Muir Woods
100th Anniversary 2008

National Park Service
U.S. Department of the Interior

National Monument
California

NPS / JAMES M. MORLEY

Muir Woods National Monument is a remnant of ancient coast redwood forests that blanketed many northern California coastal valleys before the 1800s. Local businessman William Kent and his wife Elizabeth Thacher Kent bought land in this valley in 1905 to protect one of the last stands of uncut redwoods. To ensure permanent protection, they donated 295 acres of redwoods to the federal government. In 1908 President Theodore Roosevelt proclaimed the area a national monument. At William Kent's request, it was named for conservationist John Muir.

Thanks to the inspiration of John Muir and the generous gift of the Kent family, 100 years later we are still able to experience this ancient old-growth forest. We have been entrusted to carry on the legacy of Kent and Muir, protecting this awe-inspiring place for future generations and working towards the preservation of wilderness, wildness, and natural wonder.

This is the best tree-lover's monument that could possibly be found in all the forests of the world. You have done me great honor, and I am proud of it.

—John Muir to William Kent

William Kent and John Muir

SAVE-THE-REDWOODS LEAGUE

Life of the Redwood Forest

Ancient Redwood Forest Coast redwoods dominate this fog-drenched forest. Redwoods of all ages, including many over 600 years old, grow among standing dead trees, rotting logs, and diverse undergrowth. This specialized forest environment provides habitat for a range of plants and animals adapted to the low light and moist conditions.

Redwood sorrel

NPS / JAMES M. MORLEY

Shade-loving undergrowth thrives under the redwood canopy. Redwood sorrel, sword ferns, and mosses stay cool and damp. Bay-laurels and big-leaf maples lean towards pockets of sunlight. On hillsides, large Douglas firs challenge the redwoods in height. Delicate wildflowers like trillium, clintonia, and redwood violet grace the forest floor in winter and early spring.

Animals seem elusive in the quiet redwood forest. Some, like spotted owls, bats, and raccoons, emerge mostly at night. Others like deer are most active at dawn and dusk. Some birds—warblers, kinglets, and thrushes—migrate through Muir Woods, but winter wrens live here year-round.

Reptiles and amphibians such as western garter snakes, rubber boas, and California giant salamanders are uncommon, but slimy bright banana slugs are abundant during the rainy season. Most commonly seen are Steller's jays, Sonoma chipmunks, and Western gray squirrels.

Redwood Creek Watershed Redwood Creek originates high on the slopes of Mt. Tamalpais and nearly bisects the park. It runs year-round, providing nearby trees and animals with water, and is host to diverse aquatic creatures, including fish, insects, and salamanders.

In summer the creek slows to a trickle connecting quiet pools. Winter is the wet season, with an average of 40 inches of rainfall per year. Winter rainstorms turn the creek into a raging torrent. Rain-swollen, Redwood Creek breaks through the sand barrier at Muir Beach, allowing threatened steelhead trout and endangered coho salmon to move up the creek to spawn.

An Ecological Treasure Muir Woods National Monument and the Redwood Creek watershed are a part of Golden Gate International Biosphere Reserve—one of the planet's richest and most threatened reservoirs of plant and animal life. Located near San Francisco, Muir Woods each year sees nearly one million visitors from all around the world. It is truly a window into the complex world of nature and conservation.

Steller's jay

NPS / JAMES M. MORLEY

Visiting Muir Woods

Muir Woods National Monument, 12 miles north of Golden Gate Bridge, is reached via U.S. 101 and Calif. Hwy. 1. Parking is limited: try visiting on weekdays, mornings, or late afternoons. Approach roads are steep and winding; vehicles over 35 feet long are prohibited. No public transportation serves the park. Jackets are advised: daytime temperatures average 40° to 70°F.

There is a visitor center and a self-guiding nature trail. A gift shop sells snacks and souvenirs. Find gasoline and services in Mill Valley, five miles away. The park is open 8 a.m. to sunset year-round. Visitors 16 and older must pay entrance fees.

More Information
Managed by Golden Gate National Recreation Area, Muir Woods National Monument is one of over 390 parks in the National Park System. The National Park Service cares for special places saved by the American people so all may experience our heritage. To learn more visit www.nps.gov.

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Protect Your Park
Please help preserve this natural area. • Help keep wildlife healthy: don't feed or disturb them. Fishing is prohibited in Redwood Creek. • Don't mar or remove flowers, trees, or other natural features. • No smoking on trails. • No horses or bicycles except on fire roads. • Portable radios are prohibited. • Picnicking and camping are not allowed, but facilities are provided nearby. • Pets are not permitted, except service dogs.

Danger: Poison oak and stinging nettles are common. • During high winds branches or trees may fall.

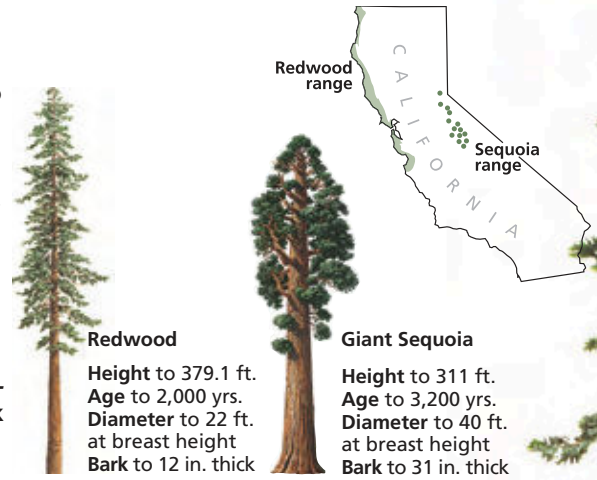
Loop Walks
Walk in Redwood Canyon to enjoy the forest. The 560-acre park includes six miles of trails. The main, canyon floor trails are paved and mostly level. Bridges 1 to 4 *(see map)* make short loop walks possible. Unpaved trails out of the canyon connect with trails in Mt. Tamalpais State Park.

All paved trails are wheelchair-accessibile.
- Paved trail
- ½ hour, ½ mile loop walk
- 1 hour, 1 mile loop walk
- 1½ hour, 2 miles loop walk
- Extended trails (unpaved)

California Redwoods

Redwood-like trees covered much of the Northern Hemisphere 150 million years ago. As the climate changed, the range of the redwood retreated. Now there are two species of redwood in California, with very limited ranges. The coast redwood (*Sequoia sempervirens*) grows on a thin and discontinuous 500-mile strip of Pacific coast from southern Oregon to Big Sur. Most ancient coast redwoods have been cut, but some are protected in Redwood National and State Parks, in many California and Oregon state parks, and here in Muir Woods. This canyon of redwoods was never logged. Its forest of mixed-age and dead trees supports a biologically rich community of plants and animals.

Closely related, the giant sequoia (*Sequoiadendron giganteum*) grows larger in bulk but is less tall than the coast redwood. Giant sequoias can be seen in Yosemite and Sequoia and Kings Canyon National Parks. Their range is restricted to small groves on the west slope of the Sierra Nevada.



Redwood
Height to 379.1 ft.
Age to 2,000 yrs.
Diameter to 22 ft. at breast height
Bark to 12 in. thick

Giant Sequoia
Height to 311 ft.
Age to 3,200 yrs.
Diameter to 40 ft. at breast height
Bark to 31 in. thick

Coast Redwoods: Tallest Living Things

Bohemian and Cathedral groves have the biggest trees in Muir Woods. The tallest is over 252 feet and the widest over 14 feet. Some redwoods are at least 1,000 years old.

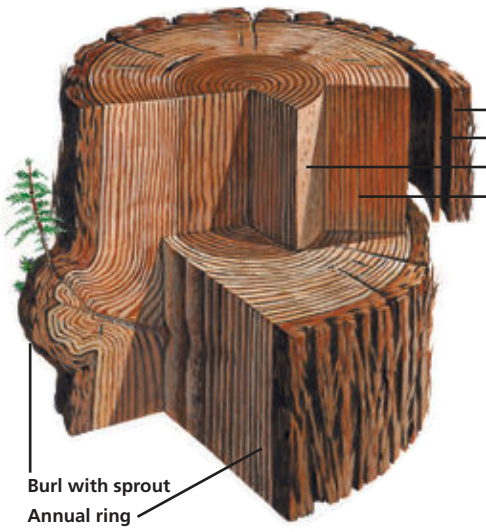
Most mature trees are 500 to 800 years old.

Coast redwoods grow best in moderate temperatures, protected from the wind and salt spray. They need substantial soil moisture from rainfall and summer fog, growing tallest on the floodplains of streams that flood periodically. The world's tallest living thing is a coast redwood in northern California. In 2006 a redwood in Redwood National Park was measured at 379.1 feet tall.

Roles of Fog and Fire

Fog Redwoods can flourish only in coastal California's fog belt, where frequent summer fog supplies critical moisture in the dry season. Condensing on leaves and needles, fog drips to the forest floor and replenishes water that trees lose to evaporation and transpiration.

Fire Fire benefits the long-term health of a forest. Fire clears the floor of duff so redwood seeds can reach mineral soil. Fire destroys bacteria and fungi in the duff layer that can kill seeds before they germinate. It recycles nutrients, turns debris into ash, and can enhance wildlife forage. Before fire suppression—begun in the 1800s—upset natural cycles, wildfire occurred every 20 to 50 years here. To restore the ecosystem's integrity the National Park Service conducts prescribed burning to re-establish fire's natural role in the forest.



Annual rings serve as a climate record and capture a tree's personal history. Light and dark rings together represent one year's growth. Wide rings show years of plentiful rainfall. Narrow rings show harsher years. Fire scars and cracks are witness to a tree's struggle to survive.

Thick Bark

Its spongy and fibrous bark—from six to 12 inches thick—insulates the mature redwood against fire damage. Repeated hot fires can burn through the bark and expose the heartwood to dry rot. Later fires may hollow out rotted portions—the blackened cavities you may see beside the trail. Redwoods get their color—and name—from the reddish-brown, bitter chemical tannin. Tannin makes both bark and wood resistant to fire and to attack by insects and fungi.

Cones and Seeds

Redwoods are conifers and evergreen. Mature cones are woody, reddish brown, and about the size of olives. Cones mature in a year and drop seeds, 50 to 60 tiny flakes per cone, in late fall. Within one month, warm, moist soil may stimulate a seed to germinate. If it is on suitable, fresh mineral soil it may root. After the first leaves appear, a seedling begins making its own food and may grow to two or three inches tall in its first year of life.

Burls and Sprouting

In established forests like Muir Woods, burl sprouting accounts for most reproduction of redwoods. A burl is a mass of dormant buds that grows at the base or on the roots or sides of redwoods. When a tree is injured or tissue near a burl is affected, the burl may sprout. The sprouting gives redwoods great competitive advantage over other trees that can reproduce by seed only. Tightly grouped redwoods, or those fused at their bases, probably began life as burl sprouts.

ALL ILLUSTRATIONS NPS / JOHN DAWSON

Shallow Roots Roots penetrate only 10 to 13 feet deep, but they spread out nearly 100 feet.