

Marbled Murrelet

The Marbled Murrelet is a robin-sized bird found from the Aleutian Islands off Alaska south to the Santa Cruz area. In the Santa Cruz Mountains, which supports one of the smallest and most isolated of all murrelet populations (estimated at less than 1,000 birds) most murrelets nest in remnant old-growth stands found in seven adjoining coastal watersheds—Pescadero Creek, Butano Creek, Little Butano Creek, Gazos Creek, Cascade Creek, Waddell Creek, and Scott Creek. Except for the extreme northern end of their breeding range in Alaska (where trees don't occur), they are restricted to old-growth conifer forests or to older second-growth forests that contain some residual old-growth trees. Murrelets need trees with large diameter limbs, large trees with broken-off tops,

or similar flat "platforms" greater than four inches in diameter on which to place their nests. The historic and ongoing loss of this habitat from logging earned the Marbled Murrelet a place on the federal endangered species list in 1991 as a threatened species in California, Oregon, and Washington.

Note

¹ Unless otherwise cited, information on murrelet distribution, demographics, nesting habitat, and life history is drawn from U.S. Fish and Wildlife Service. W. A. Lacey, Marbled Murrelet (*Brachyramphus marmoratus*) Five Year Review (USFWS, Washington Fish and Wildlife Office, 2009); S. K. Nelson, *The Birds of North America*, No. 276 – *Marbled Murrelet* (*Brachyramphus marmoratus*), in A. Poole and F. Gill eds., *The Birds of North America: Life Histories for the Twenty-first Century*, (1997).



*Adult Marbled Murrelet in breeding plumage. Bird photographed off the coast of Vancouver Island.
(Courtesy of Glenn Bartley)*

The Marbled Murrelet – Flagship Species of Our Old-Growth Forests

by Steve Singer

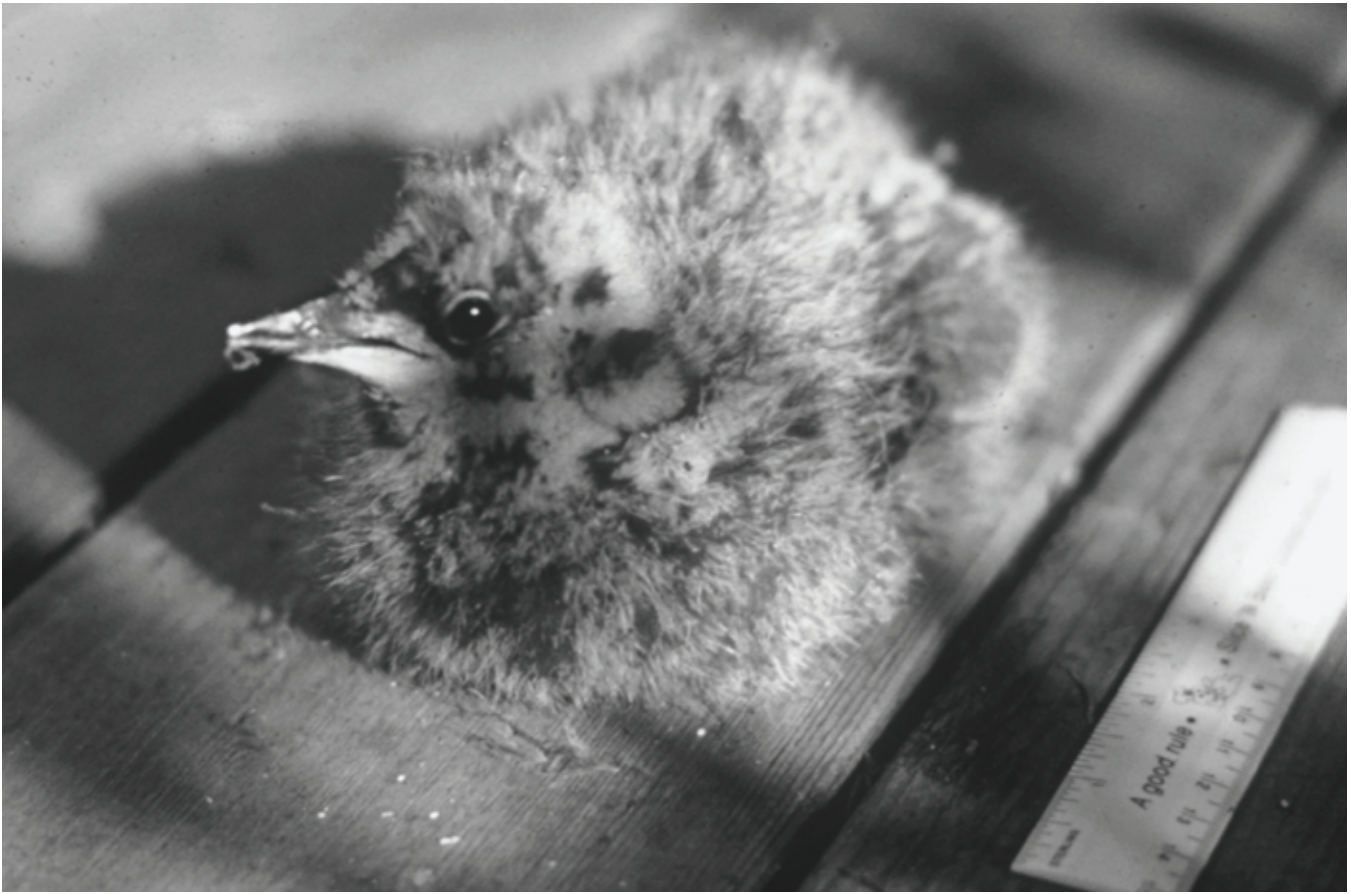
A flagship species can be defined as one that is popular, charismatic, and has become a rallying point for the conservation of a biological community or ecosystem.¹ In popular parlance it might be called a superstar. For the old-growth redwood and Douglas-fir forests of the Santa Cruz Mountains, that species is the Marbled Murrelet (*Brachyramphus marmoratus*). The story of this superstar seabird features mystery, amazing behavior, and an uncertain future. It has important links to Big Basin Redwoods State Park, which contains nearly half of the remaining old-growth forest in the Santa Cruz Mountains—forests that the murrelet needs for nesting.

Old-growth forests are not just important for murrelets. Every field biologist knows that old-growth forests are distinctly different from second-growth forests. Virgin forests enrich biodiversity by providing structures and habitat niches lacking in younger forests and by supporting different ecological processes. They also do a better job of providing such ecological services as clean water, high quality fish habitat, and, to help mitigate global warming, carbon sequestration; i.e., capturing and storing carbon dioxide.⁴

Originally, there were 160,000 acres of old-growth redwood and Douglas-fir forest in the Santa Cruz Mountains,² but clear-cutting that began in the late 1800s and continued through the 1960s has removed ninety-four percent of this forest, leaving only about 10,000 acres today.³ By far the largest remaining area of old-growth forest is the 4,560 acres in Big Basin Redwoods State Park. It was protected from logging in 1902 largely due to the efforts of the Sempervirens Club. Most of the remaining old-growth stands are small, with only twelve that are larger than one hundred acres in size, which is considered the minimum size needed to protect the stand from edge effects that adversely impact nesting suitability.

Unraveling a Mystery

On August 7, 1974, ornithological history was made in Santa Cruz County. Tree pruner Hoyt Foster was one hundred and forty-eight feet up in an old-growth Douglas-fir in Big Basin Redwoods State Park. He was about to place his foot on the next branch above him as he was working his way up the tree, removing potential “widow-makers” as he went. At the spot where his foot was poised to come down, he noticed a buff-colored web-footed chick sitting in a nest. He pulled his foot away at the last second. Although he



Marbled Murrelet chick from nest discovered by Hoyt Foster in Big Basin Redwoods State Park on August 7, 1974.
(Courtesy of Bruce Elliott)

didn't know it at the time, the chick, whose life he spared, was a Marbled Murrelet (*Brachyramphus marmoratus*),⁵ and the nest he found was the world's first Marbled Murrelet tree nest to be discovered.⁶

Hoyt's accidental discovery brought the end to a search for the nest site of the Marbled Murrelet that had been going on for over one hundred and eighty-five years.⁷ Murrelets were commonly observed in the near-shore ocean waters from Santa Cruz north through Alaska, but their breeding behavior confounded ornithologists and birders alike; this unassuming little seabird was the only regularly breeding bird in North America north of Mexico whose nest site had not yet been discovered. In 1970, the National Audubon Society promoted nest-searching efforts by offering a monetary reward for the first researchers to find a nest and document it with photos in their journal, *Audubon Field Notes*. They summarized the situation in these words, "While ornithological expeditions are dispatched to the farthest reaches of the

planet to solve perhaps lesser riddles, a species that possibly nests from California north to Alaska remains an unsolved mystery."⁸

The accidental discovery of a nest drew much attention to Santa Cruz County, but didn't resolve other mysteries, such as how the young bird leaves the nest and makes its way to the ocean. Did the fledgling flutter down to the ground, walk to the nearest stream, and then float down to the ocean; or did it fly directly from the nest to the ocean? It wasn't until 1991 that this question was answered — also in Big Basin Redwoods State Park. My research team, consisting of my wife Stephanie, biologist David Suddjian, and several volunteer birders drawn from the ranks of the Santa Cruz Bird Club, had taken positions all around the Father Tree which had an active murrelet nest. Although no one had yet seen a bird fledge in the wild, it was believed to take place sometime after sunset. We were all in place about an hour before sunset on July 3, 1991. The chick was unusually active and we saw

it variously turning, standing, preening, and flapping its wings. It had finished picking off the last of its buff-colored downy plumage about one hour before. The young bird was now in full black and white juvenile plumage and much easier to see on the branch. We waited anxiously to see what would happen next. At 8:54 PM, nineteen minutes after sunset, the young bird, having never left the nest before, hopped off the nest and flew with strong wingbeats in the direction of the ocean. It flew alone, and its time of departure seemed to be set by its own internal clock.⁹ Leaving the forest in the semi-darkness would reduce its chance of predation while in the air.

Although other mysteries remain, such as where at sea murrelets spend the winter, much has been learned about the biology of the species, its nesting habitat, and its breeding ecology.

Murrelets and the Logging Industry

Although murrelets can nest in older second-growth stands when some residual old-growth trees are present, undisturbed stands of old-growth forest are their preferred nesting habitat. Unfortunately for the murrelet, only about six percent of the original virgin forest in the Santa Cruz Mountains remains. As recently as fifty years ago, a large stand of virgin redwood forest was found on Butano Creek in southern San Mateo County. It was over 3,000 acres in size and was reported to have trees that rivaled those of the Big Basin in size and grandeur, i.e., greater than two hundred and fifty feet in height and ten feet in diameter. It was known as the Butano Forest and its core was owned by the Pacific Lumber Company.¹¹

In a 1946 survey undertaken to locate potential state park sites, consultant Frederick Law Olmsted, Jr. was surprised to find intact such a large stand of virgin forest within fifty miles of the highly populated San Francisco Bay Area. He highly recommended acquisition of the Butano Forest to the State Parks Commission. Shortly thereafter a coalition of fourteen conservation groups came together to urge its preservation. They raised over \$1 million in matching funds for acquisition and pushed a Butano Forest acquisition bill that was passed by the state legislature in 1955. Unlike the Big Basin preservation effort however, this one came to naught when Governor

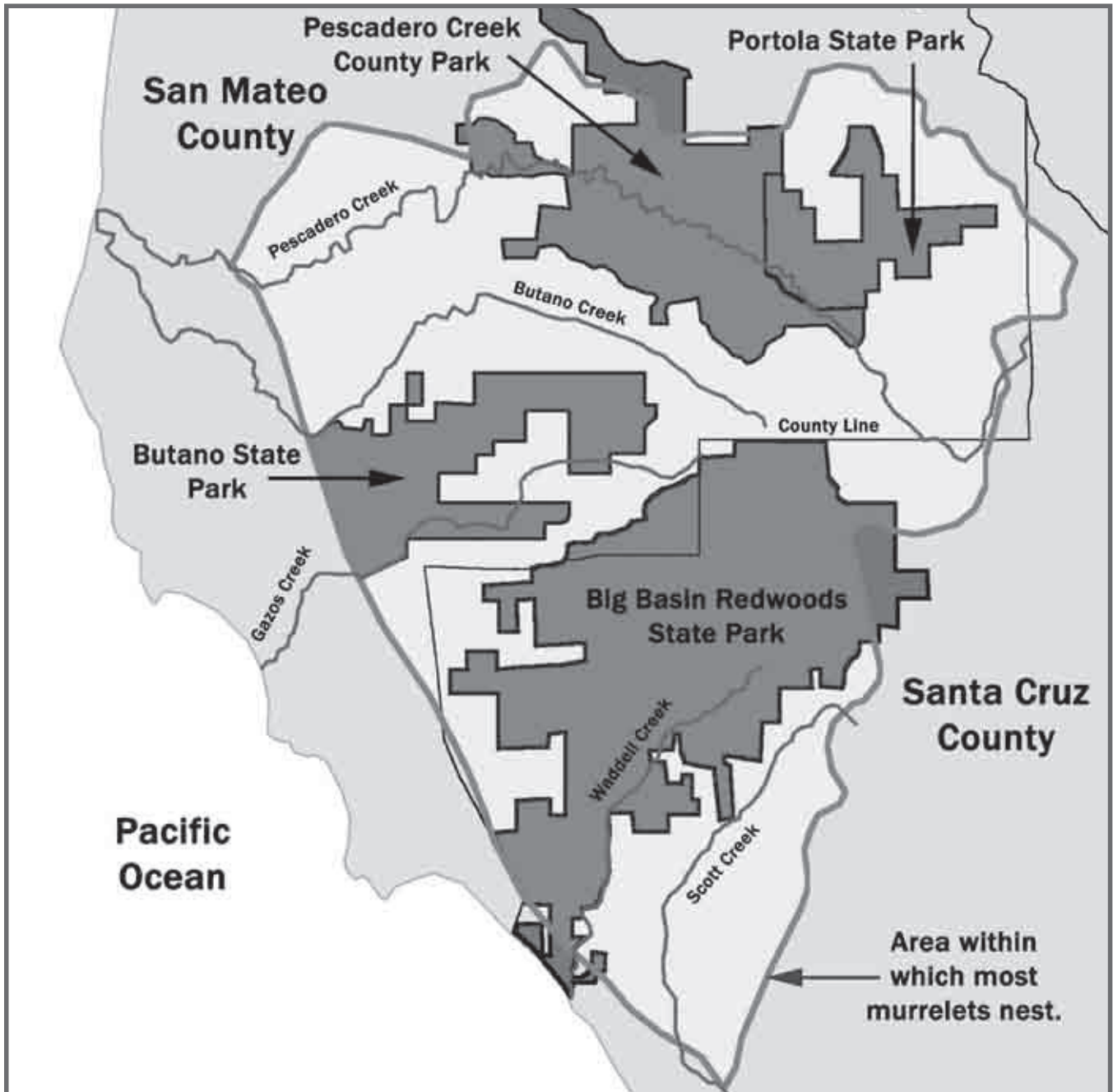
Goodwin Knight vetoed the park bill. The Pacific Lumber Company commenced clear-cutting the very next day. In the process, they destroyed nesting habitat likely used by hundreds of murrelets. Although no one was surveying for murrelets at the time, murrelets typically re-use the same stands for nesting, and a few murrelets still nest in the remnants of this stand just outside the Pacific Lumber Company's property line.

Currently there are six privately-owned stands larger than one hundred acres that remain unlogged and are used by murrelets for nesting. Three of these are owned by the Big Creek Lumber Company and one stand is owned by a private individual with close ties to the timber industry. As will be explained later, both public and private old-growth properties are important for murrelet survival and recovery in the Santa Cruz Mountains. Under state law, clear-cutting is no longer allowed in the Santa Cruz Mountains, but old-growth trees may still be cut using the selective harvest method. However, if murrelets are known to be nesting in a stand, it cannot be cut.¹²

Historic logging operations impacted murrelets not only through the net loss of nesting habitat, but also through the fragmentation of the remaining old-growth habitat. Small old-growth stands have a relatively large amount of edge, and edge environments favor murrelet nest predators. About two-thirds of all murrelet nests fail due to predation, which is a big problem for a bird that produces only one egg in a nesting year and doesn't nest every year.¹³ The most effective predators have been Common Ravens (*Corvus corax*) and Steller's Jays (*Cyanositta stelleri*), collectively known as corvids.¹⁴ Jays have always been present in our redwood forests, but ravens did not appear here until the 1980s, and their numbers have increased dramatically since then. Both ravens and jays can take murrelet eggs or chicks, but older chicks can usually fend off jays.

Murrelets and Parks

The number of corvids in an area is increased when human food subsidies are available, such as food scraps, refuse, agricultural waste, and insects or seed provided through the tillage of croplands. The location of campgrounds, picnic areas, youth camps, farms, and home sites in or adjacent to old-growth



Map showing the area of the Santa Cruz Mountains within which most marbled murrelets nest.
(Courtesy of Lisa Robinson)

stands has greatly aggravated the problem. Ironically, our state parks, which provided safe harbors for murrelets during the days of clearcutting and massive habitat loss, might now pose a threat to murrelet survival because of an elevated number of murrelet nest predators. Annual surveys of murrelets in Big Basin have shown that the number of murrelets showing flight behaviors indicative of nesting has dropped from an average of forty or more in the early 1990s to less than ten since the year 2000.¹⁵ The problem is that campgrounds and picnic areas, with their recently elevated corvid numbers, are located in prime old-growth murrelet nesting habitat. This has placed predators (ravens and jays) in close proximity to their prey (murrelet chicks and eggs). To resolve the problem, the State Parks Department, using oil spill mitigation monies provided by the California Department of Fish and Wildlife, has undertaken a major program to reduce the availability of food subsidies and thereby lower corvid numbers in the parks.¹⁶ Seasonal staff have been hired to implement a visitor education program aimed at discouraging the feeding of wildlife and at keeping campsites free of food scraps. Animal-proof garbage cans have been installed at all the parks that contain murrelets. At Big Basin and Butano State Parks animal-proof food storage lockers, each costing more than \$600, have been installed at every single campsite¹⁷ – allowing campers to safeguard their food when they are not present. These and other measures are starting to bring about a reduction in corvid numbers. Until corvid numbers are back to their pre-1995 levels though, recruitment of young murrelets into the population may need to come largely from nesting areas on remote privately-owned old-growth stands and those publicly-owned old-growth stands that lack recreational improvements.

What is So Special About the Marbled Murrelet?

The murrelet's nest site went undiscovered for so long because, unlike other seabirds, it nests in forest trees, specifically on the large branches or broken tops of old-growth conifers that can be growing several miles inland. To frustrate nest searchers even more, the murrelet is secretive near its nest. While incubating their egg or feeding their chick, the adult birds fly in or out of the nest in the semi-darkness

around dawn or dusk when observation by humans is difficult. Both male and female adults share incubation duties (24-hr shifts) and once the egg hatches, both will feed the chick. Few naturalists were looking in the forest, since most seabirds nest on coastal islands, offshore rocks, or coastal cliffs, such as do their local relatives—the Common Murre (*Uria aalge*) and the Pigeon Guillemot (*Cephus columba*). Unlike the black and white plumage of murres and guillemots, Marbled Murrelets' summer plumage is a mottled dark brown that matches the color of the branches that they nest on. So perhaps it is not surprising that the first nest was found by someone who was not looking for it.

Radio-tagging of a murrelet captured at sea led to the discovery of a second nest in Alaska in 1984 – a full ten years after the Big Basin discovery.¹⁸ The third discovered nest, and the first to be found by ground-based visual searches, occurred in 1989. I was fortunate to have participated in that discovery. It took place in Santa Cruz County, in Big Basin Redwoods State Park, and involved some scientific deduction and a considerable amount of luck.¹⁹ I identified seven trees as being similar to the 1974 nest tree and that I thought might contain a murrelet nest. I formed a team consisting of Nancy Naslund, a graduate student at UCSC, my wife Stephanie, and myself to stake out each tree at dawn and look for entering or leaving murrelets (which would indicate a nest was present in the tree). We had no funding to do this research and all of us had other jobs or classes full-time, so the stake-outs were to be done on weekends. We anticipated a long, slow process as it would take several days to thoroughly check each tree (it took three people to watch each tree). We knew it was a long shot that a murrelet would be nesting in any of those seven trees amidst the thousands of suitable trees in the park. But in an amazing stroke of good luck, we saw a murrelet fly into the very first tree on our very first morning stake-out. Subsequent observations over several days, made with the assistance of Park Ranger Gary Strachan, allowed us to find where the nest was on the tree. When found, the nest had an adult sitting on an egg. That nest was observed from a distant location for two weeks until a raven flushed the adult off the nest and came back to eat the egg.²⁰ This was the first documented case of cor-

vid predation on a murrelet nest and would bode ill for the future.

Subsequent work at Big Basin and other sites has shown that ground-based visual searches have a very low success rate since murrelets may delay the start of their nesting season for several weeks or even skip a year entirely. To date only nineteen murrelet nests have been discovered in the Santa Cruz Mountains and the majority of those have been discovered by radio tagging of birds captured at sea.²¹ Although radio tagging is a more effective way to find nests, this technique can be harmful to the birds, so it is no longer used on birds in the small and vulnerable Santa Cruz Mountains population.

The Marbled Murrelet is a difficult bird to study in the field, but rewarding when you do. Consider its exceptional lifestyle: It is a seabird adapted to swimming, diving, and sleeping in the ocean, yet it nests in trees. It can fly at speeds up to sixty miles per hour, yet still has the aerial dexterity and visual acuity to fly through the tree canopy during the semi-darkness of dawn and land on its nest branch while most other birds can't yet see well enough to fly. In Washington they sometimes nest forty miles or more inland and

traverse this distance round-trip at least twice a day while carrying a fish back from the ocean to feed the chick. Consider also the fact that the chick, which has never practiced flying before it fledge, has to fly all the way to the ocean on its first flight and must do so unguided by its parents. It then must land in the water (which it has never seen) then dive, swim, and catch prey without any coaching or assistance from other murrelets.

Much has been learned about the Marbled Murrelet, but many mysteries remain. For thousands of years its unusual lifestyle was effective in maintaining a large population, but now its future in the Santa Cruz Mountains is uncertain due primarily to high predation rates in its nesting stands. As a flagship species with an amazing lifestyle, it deserves our support.

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