

BRIEF ENVIRONMENTAL DESCRIPTION OF THE AREA SURROUNDING RODEO LAGOON

The northern arc of Rodeo Beach faces the ocean. Behind this barrier bar lies Rodeo Lagoon covering the valley floor approximately two-thirds of a mile to the east. During winter storm months a tidal inlet is formed which changes the shape and size of both the lagoon and beach. In the natural course of events this phenomenon occurs by waves attacking the beach spilling ocean water into the lagoon, and by the accumulation of rain water from the 2400-acre watershed filling the lagoon to the point of overflow. During these months the lagoon and beach are in an unbalanced condition and the water level of Rodeo Lagoon fluctuates greatly. Associated with these changes are the changes in salinity. During the summer (when the concentration is increased due to evaporation) the brackish water has been measured at 15-25ppt, whereas winter salinity readings may only be 1-2ppt. Because of interstitial seepage the salinity increases in the lagoon from east to west.

All of this is very important to the living organisms that depend on the lagoon for life. For thousands of years animals and plants of this habitat have had to adapt to these very unique conditions or they would not survive. It can be assumed that continued survival is contingent upon the maintenance of this annual cyclic system or its evolutionary alteration.

PLANTS

Plantlife along the shores of the lagoon correspond to differences in water levels, low water being the most saline. Halophytes, such as Pickle

are adapted to the low water shore. Low brackish-fresh water plants such as reeds and sedges occupy the higher level shore. Just above the lagoon shores are plants associated with moist soils, such as Hemlock, Willow, and Cattail. Surrounding the lagoon area are the plants of the major plant community found in this area which is called the Northern Coastal Scrub, or the "soft chaparral". Common plants include Coyote Brush, Cow parsnip, California Sagebrush, Lupine, and Poison Oak. Attached is a list of the major flora species in and around Rodeo Lagoon.

BIRDS

Waterfowl, shore birds, and land birds abound at Rodeo Lagoon. The area is a favorite of Bay area Audubon chapters because of the opportunity to observe large numbers of birds within a relatively confined area. Of special interest are vagrant birds (usually not found in this area) which have migrated off course. A good many rest at the east end of the lagoon and at Rodeo Lake before continuing on their wayward way. General migration patterns are just beginning to be studied, therefore specific information is unavailable. It was noted that the Brown Pelican, for example, returned to the lagoon and Bird Island last June and remained until November. An estimate of 300 individuals was given. Informally, it has been learned that many years ago thousands of Brown Pelicans could be seen on the lagoon. As recent as two or three years ago very few were found at the area, indicating a recent increase.

Some non-migratory patterns have been observed. The frequency of wading birds such as Egrets and Herons, and the shore birds such as Willets and Sandpipers, appears to be correlated with the height of the water level.

More birds are seen during high water periods because food is less available at this time since the mud flats are covered with water. There is a large population of swimming water fowl that appear to be quite content with the lagoon habitat and have established a semi-permanent or permanent residency. These include numerous species of ducks, Grebes, and Coots. A list of bird species observed at Rodeo Lagoon within the last year is included.

GEOLOGY

The landscape of the Rodeo Lagoon area has been determined through a long geologic history. Massive earth movements causing a collision between the continental and oceanic crusts, erosion of uplifted mounds, and sea level changes have combined to produce the present setting for the lagoon. The San Andreas Fault is located about four miles west of Rodeo Cove and lesser fault lines cut across the lagoon itself which has and will affect its configuration.

The watershed area is comprised of rocks of the Jurassic-Cretaceous Franciscan formation. The outcropping to the north of the beach is a special type of sandstone called graywacke. Chert, a hard thinly bedded sedimentary rock, is found directly south of the beach and is the material most often found on the surface throughout the Marin Headlands area. The third major Franciscan rock formation is greenstone (altered volcanic flows). Bird Island and the sea floor just beyond the beach are remnants of ancient basaltic lava eruptions.

... are walking on the for the first time can resist scooping up a handful of multicolored pebbles and sorting through the treasure of reds, yellows, greens, browns, and whites. Rock hounds and casual visitors alike spend hours sifting the coarse sand in search of rare orange carnelians. According to geologists, the volume of chert (colored pebbles) on the beach has not significantly increased during recent history; that is, during the present sea level (the last five thousand years). The conclusion is that whatever material removed is gone forever and will not be renewed until the next drop in sea level.

PLANKTON AND FISH

No conclusive studies have been made to determine the animal life within the waters of the lagoon. There are rumors of two-foot long trout, flounders, and striped bass that have entered the lagoon when it is linked with the ocean. An accurate study is required to dispell or confirm these stories and access the fish population. Some preliminary study has been done concerning the plankton organisms. Simple testing has determined that the major zooplanktonic form in Rodeo Lagoon consists of the Rotifer Epiphanes. Also found present were Nauplius larvae and Cladocera. The following is a list of Diatoms found in the lagoon.

Surirella
Navicula
Bacillaria
Laudaria
Chaetoceros
Coscinodiscus
Thalassiosira
Navicula
Nitzschia

LIST OF BIRDS AT RODEO LAGOON

Common

Western Grebe
Horned Grebe
Eared Grebe
Pied-Billed Grebe
Brown Pelican
Brandt's Cormorant
Double-crested Cormorant
Mallard
Canvasback
Red head *Aythya americana*
Common Goldeneye
Bufflehead
Ruddy Duck
Surf Scoter
California Quail
Black-Crowned Night Heron
American Coot
Kildeer
Willet *Entolimphus*
hemipodius

Glaucous Wing Gull
Western Gull
Herring Gull *Larus argentatus*
Heermann's Gull
Mourning Dove
Belted Kingfisher *Ceryle alcyon*
Scrub Jay *Aphelocoma coerulescens*
Common Bushtit
Long-Billed Marsh Wren
Robin
Red-Winged Blackbird
Brewers Blackbird
Starling
House Finch
White-crowned Sparrow
Song Sparrow

Infrequent

Pintail
Blue-Winged Teal *Anas discors*
Cinnamon Teal *Anas cyanocephala*
Green-Winged Teal
Ring-Necked Duck
Greater Scaup
Lesser Scaup *Anas affinis*
Barrows Goldeneye *Bucephala islandica*
Common Scoter
White-Winged Scoter *Macrorhamphus fusca*
Red-Breasted Merganser *Mergus americanus*
Common Gallinule *Gallinula chloropus*
Black-Bellied Plover
Marbled Godwit
Western Sandpiper *colinus maculosa*

Red-shafted Flicker *Colaptes cafer*
Black Phoebe *Sayornis nigricans*
Say's Phoebe
Horned Lark *Eremophila alpestris*
Barn Swallow *Hirundo lunifrons*
Violet-Green Swallow *Tachycineta thalassina*
Common Crow
Chestnut-backed Chickadee
Bewicks Wren
Hermit Thrush
Palm Warbler
Fox Sparrow
Common Egret
Snowy Egret
Great Blue Heron

MAJOR FLORA SPECIES IN AND AROUND RODEO LAGOON

- ✓ *Achillea borealis* (Yarrow)
- ✓ *Agrostis californica*
- ✓ *Agrostis diegoensis*
- ✓ *Agrostis Hallii* (Bentgrass)
- ✓ *Angelica Hendersonii*
- ✓ *Atriplex leucophylla*
- ✓ *Avena sativa* (Cultivated oak)
- ✓ *Azolla filiculoides* (Duckweed fern or American water fern)
- ✓ *Baccharis pilularis* (Coyote brush)
- ✓ *Brodiaea peduncularis* (Marsh triteleia)
- ✓ *Bromus maritimus* (Brome grass)
- ✓ *Cakile maritima* (Sea rocket)
- ✓ *Carex amplifolia* (Sedge)
- ✓ *Carex subbracteata* (Sedge)
- ✓ *Carex tumulicola* (Sedge)
- ✓ *Cicuta* (Water hemlock)
- ✓ *Cirsium Andrewsii* (Thistle)
- ✓ *Conium maculatum* (poison hemlock)
- ✓ *Deschampsia holiformis* (Hairgrass)
- ✓ *Dipsacus sativus* (Fullers teasel)
- ✓ *Distichlis spicata* (Saltgrass)
- ✓ *Echeveria capspitosa* (Sea lettuce)
- ✓ *Eleocharis macrostachya* (Spike-rush)
- ✓ *Elymus triticoides* (Wild rye)
- ✓ *Equisetum arvense* (Common horsetail)
- ✓ *Festuca rubra* (Red fescue)
- ✓ *Frankensia grandifolia* (Alkali-heath)
- ✓ *Fromseria chamissonis*
- ✓ *Glyceria* (Manna grass)
- ✓ *Gnaphelium ramossissimum* (Cudweed)
- ✓ *Godetia Amoena* (Summers darling)
- ✓ *Heliotropium curassauicum* (Heliotrope)
- ✓ *Hemizonia luzulaefolia* (Hayfield tarweed)
- ✓ *Hydrocotyle ranunculoides* (Water pennywort)
- ✓ *Hypericum anagalloides* (Tinkers penny)
- ✓ *Jaumea carnosa*
- ✓ *Juncus Leseurii* (Rush)
- ✓ *Layia platyglossa* (Tidy tips)
- ✓ *Lemna minor* (Duckweed)
- ✓ *Lilaeopsis occidentalis*
- ✓ *Lilium pardalinum* (California tiger lily)
- ✓ *Lonicera Ledebourii* (Twin berry)
- ✓ *Lythraceae hyssopifolia* (Grass poly)
- ✓ *Mesembryanthemum chilense*
- ✓ *Monardella villosa* var. *franciscana* (Western penny royal)
- ✓ *Montia perfoliata* (Miners lettuce)
- ✓ *Myriophyllum* (Milfoil)
- ✓ *Oenothera cheiranthifolia*

Scirpus castillejoides (Johnny-nip)
Scirpus incurva (Sickle grass)
Xanthoxylum (Canary grass)
Plantago juncoidea (Plantain)
Poa Douglasii (Bluegrass)
Polygonum punctatum (Knotweed)
Potentilla californica
Potentilla Egedii
Psoralea orbicularis
Ranunculus Bloomeri
Rhododendron occidentale (Western azalea)
Ribes sanguineum (Flowering currant)
Rorippa nasturtium-aquaticum (Water cress)
Rosa californica (California wild rose)
Rumex occidentalis (Western dock)
Rumex salicifolius (Willow dock)
Salicornia virginica (Pickle weed)
Salix Coulteri (Coulter willow)
Salix lasiolepis (Arroyo willow)
Sambucus callicarpa (Red elderberry)
Satureja Douglasii (Yerba Buena)
Scirpus americanus (Three-square)
Scirpus californicus (California tule)
Scirpus cernuus (Slender clubOrush)
Scirpus validus (Great bulrush)
Silene pacifica
Solidago californica (Common goldenrod)
Solidago occidentalis (Western goldenrod)
Spartanium Greenei (Bur-reed)
Spartina foliosa (Pacific cord grass)
Stachys (Hedge nettle)
Suaeda (Sea blite)
Tetragonia expansa (New Zealand spinach)
Typha latifolia (Cattail)
Urtica holosericea (Nettle)
Vicia gigantea (Giant vetch)