

RESOURCE INVENTORY

MARINE LIFE

**BIG BASIN REDWOODS STATE PARK
DECEMBER 1998**

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INTRODUCTION

The Waddell Beach portion of Big Basin Redwoods State Park borders the Pacific Ocean for about 6,500 linear feet at the mouth of Waddell Creek. Information on this portion of the park is limited, particularly in regards to the marine invertebrates and flora. Primary sources of information regarding these topics were Le Boeuf and Kaza (eds.) (1981), Morris (1980), Abbott and Hollenberg (1976), and Light (1954). No field surveys were performed beneath the ocean surface. Additional research is needed to complete this inventory section.

The Monterey Bay and coastal region is protected as a National Marine Sanctuary and provides habitat for an unusually rich assemblage of both vertebrates and invertebrates. Monterey Bay is divided by a deep submarine canyon that reaches 6,000 feet in depth. From February through September, upwelling of cold, nutrient-rich water along the rim of the canyon brought on by prevailing northeasterly winds supports tremendous invertebrate biomass. This, in turn, supplies a food base for fish, seabird, and mammal populations.

EXPOSURE

The largest portion of the park's marine environment consists of a gently sloping sandy beach at the mouth of Waddell Creek. The beach is flanked on both sides by steep bluffs inhabited by coastal strand vegetation and Monterey pines.

As Waddell Creek flows out of Waddell Marsh it takes a bend to the north, becomes wider and forms a large body of brackish water that is subject to tidal influence (see Estuarine habitat type in the Animal Life Section of this report).

MARINE FLORA

Composition

Coastal strand vegetation grows on the dune areas in back of Waddell Beach and on the sand covered bluffs along the southeast approach of State Highway 1, below Big Creek Lumber Company. Many of the plants in this community are adapted to the saline conditions that prevail on the spray-swept strand (California Department of Parks and Recreation 1984). Many of the plants also have morphological adaptations such as tufted forms or stolons (runners), producing spreading forms which stabilize the shifting sands.

A list of marine algae sampled from nearby Ano Nuevo State Reserve appears in Appendix ML-1. The presence of any of the species appearing on this list at Waddell Beach is undetermined; the list is provided as a local reference only.

MARINE FAUNA

For the purposes of this inventory, the marine habitat is further subdivided into the following zones: pelagic, offshore, inshore, rocky intertidal and coastal strand.

Pelagic Zone

The pelagic zone, roughly set at the 600 foot contour and deeper (Wynne-Edwards 1930) is inhabited in Santa Cruz County by pink-footed shearwater, black-footed albatross, Leach's storm petrel, black-legged kittiwake, sperm whale (*Physeter macrocephalus*) (federally listed endangered), and the fin whale (*Balaenoptera physalus*) (federally listed endangered). Subtle changes in water temperature, current patterns, and submarine topography are important determinants of animal and plant species distributions.

Offshore Zone

This zone includes waters over the continental shelf, out of sight of land. There appears to be a fairly distinct assemblage of marine birds and mammals utilizing this zone with dominant species including sooty shearwater, ashy storm-petrel, rhinoceros auklet, common murre, northern right whale (*Balaena gracialis*) (federally listed endangered), and the blue whale (*Balaenoptera musculus*) (federally listed endangered). Note that although the murre is a common nesting species along the coast and is frequently seen close to shore, most foraging activity occurs in the offshore zone.

Inshore Zone

This zone includes all waters in sight of land. Larids are most common as are all three species of cormorants indigenous to the Central Coast, marbled murrelets, and brown pelicans. The marbled murrelet is a California listed endangered and Federal listed threatened species, whereas the brown pelican is a federal and state listed Endangered species. The marbled murrelet recovery plan (U.S. Fish and Wildlife Service 1997) recommends protection for the species should extend 2 kilometers (1.2 miles) offshore and include estuaries, the mouth of Waddell Creek, and the ocean floor. Marbled murrelets can dive to great depths within the water column and many nearshore, bottom- and midwater- dwelling prey occur and/or spawn in the area. A large majority of offshore sightings of marbled murrelets over a 9 year period 1986-1994 occurred within 10 km of Pt. Ano Nuevo (Ralph and others 1995). Harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*), gray whales (*Eschrichtius robustus*) (formerly federally listed endangered, now declared recovered and delisted), and humpback whales (*Megaptera navaeangliae*) (federally listed endangered) also occur in this zone.

Migratory shorebirds and waterfowl depend upon suitable habitats adequately spaced along a chain of traditional breeding, stopover, and wintering sites for survival. Lagoons, estuaries, and tidal wetlands typically provide these critical

habitats. The mouth of Waddell Creek provides important migratory waterbird habitat. During the winter, rafts of birds congregate just beyond the surf zone, including such species as western grebes, surf scoters, and Brant's cormorants.

Rocky Intertidal Zone

The rocky intertidal zone includes that portion of the terrestrial environment subject to daily tidal inundation and where the substrate is rock rather than sand.

A list of intertidal invertebrates found on the San Mateo and Santa Cruz counties coastline is provided in Appendix ML-2. The presence of any of the species appearing on this list at Waddell Beach is undetermined; the list is provided as a local reference only.

Rocky intertidal habitat occurs off of Waddell beach near the park units northern boundary (the San Mateo - Santa Cruz county line).

Coastal Strand Zone

The coastal strand includes approximately 22.5 acres of sandy substrate on the southwestern edge of the state park. Coastal strand includes the littoral zone, subject to wave and tidal action; the inland edge is designated by the highest extent of storm waves. Shorebirds, including the State listed threatened western snowy plover, forage in the tidally active areas. In particular, kelp wrack and other detritus washed up on the beach are favored forage areas. Kelp flies (*Coelopa vanduzeei*, *Fucellia costalis*) are attracted to, and lay eggs in, the rotting mass of vegetation. Sometimes found in tremendous swarms, they offer an abundant food source for insectivorous vertebrates. Raccoon (*Procyon lotor*), spotted skunk (*Spilogale putorius*), and bobcat (*Lynx rufus*) forage in the tidal zone at night.

Sand and cobble near the opening of the mouth of Waddell Creek is used as a roost and loafing area by several species of gulls, including western, ring-billed, California, and Heerman's. The lagoon mouth is frequently used by shorebirds as a feeding stop during migration.

The peregrine falcon, a state listed endangered species, is known to breed in the state park and forage along the coastal zone of northern Santa Cruz County. Peregrines include a high proportion of birds in their diet; the presence of a seabird colony, shorebird and waterfowl concentration areas, brackish marsh, and the relatively undisturbed nature of the state park provide optimal year-round habitat for the species.

Human use of the coastal strand can be intense, especially during the summer months. The visitor parking lot at Waddell Beach generally steers the public to the beach on the north side of the creek, allowing the southern portion of the beach to remain relatively undisturbed. Western snowy plovers are known to nest on the southern portion of beach. Western snowy plovers are vulnerable to predation by dogs, as well as destruction by the unwitting visitor that may walk on the cryptically

colored eggs. Also, red fox (*Vulpes fulva*) were sighted at the park headquarters area of Big Basin Redwoods State Park in 1996. The extension of their range to Waddell Beach is unknown. This introduced species predates upon ground nesting birds and their eggs, including the western snowy plover (Strong et. al. 1993). Its occurrence at Waddell could have serious negative impacts on nesting snowy plovers.

Composition

Most of the marine fauna occurrence data utilized herein is from just north of the Rancho del Oso subunit of Big Basin Redwoods State Park at Ano Nuevo Point and Island. The park is included within this survey as some of the animals range beyond the high density area of Ano Nuevo.

Pinnipeds

Five species of seals and sea lions are found along the central California coast. Each has a peak abundance season and a characteristic annual cycle. The two most abundant species are the northern fur seal (*Callorhinus ursinus*) and the California sea lion; each reach peak numbers during their migrations. In contrast, harbor seal and steller sea lions reach their peak numbers during breeding season, during the molting season.

Northern fur seals and elephant seals spend much of the year at sea, drifting alone or in small groups in pelagic waters of the California current. California sea lions, steller sea lions (*Eumetopias jubatus*) and harbor seals are frequently found on land and commute from onshore hauling grounds to offshore feeding grounds (Dohl et al. 1982).

Two of the five pinniped species breed in central California. Northern elephant seals (*Mirounga angustirostris*) breed in the winter, from December to early March; rookeries presently exist on Ano Nuevo Island and Point Ano Nuevo, the locations of major steller sea lion rookeries as well.

Cetaceans

Cetaceans are distributed throughout the central California coast. Dohl et al. (1982) concluded that:

1. Statewide, the highest densities and greatest utilization occurs in winter;
2. Statewide, the lowest densities and sparsest utilization occurs in the summer;
3. Autumn is the season when cetacean schools coalesce into large aggregates.

The most common cetaceans found off the coast of Big Basin Redwoods State Park are Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), northern right whale dolphins (*Lissodelphis borealis*), Risso's dolphin (*Grampus griseus*), killer whale (*Orcinus orca*), and gray whale).

Cetacean season distribution and numbers data for each species listed above are provided on Maps ML- 1

Seabirds

A list of marine birds occurring or predicted to occur in the area of the state park appear in Appendix AL-1.

Several seabird nesting colonies exist on rocky outcroppings near the park boundaries. They have been mapped and can be identified by the following coordinates (U.S. Fish and Wildlife Service/Bureau of Land Management 1980):

1. Punta del Ano Nuevo (37° 07' 07"N, 122° 10' 09"W)

Species	Number of Breeding Birds
Pelagic cormorant (<i>Phalacrocorax palagicus</i>)	210
Pigeon guillemot (<i>Cepphus columba</i>)	<u>70</u>
Total	280

2. Greyhound Rock and Davenport (37° 04' 40"N, 122° 16' W to 37° 00' 30"NW)

Brandt's cormorant (<i>Phalacrocorax penicillatus</i>)	236
Pelagic cormorant	50
Black oystercatcher (<i>Haematopus bachmani</i>)	6
Pigeon guillemot	<u>400</u>
Total	682

3. Davenport to Point Santa Cruz (37° 00' 30"N, 122 11' 30"W to 37° 57' 10"N, 122° 01' 15"W)

Pelagic cormorant	28
Balck oystercatcher	P
Western gull (<i>Larus occidentalis</i>)	2

Pigeon guillemot	<u>1200</u>
Total	1230
(P=probably present)	

4. Pigeon Point (37° 10' 55"N, 122° 23' 20"W)

Black oystercatcher	2
Pigeon guillemot	<u>6</u>
Total	8

Examples of seabird species composition and occurrence is discussed above, with a list of observed species appearing in Appendix AL-1. A list of marine birds of the Central and Northern California Coast is included here as reference for further study (California Department of Parks and Recreation 1984):

Breeding Species:

- Fork-tailed storm-petrel (*Oceanodroma furcata*)
- Leach's storm-petrel (*O. leucorhoa*)
- Double-crested Cormorant (*Phalacrocorax auritus*)
- Brandt's cormorant (*P. penicillatus*)
- Pelagic cormorant (*P. pelagicus*)
- Western gull (*Larus occidentalis*)
- Heerman's gull (*L. heermanni*)
- Forster's tern (*Sterna forsteri*)
- Caspian tern (*S. caspia*)
- Least tern (*S. antillarum*)
- Common murre (*Uria aalge*)
- Pigeon guillemot (*Cepphus columba*)
- Cassin's auklet (*Ptychoramphus aleuticus*)
- Marbled murrelet (*Brachyramphus marmoratus*)
- Rhinoceros auklet (*Cereohinca monocerata*)
- Tufted puffin (*Lunda fratercula*)
- Brown pelican (*Pelecanus occidentalis*) (nested until 1959, not thereafter; now mostly a summer resident)

Winter residents/visitors:

- Common loon (*Gavia immer*)
- Arctic loon (*G. artica*)
- Red-throated loon (*G. stellata*)

Western grebe (*Aechmophorus occidentalis*)
Red-necked grebe (*Podiceps grisegena*)
Eared grebe (*P. nigricollis*)
Horned grebe (*P. auritus*)
Laysan albatross (*Diomedea immutabilis*)
Northern fulmar (*Fulmarus glacialis*)
Short-tailed shearwater (*Puffinus tenuirostris*)
American white pelican (*Pelecanus erythrorhynchos*)
Surf scoter (*Melanitta perspicillata*)
White-winged scoter (*M. fusca*)
Black scoter (*M. nigra*)
Red-breasted merganser (*Mergus serrator*)
Harlequin duck (*Histrionicus histrionicus*)
Oldsquaw (*Clangula hyemalis*)
Glaucous gull (*Larus hyperboreus*)
Glaucous-winged gull (*L. glaucescens*)
Herring gull (*L. argentatus*)
Thayer's gull (*L. thayeri*)
Ring-billed gull (*L. delawarensis*)
California gull (*L. californicus*)
Mew gull (*L. canus*)
Black-legged kitiwake (*Rissa tridactyla*)
Ancient murrelet (*Synthliboramphus antiquus*)

Spring/autumn migrants:

Flesh-footed shearwater (*Puffinus carneipes*)
Buller's (New Zealand) shearwater (*P. bulleri*)
Mottled petrel (*Pterodroma inexpectata*)
Brant (*Branta bernicla*)
Red phalarope (*Phalaropus fulicaria*)
Northern phalarope (*Lobipes lobatus*)
South polar skua (*Catharacta maccormicki*)
Pomarine jaeger (*Stercorarius pomarinus*)
Parasitic jaeger (*S. parasiticus*)
Long-tailed jaeger (*S. longicaudus*)
Bonaparte's gull (*Larus philadelphia*)
Laughing gull (*L. atricilla*)
Sabine's gull (*Xema sabinii*)
Arctic tern (*Sterna paradisaea*)
Common tern (*S. hirundo*)
Horned puffin (*Fratercula corniculata*)

Summer/autumn (nonbreeding residents/visitors):

Black-footed albatross (*Diomedea nigripes*)
Pink-footed shearwater (*Puffinus creatopus*)
Sooty shearwater (*P. griseus*)
Manx shearwater (*P. puffinus*)
Black storm-petrel (*Oceanodroma melania*)
Royal tern (*Sterna maxima*)
Elegant tern (*S. elegans*)
Xantus's murrelet (*Synthliboramphus hypoleuca*)

Rarities:

Yellow-billed loon (*Gavia adamsii*)
Short-tailed albatross (*Diomedea albatrus*)
Wandering albatross (*D. exulans*)
Cape pigeon (*Daption capense*)
Greater shearwater (*Puffinus gravis*)
Streaked shearwater (*Calonectris leucomelas*)
Cook's petrel (*Pterodroma cookii*)
Galapagos storm-petrel (*Oceanodroma tethys*)
Least storm-petrel (*Halocyptena microsoma*)
Wilson's storm-petrel (*Oceanites oceanicus*)
Solander's petrel (*Pterodroma solandri*)
Red-billed tropicbird (*Phaethon aethereus*)
Red-tailed tropicbird (*P. rubricuada*)
Blue-footed booby (*Sula nebouxii*)
Brown booby (*S. leucogaster*)
Red-footed booby (*S. sula*)
Magnificent frigatebird (*Frigata magnificens*)
King eider (*Somnateria spectabilis*)
Common black-headed gull (*Larus ridibundus*)
Lesser black-backed gull (*L. fuscus*)
Little gull (*L. minutus*)
Thick-billed murre (*Uria lomvia*)
Craveri's murrelette (*Synthliboramphus craveri*)
Parakeet auklet (*Cyclorhynchus psittacula*)
Crested auklet (*Aethia cristatella*)

RECOMMENDATIONS

Park rules pertaining to dogs off leash should be strictly enforced on Waddell Beach south of Waddell Creek, especially during western snowy plover breeding season (April – July).

A comprehensive inventory should be performed in the nearshore and intertidal zones to document occurring marine flora and fauna. The Department should continue to oppose any off-shore oil exploitation in order to reduce the threat of oil or diesel spills affecting Ano Nuevo Bay and Waddell Beach.

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