



## The San Andreas Fault

### Contrast and Variation

The world-famous San Andreas Fault separates the Point Reyes peninsula from the main land of California. The fault is much more than a simple boundary. It has created the landscape of this area with its long bays and lagoons and the narrow Olema Valley. It looms and promises to change the landscape again with the next big earthquake. Will the “Big One” be today, next week, or five years from now? It’s a hard question to answer because there is so much that is still not known about earthquakes and seismic activity. However, it is known that the earthquakes we experience are caused by the shifting and movements of the vast plates that cover the earth... some of which we live on.

### Think Big, Think Plate Tectonics

To understand the San Andreas Fault, we must leave the Olema Valley to examine the larger global theory Plate Tectonics. Geologists believe that the outer layer of the earth is segmented into about a dozen rigid plates. These plates which are up to 62 miles thick, float on a fluid layer of molten earth. Currents within this layer slowly move and shift the surface plates that we live on. This movement causes plates to collide in convergent plate boundaries, to separate in divergent plate boundaries or slide past one another in transform plate boundaries. Where these plates meet, boundaries are the site where mountains are created, volcanoes erupt, and earthquakes occur.

The San Andreas Fault is a transform plate boundary that separates the two largest plates in the world, the Pacific and North American plates. The oceanic Pacific plate, which includes Point Reyes, is slowly grinding to the northwest at about two inches per year in relation to the North American plate. This movement is responsible for the topography of the area as well as the frequent earthquakes of varying magnitude.

### Hop a Ride on the Pacific Plate

Visitors to Point Reyes National Seashore will enter the San Andreas Fault zone and cross from the North American to the Pacific plate. Even though the Point Reyes peninsula is currently attached to the mainland, in many ways you have set foot onto a land in motion. The peninsula is thought to have traveled 280 miles over the last 30 million years from its origins near Los Angeles.

When exploring the peninsula, you are exploring a land apart. It is easy to recognize that Point Reyes is unlike the surrounding California mainland. There are distinct differences in terrain and vegetation. Its geologic history is the key. With its origins further

south, the parent rocks and soils of the Point Reyes Peninsula are different from the soils and substrate of the continental mainland. This difference in soils affects the plants that are able to grow here. Here at Point Reyes, Douglas firs and the ancient bishop pine dominate the Inverness Ridge while elsewhere along the California coast, you’ll find coast redwoods thriving.

The geology affects more than just its plants and topography. Indirectly, it influences all the species of animals that are dependent on habitat created by the peninsula’s geologic migration. It even impacts us... sometimes in devastating ways.

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## Not Soon Forgotten

During the brief presence of humans along the fault, the San Andreas has played a significant role in human history. Perhaps the most famous earthquake in the western world occurred the San Francisco Bay Area on April 18, 1906. When the earthquake struck, the Point Reyes Peninsula jolted northwest about 20 feet (6 meters). In nearby San Francisco, fires resulting from the earthquake crippled the city causing millions of dollars of damage and hundreds of deaths.

On October 17, 1989, San Francisco Bay Area residents were again reminded of the power of the San Andreas and its adjacent faults. The Loma Prieta Earthquake, whose epicenter was in the Santa Cruz Mountains, caused the collapse of a portion of the Bay Bridge, a freeway overpass in Oakland and many other structures.

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## Experience the Fault

The San Andreas Fault serves as a reminder to us of the incredible power of the earth upon which we live for a very brief moment in time. Today, a stroll along the Earthquake Trail in Bear Valley offers the visitor an account of the geology behind earthquakes and specifically the 1906 earthquake. The paved .6 mile Earthquake Trail is located across the parking lot from the Bear Valley Visitor Center, just to the left of the restrooms.

The summit of Mount Wittenberg at 1407 ft is an excellent elevated observation point of the San Andreas Fault zone. This vantage point provides a view of the Olema Valley and Tomales Bay. Mt. Wittenberg is a four-mile round trip hike from the Bear Valley Visitor Center. Start on the Bear Valley Trail and turn right on the Mt. Wittenberg Trail. Follow that trail to the summit. Pick up a trail map from the Visitor Center before you set out.

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## Learn more...

Learn more about the San Andreas and earthquakes around the world on the Internet at <https://earthquake.usgs.gov> .



*A surface rupture was visible in the Olema area after the 1906 earthquake after the peninsula jolted 20 feet to the northwest.*