the earthquake and fires?
What was the estimated cost of the property damage?
How did the military attempt to control the fires?

ANSWERS:
Estimated at 7.8 on the Richter scale. Under the Pacific Ocean, within a mile of Daly City. More than 225,000 of the city’s 400,000 residents were displaced. $400 million, or more than $8 billion in today’s dollars. By dynamiting firebreaks, which itself caused additional fires.

A Land in Motion: California’s San Andreas Fault
Join author Michael Collier as he travels the San Andreas Fault and talks to the scientists who study it. Incorporating an amazing collection of photographs, clear writing, maps, and diagrams, A Land in Motion gives readers a new appreciation of the science, history, and impact of the most famous fault on Earth. $19.95

1906 Earthquake Playing Cards
Read about the facts, stories, and scandals of the 1906 earthquake and subsequent fire in this unique set of playing cards. Learn about tremendous acts of bravery, how the Presidio provided critical services to earthquake refugees, the role of Alcatraz in housing the city’s prisoners, and much more. $5.95

Earthquake Safety Tips Playing Cards
Being prepared is the best defense against the natural disasters that threaten our lives and properties. Use the 54 safety tips contained in these playing cards as suggestions to help reduce loss of life and property damage at your home and workplace. $5.95

Do You Enjoy the Parks?

JOIN US!

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- 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:

$5 Park Partner — Receive all benefits of membership
$50 Park Sponsor — Receive the award-winning book, Guide to the Parks
$100 Park Steward — Receive a Mount Tamalpais sweatshirt

Donations are tax-deductible. For information, or to join online, visit our website www.parksconservancy.org. To join by phone, call the Parks Conservancy at (415) 4R-PARKS.

SIGNATURE

NAME
ADDRESS
CITY STATE ZIP EMAIL
PAY PHONE (INCLUDE AREA CODE)

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

Charge to: Visa Mastercard AmEx Discovery

ACCOUNT NUMBER
EXPIRATION DATE

EXPENSES

Mail this coupon with payment to:
Golden Gate National Parks Conservancy, Building 201, Fort Mason, San Francisco, CA 94123

THE GOLDEN GATE NATIONAL PARKS CONSERVANCY—OUR MISSION

The Golden Gate National Parks Conservancy is a nonprofit membership organization created to preserve the Golden Gate National Parks, enhance the experiences of park visitors, and build a community dedicated to conserving the parks for the future. We seek private contributions to augment federal funds for the parks, and work in collaboration with the National Park Service and the Presidio Trust to improve park sites, enlist volunteers in restoration projects, provide services and education programs for visitors and local communities, and engage diverse audiences in the national parks at the Golden Gate.
The Camp No One Used

The Plight of the Chinese After the 1906 Earthquake

Will Elder, NPS Interpretive Ranger, Presidio

Catastrophe draws people together, but at the same time, can magnify class and race distinctions. Like the recent Hurricane Katrina disaster, the 1906 San Francisco earthquake and fire were no exceptions to this paradox. Although heroes arose from the dire circumstances, not everyone afflicted was treated with the same respect, or obtained the same level of assistance in the aftermath. Following the 1906 disaster, the people of San Francisco's Chinatown received some of the poorest treatment of any group in the city.

The 1849 Gold Rush and the building of the trans-continental railroad had brought people to San Francisco from all over the world. For a number of sociological reasons, by the early 20th century, there was great prejudice against Asians in America, particularly on the West Coast. Though a small part of this larger story, the army's approach to dealing with Chinatown's earthquake refugees is unfortunately representative.

SHOCK, PANIC, CONFUSION

Like much of the city, when the violent earthquake struck in the dawn light of April 18, 1906, Chinatown suffered some damage, but its complete destruction came later as a result of the firestorm that engulfed much of downtown San Francisco. Similar to most of the city's residents, the Chinese were overcome by shock, panic, and confusion after the powerful quake. Watching helplessly as the fires approached their homes and businesses, they no doubt wondered which of their possessions they should take. What would they require, or desire, after all was gone? And where would they go? Would they be safe away from Chinatown?

As did others across the city, the Chinese scrambled to gather their belongings and flee the encroaching flames. As they left, the National Guard moved in to evacuate and “safeguard” Chinatown. Hugh Kwong Liang, only fifteen at the time, recalled, “I turned away from my dear old Chinatown for the last time... City officials directing the refugees approached us and told us to proceed toward the open grounds at the Presidio Army Post.”

However, the majority of Chinese refugees left San Francisco entirely, most traveling to camps in Oakland, which had its own small Chinatown. The 400 or so Chinese who chose to remain in the city endured much confusion as military officials shuttled them from camp to camp in the ensuing days. The first move was to rout them from a “mixed-race” camp near the entrance to Fort Mason and take them to a camp on Van Ness Avenue. James Phelan, a prominent San Francisco capitalist and politician, objected to this site, arguing that the camp would prove difficult to dismantle once the Chinese settled in a location so close to the original Chinatown.

The army then moved the camp to the Presidio Golf Links, but the post's Presidio Heights neighborhoods were greatly displeased, saying “the summer zephyrs would blow the odors of Chinatown into their front doors.” The next day, Chinese refugees were again transferred to a remote location on the Presidio near Fort Point. With each move, the number of refugees dwindled. By the time they reached this third and final location on April 28, less than 300 remained to occupy a camp capable of holding up to 10,000 refugees. (The Chinese camp at the Presidio was the shortest-lived of any official camp, only lasting a little more than a month as its residents, not surprisingly, found accommodations elsewhere.)

LAND GRAB ATTEMPTED

Despite the military presence, there was extensive looting by city residents and even by the National Guard troops. Consequently, the National Guard was replaced by regular military soldiers, who, though they did not themselves loot, reportedly turned a blind eye to Chinatown's civilian looters.

The Chinese, who numbered around 15,000 in San Francisco in 1906, were one of the largest and least-welcomed immigrant populations. As Ching Wah Lee, a Chinatown historian, explained, “At the time there was no work for white men, never mind the Chinese. But the Chinese would take any work at any pay. This just increased their unpopularity.” With the destruction of Chinatown by the 1906 earthquake and fire, city officials had a convenient excuse to drive the Chinese out of the city and claim the land Chinatown occupied for profitable commercial development.

By then, reports of poor treatment of the Chinese had gained the attention of both the Chinese Legation and President Theodore Roosevelt. The president sent Secretary of Commerce Victor H. Metcalf to San Francisco to investigate incidents of discrimination. After meeting with city officials, Metcalf telegraphed the President: “It is reported to me that no discrimination of any kind has been shown against anyone on account of race or color. The spirit has been and is to assist the suffering, whoever and wherever they may be.” At the same time, the inhabitants of the Chinese camp were briefly detained in camp after many “became demoralized and were leaving camp in body.”

This action prompted a visit by the first secretary of the Chinese Legation, Chow Tsz Chi, who requested that the refugees be permitted to go in and out of the gate unmolested and that the current site of the camp be made permanent. He stated that should circumstances necessitate a further move, there should be adequate warning and sensitivity to the language barrier. He assured military authorities that if this were done, the Chinese would give no trouble.

Meanwhile, a Committee on the Location of Chinatown was formed and debated numerous permanent sites for its rebuilding, including Hunter's Point in San Mateo County. This idea was dismissed after officials realized that property and poll taxes collected from the Chinese in Hunter's Point would no longer benefit San Francisco. The relocation of Chinatown also posed a threat to the “Oriental trade” dominated by San Francisco ports. As the committee struggled with the mounting pressure from local and national concern over the treatment of the Chinese, Seattle and Los Angeles offered to take them in, no doubt further alarming the committee members. Slowly, the Committee on the Location of Chinatown lost momentum, and the Chinese were allowed back into their former neighborhood, which they rebuilt into one of the city's cultural icons.

ISING LIKE A PHOENIX

In a round-about way, the earthquake and fire may have benefited the Chinese. With municipal records destroyed, many were able to fill out new certificates of residence and claim American citizenship; this paved the way for their wives, children, and “paper sons” to join them. Many of the original Chinatown shacks were replaced with Asian-style architecture—graceful pagodas, ornate balconies, and colorful façades.

Today, Chinatown is a bustling community of 70,000, one that opens its doors to immigrant newcomers and tourists alike. It represents a story not only of survival, but of overcoming prejudice. The city's Chinese earthquake refugees, determined to stay and rebuild, also improved their community for the benefit of the entire city.
WHERE DID ALL THE CONVICTS GO? One fine spring morning, the newly completed Alcatraz barracks—and the entire island—had their structural stability sorely tested in what history has titled the Great Earthquake. The entry in the 1906 annual report was concise: “At about 5:30 on the morning of [April] 18th, a very severe earthquake shock occurred, shaking all buildings, cracking many walls, and wrecking many chimneys.” Soldiers living in the Building 64 barracks made a simultaneous dash for the only stairway, causing momentary panic and an impressive human traffic jam. A hurried inspection revealed that Alcatraz had suffered relatively minor damage—mostly, broken chimneys and some cracked plumbing.

San Francisco had not been so lucky. Water mains and cisterns had ruptured throughout the city and fires burned out of control, fueled by broken gas mains under a hundred twisty streets, and made their way to the downtown financial district. Alcatraz troops were ferried in to assist in evacuating citizens, dynamite fires, and protecting abandoned buildings from looters.

By the morning of April 19, a firestorm approached the city’s municipal jail on Broadway Street. Guards could hear an unearthly roar as oxygen rushed through the superheated air, and asphalt on the streets burst into flames as temperatures soared. The jailers decided it was time to evacuate their charges. Talking some National Guardsmen and sailors into assisting them, the guards removed 176 prisoners from their cells, herded them through the blazing streets, and made their way to the emergency headquarters at Fort Mason.

Later in the afternoon, the city’s prisoners embarked on a heavily guarded launch headed for Alcatraz. When they pulled up alongside the island dock, the commanding officer had no option but to let the motley crew land. Space was found for the new arrivals in the already crowded cellblocks, and for the next nine days, the Rock’s military prisoners were joined by an eclectic mixture of muggers, thieves, junkies, and drunken revelers—refugees from the Barbary Coast.

WHO IS CLYDE? Clyde Wahrhaftig was a noted geologist whose lifelong work included extensive geological study of the San Francisco Bay Area. A professor in the geology and geophysics department at the University of California, Berkeley, from 1960 to 1982, Clyde was also a long-term employee of the US Geological Survey in Menlo Park. Known to “distrust and dislike the speed of automobiles and airplanes,” Clyde traveled the Bay Area by public transportation, studying its various seismic sites. He also researched and published numerous geologic field trip guides, including A Walker’s Guide to the Geology of San Francisco and the Hayward Fault in Hayward and Fremont, via BART, and the appropriately titled A Streetcar to Subduction and Other Plate Tectonic Trips by Public Transport in San Francisco. Clyde made numerous contributions to studies and projects undertaken in the GGNRA landscape.

WHERE CAN I FIND OUT MORE ABOUT CLYDE’S WORK? Clyde’s extensive collection of personal and professional papers, maps, photographs, and publications is now housed at the GGNRA Archives and Records Center and is available for research by appointment; phone (415) 561-4804 for more information. In this year commemorating the centennial of the Great Earthquake and Fire of 1906, it is only right to recognize and remember the magnificent work of a student of the Earth, Clyde Wahrhaftig.

—Susan Ewing Haley, Archivist, Park Archives and Records Center

WHO WAS GENEROUS, WHO WAS BRAVE? The earthquake that rumbled through San Francisco in the early-morning hours of April 18, 1906, left Sequoia Canyon—home to what is now Muir Woods—virtually unscathed. None of the redwoods fell, none of the redwoods burned. But San Francisco burned, and the aftershocks from that conflagration nearly spelled doom for these towering trees.

About nine months following the earthquake, “the greatest tree of science’s literally invaluable plant collection. Eastwood, a pioneering botanist, was head of the botanical collection at the Academy for over fifty years. In the days following the earthquake, Eastwood salvaged the Academy’s botanical specimens (or “type collection,” examples that define a species) as flames from post-quake fires crept ever nearer to the Academy building. At great personal risk, Eastwood removed the collection to places of safety.

Today, Eastwood is remembered at Muir Woods through the Alice Eastwood Trail, which climbs from the floor of Muir Woods to Camp Eastwood in Mount Tamalpais State Park. The upper reaches of the Eastwood Trail are adorned with Eastwood manzanita, one of many plant species identified by Alice Eastwood during her sojourns in and around Muir Woods.

—Ken Lavon, NPS Interpretive Ranger, Muir Woods
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)

Golden Gate National Recreation Area (GGNRA)

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 (main) ........ 561-7990
Fort Mason Center ........ 441-3400
Golden Gate National Parks Conservancy ........ 561-3000
Golden Gate Park Ranger Station ........ 561-3040
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/muir
Muir Woods National Monument ........ www.nps.gov/muwo
Fort Mason ........ www.nps.gov/fmfn
Golden Gate National Recreation Area ........ www.nps.gov/goga

ADDITIONAL PARK-RELATED SITES
Crissy Field Center ........ www.crissyfield.org
Fort Mason Center ........ www.fortmason.org
Golden Gate Park Ranger Station ........ www.nps.gov/ggpr
Golden Gate National Recreation Area ........ www.nps.gov/goga
Parks and Recreation Department ........ www.nps.gov/parkrecreation
Golden Gate National Recreation Area ........ www.nps.gov/goga

Calder the Farallones National Marine Sanctuary ........ www.farallones.org
Golden Gate National Recreation Area ........ www.nps.gov/goga
Golden Gate National Recreation Area ........ www.nps.gov/goga

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 48 square nautical miles of the Pacific Ocean off the California coastline, west and north of San Francisco and includes the Gulf of the Farallones and the nearshore waters of Bodega, Tomales, and Drakes bays, Estero de San Antonio, Estero Americano, Bodega, Tomales, and Drakes bays, Estero de San Antonio, Estero Americano, Duxbury Reef, and Bolinas Lagoon. It is managed by the National Oceanic and Atmospheric Administration (NOAA) and provides special protection and management for marine areas of national significance, for the benefit of the public and the world's oceans.

Road ParkNews on the Web: www.nps.gov/goga/parknews

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