III. ENVIRONMENT

ENVIRONMENTAL RESOURCES

Introduction

Sonoma County's coastal area is rich in natural resources. The use of the shoreline of Sonoma County by shorebirds, seabirds, and waterfowl, as well as numerous terrestrial and marine mammals, reptiles, and amphibians has been documented over the last two decades. Varied plant species, including rare and endangered plants, have been identified. This section provides an inventory of biological resources, particularly those which are sensitive to disruption, and methods to protect these resources. A 1975 report for the State Coastal Commission, **Natural Resources of the North Central Coast Region**, forms the foundation upon which this present update of the biological resources of Sonoma County is based.

California Coastal Act Policies

Coastal Act policies encourage the protection of, and continued biological productivity of marine resources and environmentally sensitive habitat areas:

> 30230. Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.
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> 30231. The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entertainment, controlling runoff, preventing depletion of ground water supplies and encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.
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> 30233. (a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible, mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:
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> (1) New or expanded port, energy, and coastal dependent industrial facilities, including commercial fishing facilities.
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> (2) Maintaining, existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.
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> (3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities of, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland; provided, however, that in no event shall the size of the wetland area used for such boating facility, including berthing space, turning basins, necessary navigation channels,

and any necessary support service facilities, be greater than 25 percent of the total wetland area to be restored.

(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities.

(5) Incidental public service purposes, including, but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(7) Restoration purposes.

(8) Nature study, aquaculture, or similar resource-dependent activities.

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable longshore current systems.

(c) In addition to other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game, including, but not limited to the 19 coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California" shall be limited to very minor incidental public facilities, restorative measures, nature study, commercial fishing facilities in Bodega Bay, and development in already developed parts of South San Diego Bay, if otherwise in accordance with this division.

30236. Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects; (2) flood control projects where no other method for protecting exiting structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or; (3) developments where the primary function is the improvement of fish and wildlife habitat.

30240. (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

Definitions of Habitat Categories

Wetlands

Areas where the water table is at, near, or above the land surface long enough to bring about the formation of hydric soils or to support the growth of plants which normally are found to grow in water or wet ground. Wetlands are here defined to include marshes, ponds, seeps, and reservoirs, but not the Bodega Harbor tide flats. The upland limit of a wetland is designated as 1) the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic or xerophytic cover; 2) the boundary between soil that is predominantly hydric and soil that is predominantly non-hydric. Typical wetland vegetation: pickleweed, cordgrass, Jaumea, salt grass, rushes, bulrushes, sedges, cattails, tule, marsh rosemary, marsh grindelia.

Bodega Harbor Tideflats

A marshy, sandy or muddy nearly horizontal coastal flatland which is alternately covered and exposed as the tide rises and falls. Vegetation is limited to algae and some other wetland vegetation.

Riparian

Tree and shrub vegetation of freshwater courses. A line or belt of vegetation following the course of a river or stream on the immediate banks and appearing visually and structurally separate from the surrounding landscape. Boundaries are delineated by the outer edge of riparian vegetation. Riparian vegetation consists of that vegetation in or adjacent to permanent or intermittent freshwater streams and other freshwater bodies where at least 50 percent of the cover is made up of species such as alders, willows, cottonwoods, box elders, ferns, and blackberries.

Dunes and Coastal Strand

Coastal dunes are sandy beach materials formed into dunes by the wind. Most of the ground is bare sand, either actively moving or stabilized by a vegetative cover: low growing annual or perennial herbs with low water requirements and a high salt tolerance. (Coastal Strand is the plant community found on sandy beaches and dunes scattered along the entire coast).

Coastal Bluffs

Area between the cliff edge and the highest hide tide line. Bluffs or cliffs are scarps or steep faces of rock, decomposed rock, sediment or soil resulting from erosion, faulting, folding or excavation. When the top edge of the cliff is rounded away from the face of the cliff, the edge shall be defined as that point nearest the cliff beyond which the downward gradient of the land surface increase more or less continuously until it reaches the general gradient of the cliff.

Rocky Intertidal

Coastal rocky shore between the highest high tide line and the low tide line.

Coastal Prairie and Grassland

Discontinuous grassland usually within 100 km of the coast; usually on southerly facing slopes or terraces. Today is a mixture of heavily grazed, introduced annual grasses and some native perennial grasses. Generally sandy to clay loam surface soils. This mapping category does not indicate pristine coastal prairie.

Coastal Woodland

Category grouping the redwood, mixed evergreen, closed cone pine, and oak woodland forests.

Pygmy Forest

Forest community dominated by dwarfed endemic species which are limited by poor drainage, acid humus layer, climate and rainfall, terrace age, and mineral content of subsurface soils.

Environmental Resource Designations and Mapping

The environmental resources of the Sonoma Coast were identified, reviewed and mapped by a biological consulting firm, the Environmental Technical Advisory Committee and staff. Based on this assessment a hierarchy of environmental sensitivity was established. Especially sensitive areas are designated Sanctuary-Preservation; the more important environmental resource areas are designated Conservation; the remaining environmental resources are designated Potentially Sensitive.

Sanctuary-Preservation areas are the most environmentally sensitive areas along the coast. They correspond to "Environmentally Sensitive Habitat Areas" as defined in the 1976 Coastal Act Sections 30107.5 and 30240. No development other than nature trails and resource dependent uses shall be allowed within such areas. There shall be no significant disruption of habitat values. Pesticide and herbicide applications would not be allowed within or affecting such areas unless it is necessary to maintain or enhance the functional capacity of the Sanctuary Preservation area.

Conservation areas also encompass sensitive resource areas. No development will be allowed in Conservation areas unless an environmental study determines that no adverse effects would occur. Pesticide and herbicide applications would not be allowed within or affecting Conservation areas unless it is necessary to maintain or enhance the functional capacity of the Conservation area.

Potentially sensitive areas include minor or disturbed drainages, coastal bluffs, beaches, windbreaks, known or suspected archaeological sites, and sensitive soils.

Of the mapped environmental resources, the potentially sensitive are the least sensitive or are of undetermined sensitivity. Development shall be allowed only if no adverse effects would occur. Environmental studies may be required.

Policies and recommendations governing specific resource categories provide guidance for protection of the mapped area in each of the three designations as well as adjacent lands, and unmapped areas.

Environmental resources are represented on three sets of maps. First, Sonoma County Coastal environmental resource categories are mapped on the ten Coastal Plan subarea base maps at a scale of 1 inch = 1000 feet. These maps are located in the Sonoma County Permit and Resource Management Department and are intended primarily for use by coastal planners in implementing the biological and ecological resource management recommendations contained in this chapter. (The Environmental Resource Summaries list the resource categories shown on each subarea map.)

Second, known or suspected archaeological sites are identified on ten Archaeological Maps at a scale of 1 inch = 1000 feet for use by coastal planners.

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Third, Resource areas requiring special consideration and protection received Sanctuary-Preservation, Conservation, or Potentially Sensitive area designations. These areas are mapped at a scale of 1 inch = 6000 feet and are included in the Coastal Plan (Open Space Maps).

Present environmental resource mapping portrays the extent of known resources. The final implementation Plan will contain a procedure by which refinements or corrections to these maps can be made.

TABLE III-1

ENVIRONMENTAL RESOURCE CATEGORIES

San Beaches/Sand Spits including Smelt Spawning Areas	Rocky Intertidal Shoreline including Seabird Rookeries	Osprey Nest Sites
Dunes/Coastal Strand	Coastal Bluffs	Heron Rookeries
Riparian Corridor	Grassland/Coastal Prairie	Spotted Owl Territory
Freshwater/Brackish Marsh	Coastal Woodland	Anadromous Fish Streams
Ponds, Reservoirs, Seeps	Pygmy Forest	Marine Mammal Haul-out Grounds
Bodega Harbor Tideflats	Rare and/or Endangered Plants (California Native Plant Society list)	Kelp Beds
		Open Water

ENVIRONMENTAL RESOURCE SUMMARIES

1. Sea Ranch North

The northern section of The Sea Ranch contains the State Del Mar Ecological Reserve. The Gualala River supports a sizeable (4,000-5,000 fish) steel head run which is harvested by sportsmen. The mouth of the river includes freshwater and brackish water marshes. The habitat of the river wetlands include nursery areas for smelt, surf perch, flatfish, spider and market crab. Sand bars are used as shorebird nesting areas and osprey foraging areas. Gualala Point Island is a major seabird rookery.

Sanctuary Preservation Areas:

Gualala River
The sandy beach, freshwater marsh and riparian areas at the mouth of the Gualala River
Del Mar Landing Ecological Reserve
Rocky intertidal area
Seabird rookery on the southern boundary
Ponds, reservoirs, seeps
Two rare and/or endangered plant sites
Riparian areas on the south side of the Gualala River

Conservation Areas:

Coastal bluffs on the south side of the Gualala River

2. Sea Ranch South

Natural biological resources of the southern half of The Sea Ranch area have been disrupted by subdivision homes, roads and accessory facilities. The most pronounced natural environment is coastal

woodland covering approximately two thirds of the uplands east of the 200 foot contour line. Windbreaks found throughout the area are major landscape features.

Sanctuary Preservation Areas:

Three seabird rookeries
Ponds, reservoirs, seeps
Several rare and/or endangered plant sites
Rocky intertidal area

3. **Stewarts Point-Horseshoe Cove**

The natural resources from The Sea Ranch to Fisk Mill Cove are relatively unstudied. This area is primarily coastal woodland and grassland. The marine terrace varies in width, is well defined, and separates Highway 1 from the coastal bluffs.

Sanctuary Preservation Areas:

Seabird rookery at Stewarts Point
Several rare and/or endangered plant sites
Osprey nest site
Rocky intertidal area

4. **Salt Point**

Over 90 percent of the Salt Point area is within Salt Point State Park and Kruse Rhododendron State Reserve. The shoreline varies from sheer cliffs to coastal bluffs and sandy beaches. The broad marine terrace from Stump Beach south to Salt Point is visible from distances south on Highway 1. The surface of the marine terrace is occasionally interrupted by ancient sea stacks. Several streams intersect the area; the largest is Miller Creek. The upper watershed of Miller Creek is the site of a pygmy forest.

Plant communities in this area include coastal bluff, riparian, and forest. Forest communities are dominant and composed of redwood, mixed evergreen, Douglas fir, and closed cone pine.

Gerstle Cove is designated an Ecological Reserve as part of the State Marine Life Refuge System.

Sanctuary Preservation Areas:

Marine mammal haul out ground at the mouth of Phillips Gulch
Freshwater marsh surrounding Lake Oliver
Rocky intertidal area
Pygmy Forest
Gerstle Cove Ecological Reserve
Rare and/or endangered plant sites
Osprey nest sites
Riparian corridors of Chines Gulch, Phillips Gulch and Miller Creek

Conservation Areas:

Kruse Rhododendron State Reserve
Area of concentration of rare or endangered plants in Salt Point State Park

5. **Timber Cove - Fort Ross**

The rocky coastline of the area from Mill Gulch to Stockhoff Creek is intersected by three other large drainages: Fort Ross Creek, Kolmer Gulch, and Timber Cove.

Fort Ross State Historical Park, including the anadromous fish stream of Fort Ross Creek, is an area of public access.

Kelp beds stretch from Russian Gulch to north of Kolmer Gulch. The Kolmer Gulch watershed is an important area of identified seabird roosting sites. At the northern end of this area the mouth of Stockhoff Creek forms Stillwater Cove, a County park heavily used by divers.

Grassland and coastal woodland are the major plant communities, and each stream in the area has a well-defined riparian community.

Sanctuary-Preservation Areas:

Fort Ross Creek
Osprey nest sites
Rare and/or endangered plant sites, ponds, reservoirs, seeps
Seabird rookery
Riparian corridors of Stockhoff Creek, Kolmer Gulch, Fort Ross Creek, Mill Gulch and Timber Cove Creek
Rocky intertidal area
Jewel Gulch

Conservation Areas:

Stillwater Cove County Park
Upper immediate watershed of Kolmer Gulch (includes three known osprey nest sites)

6. **Muniz-Jenner Highcliffs**

Steep cliffs dominate the area from Timber Gulch to Russian Gulch. Bluffs and grass land are the major communities from Russian Gulch south to the Highway 1 bridge.

Russian Gulch is an anadromous fishery spawning stream and its shore is a surf-casting area for day and night smelt. Osprey nests have been reported in the Russian Gulch watershed.

At the intersection of Highway 116 and Highway 1, there is a flat area used for hay production. Jenner Pond, near this intersection, is one of the most visible freshwater wetlands in the coastal zone. In spite of its immediacy to Highway 1, this pond is used extensively by shorebirds, ducks, coots and rails.

Sanctuary-Preservation Areas:

Russian Gulch stream
Offshore rocks (seabird nesting sites) south of Russian Gulch
Jenner Pond
Riparian corridors of Timber Gulch, Russian Gulch, Jenner Gulch, and the Russian River north edge
Rocky intertidal area

Conservation Areas:

Agricultural surrounding Jenner Pond
Little Black Mountain

7. **Duncans Mills**

The Duncans Mills unit extends to the inland limit of tidal influence in the Russian River, or roughly to Saint Joseph Camp.

South of the Russian River the steep slopes are covered by dense coastal woodlands, while the land to the north is predominantly grassland community. A well-developed riparian community parallels the river on either side.

Duncans Mills Marsh, privately owned by the adjacent property owners, is a unique freshwater marsh containing a wood duck nesting area and several plants uncommon in California.

Sanctuary-Preservation Areas:

Duncans Mills freshwater marsh and adjacent riparian area
Osprey nest site
Riparian corridor on north and south sides of the Russian River
Redwood Tree on Freezout Road

Conservation Areas:

Part of coastal woodland south of Rancho del Paradiso subdivision

8. **Pacific View-Willow Creek-Russian River South Side**

The Pacific View-Willow Creek unit is dominated in its southern half of coastal grassland and in the northern half by coastal woodland. Coastal beaches are sandy cusps at the north and south extremes with rocky intertidal between. The coastline is part of the Sonoma Coast State Beach and includes Goat Rock State Park and Shell, Wright, Gleason, and Portuguese Beaches.

Riparian vegetation stretches along both sides of the Russian River and is also dominant plant growth along Willow Creek, Kolmer Gulch and Scotty Creek.

The Willow Creek Ranch, south of the river, contains the largest freshwater marsh in the Sonoma coastal zone from the junction of Willow Creek with the Russian River to the east and southeast about one mile.

The secluded upland coastal woodlands (redwood and Douglas fir) and adjacent grasslands are territory for the spotted owl and contain a number of documented nesting sites for the osprey which feed particularly along the Willow Creek wetland area.

Large offshore rocks, Arch Rock and Gull Rock, are nesting areas for several seabirds, and have provided nesting for peregrine falcons.

The coastline off of Portuguese Beach, between Duncans Point and Furlong Gulch, and at the mouth of the Russian River are three areas of surf smelt or day smelt and night smelt.

A heron rookery is located on Penny Island in the cypress trees on the northeastern side of the island. Successful nesting at this site has been observed during the most recent three years. The island is presently part of the State Park, but does not have any particular sanctuary status. Log shags in the Russian River from Penny Island to Willow Creek provide habitats for seals, sea lions, and water birds and should be preserved.

Sanctuary-Preservation Areas:

Penny Island
Willow Creek freshwater marsh
Coastal bluff at Duncan Point
Rare and/or endangered plant site
Osprey nest sites
Heron rookeries in Willow Creek Park
Freshwater marsh, sand spit, and riparian corridor on south side of the Russian River
Riparian corridor of Willow Creek upstream to its second land-crossing by Willow Creek Road
Riparian corridor of Scotty Creek and Kolmer Gulch
Rocky intertidal area

Conservation Areas:

Coastal woodland and grassland between the south side of Freezeout Creek and the north side of Willow Creek

9. **Bodega Bay**

Bodega Harbor is an area of high natural resource value, combined with intensive activities of commercial and sport fishing, passive recreation, and educational institutions. The natural resources of the are include a salt marsh which is rare on the northern California coast and which would benefit from restorative measures; tidal mud flats; freshwater-brackish water on the west side and north end of the harbor.

Sanctuary-Preservation Areas:

Freshwater marshes on west side and at north end of Bodega Harbor
Ocean, rocky intertidal, and sandy beach of the Bodega Marine Life Refuge
Bodega Rock
Freshwater marsh along Salmon Creek
Dunes and mud flats on the north side of Doran Park
Rare and/or endangered plant sites
Ponds, reservoirs, seeps
Freshwater marsh areas north of the entrance road to Bodega Dunes State Park and at the north end of the harbor
Marsh areas at the southeast side of Bodega Harbor
Seabird nest sites near Bodega Head
Riparian areas of Salmon Creek
Riparian areas west of the entrance road to the State Park and at the north end of the harbor

Conservation Areas:

Dunes, coastal strand and sandy beach areas of Salmon Creek Beach and the adjacent State Park
Entire Bodega Head

10. **Valley Ford**

Estero Americano is an estuary seasonally closed by a sand bar which blocks its connection with the open space. Natural resources of the estero include mud flats, tidal marsh, freshwater marshes, ponds and seeps, vernal pools, riparian drainage and the adjacent upland grass lands. Estero Americano is considered a unique area due to its isolation, its semi-pristine condition, and its formation processes.

Sanctuary-Preservation Areas:

Marsh, riparian and open water areas of Estero Americano from the mouth to Valley Ford
Rare and/or endangered plant site

Conservation Areas:

Grassland northward of Estero Americano from the coast to Estero Lane

ENVIRONMENTAL RESOURCES MANAGEMENT RECOMMENDATIONS

The habitats or specific resources which have been mapped for the Sonoma County coast are listed below with management recommendations for each.

Sandy Beaches and Sand Spits, including Smelt Spawning Areas

1. Prohibit the opening of sandbars except for maintenance of tidal flow to assure the continued biological productivity of streams and associated wetlands and in particular cases to prevent flooding. Bars should not be breached until there is sufficient in-stream flow to preserve anadromous fish runs.

2. Prohibit all off-road non-authorized motor vehicles from beach areas.

3. Prohibit the removal of sand from beaches and spits.

Dunes and Coastal Strand

4. Prohibit the removal of sand from dunes except for dunes management.

5. Preserve and protect coastal dune habitats from all but resource dependent, scientific, educational, and passive recreational uses including support facilities. Disturbance or destruction of any dune vegetation should be prohibited unless as required for public park facilities, and then only if revegetation is a condition of project approval.

6. Prohibit all off-road, non-authorized vehicles from dune areas.

7. Minimize foot traffic for all permitted uses, including recreation, on vegetated dunes. Where access through dunes is necessary, well-defined footpaths or raised boardwalks shall be developed and used. Access areas should be posted with explanations describing the importance of the use of limited access routes for the purpose of protecting the plant communities.

8. Identify wildlife nesting and breeding habitats of rare or sensitive plants or animals for the publicly owned dune areas in order to temporarily restrict access to these areas during identified breeding and nesting seasons.

Riparian: Note - Where General Plan standards and policies are more restrictive than the following, development shall comply with the General Plan or Coastal Plan policies, whichever are more restrictive, provided that no development shall be approved which does not comply with Coastal Plan policies.

9. Prohibit construction of permanent structures within riparian areas as defined, or 100 feet from the lowest line of riparian vegetation, whichever is greater, except development dependent on the resources in the riparian habitat, including public recreation facilities related to the resource. Any development shall be allowed only if it can be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of the riparian habitat. The riparian area or 100 foot wide buffer zone should generally be maintained in a natural, undisturbed state. Trails and access may be permitted if studies determine no long-term adverse impacts would result from their construction, maintenance, and public use. Trails should be made of porous materials.

10. Require erosion-control measures for projects affecting the riparian corridor.

11. Prohibit the removal of vegetation except commercial timber, subject to an approved timber harvest plan, from the riparian corridor unless it is shown to be essential to continued viability of the wetland.

12. Prohibit filling, grading, dredging, excavation or construction in the watercourse of a riparian corridor unless it is shown that such action will maintain the value of the area as a habitat for wildlife and aquatic organisms and is compatible with continued viability of the habitat.

13. Prohibit pesticide and herbicide application in a riparian protection zone of 100 feet above the lowest line of streamside vegetation, or within riparian areas as defined, whichever is greater.

14. Encourage special range management practices which protect riparian areas.

15. Encourage development of livestock watering areas away from the riparian corridor.

Wetlands (Marshes, Ponds, Reservoirs, Seeps):

Note - Where General Plan standards and policies are more restrictive than the following, development shall comply with the General Plan or Coastal Plan policies, whichever are more restrictive, provided that no development shall be approved which does not comply with Coastal Plan policies.

16. Encourage restoration of marshlands where feasible.

17. Exclude all motor vehicles from wetlands. Pedestrian and equestrian traffic should be directed to specific areas with facilities provided to eliminate adverse impacts on biological resources.

18. Prohibit filling, grading, diking, dredging, and construction in wetlands, except under special conditions delineated in the Coastal Act Section 30233. All projects must maintain or enhance the functional capacity of the wetland or estuary. Dredging, when consistent with the provisions of the Coastal Act and where necessary for the maintenance of the tidal flow and continued viability of the wetland habitat, should be subject to the following conditions:

    Prohibit dredging in breeding and nursery areas and during periods of fish migration and spawning.

    Limit dredging to the smallest area feasible.

    Require protective measures for dredging and excavation such as silt curtains, diapers, and weirs to protect water quality.

    Remove structures as soon as possible once they have served their purpose.

    Dredge spoils should not be deposited in areas subject to tidal influence or in areas where public access would be significantly adversely affected, as well as certain environmentally sensitive areas.

19. Minimize construction on land adjacent to wetlands during maximum seasons of breeding bird activity (March 1 to July 1).

20. Prohibit discharge of wastewater into any wetland unless such discharge maintains or enhances the functional capacity of the wetland and maintains the quality of the receiving water.

21. Prohibit grazing or other agricultural uses in designated coastal wetlands. On watershed lands, a fence should be constructed on the outer edge of the wetland.

22. Prohibit the diking or filling of seasonal wetlands for the purpose of conversion to agriculture or to accommodate development of any kind.

23. Encourage the fencing of springs, seeps, and pond areas surrounded by lands used for grazing. Water for livestock should be piped outside of the wetland for use by livestock.

24. Prohibit the removal of vegetation from wetlands unless it is shown to be essential to the habitat viability.

25. Prohibit construction of agricultural, commercial, industrial and residential structures within 100 feet of wetlands.

26. Between 100 and 300 feet of wetlands, prohibit construction of agricultural, commercial, industrial and residential structures unless an environment assessment finds the wetland would not be affected by such construction.

27. Prohibit new water diversions from streams that feed wetlands without establishing limits on diversion sufficient to protect the wetland.

Bodega Harbor Tideflats

28. Prohibit motor vehicles.

29. Recommend periodic closing of portions of the tide flats on the west side of the harbor to shellfish harvesting. A rotation system allowing opening of each section of the tide flats every three to five years has been suggested. The County should request evaluation of this proposal by the Department of Fish and Game.

30. Encourage more restrictive bag and possession limits and gear restrictions for ghost shrimp (Callianassa californiensis), mud shrimp (Upogebia pugettensis), and blood worms (Urechis caupo).

31. Enforce leash laws to minimize the effects of domestic animals on marine mammal and shorebird populations on the tide flats.

32. Prohibit discharge of effluents in tide flat areas.

33. Prohibit dredging and filling in tide flat areas, except under special conditions delineated in the Coastal Act. The impact of dredging on the surrounding biota can be minimized by restricting operations to winter months.

Rocky Intertidal, Including Sea Bird Rookeries

34. Generally prohibit the development of groins, breakwaters, piers, sea walls, pipelines or other structures in the rocky intertidal areas. These structures or other such construction that alters natural shoreline processes shall be permitted in other resource areas only when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shorelines and supply. Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.

35. Prohibit vehicles in rocky intertidal areas.

36. Designate important rocky intertidal areas as Marine or Ecological Reserves. Encourage maintenance of such areas by appropriate public agencies or private groups.

37. Designate the offshore, mouth, and banks of the Estero Americano as a ecological reserve. Sonoma County should act as the "lead public agency" to preserve this areas as a representative of the coastal estuarine environment of Northern California.

38. Encourage utilization of the public shoreline at Salt Point State Park, Kruse Ranch, and the non-historic areas of Fort Ross Park to remove some pressure on the underwater resources at Stillwater Cove.

39. Prohibit public access to offshore rocks which are designated as seabird rookeries and nesting areas, and to habitats of seals and sea lions.

Coastal Bluffs

40. Require erosion and sediment control measures for excavation, grading, and construction operations in coastal permits for areas adjacent to coastal bluffs.

41. Prohibit the removal of sand or rock materials from any part of the bluffs except for road maintenance.

42. Minimize the removal of native plant species from the coastal bluff area.

43. Prohibit all off-road non-authorized motor vehicle traffic on bluff areas in order to limit compaction, erosion, and destruction of plants. Equestrian traffic should be directed to areas where the subsequent compaction and erosion do not adversely affect the stability of the bluffs.

44. Minimize recreational use of bluff sites known to be used by birds as nesting or roosting areas.

45. Design access points (stairways or trails) which pass through coastal bluff habitat to minimize erosion and disruption of bluff vegetation. Public access must be limited to the trailway corridor.

46. Develop surfaced paths along cliff tops, and paths or steps down cliff faces in bluff areas with heavy recreational use. In areas of moderate use, paths can be constructed of local material.

47. Prohibit development within 100 feet of a bluff edge except as described in Environmental Hazards Recommendation 2.

Grassland-Coastal Prairie

48. Encourage agricultural management practices which minimize soil erosion, sedimentation and siltation.

49. Include in coastal permits erosion and sediment control measures for excavation, grading and construction operations.

50. Provide areas for public observation of local cormorant population on Bodega Head and Stump Beach.

51. Encourage use of the upland area of Stillwater Cove County Park as a suitable area for educational facilities concerning coastal grassland or prairie.

Coastal Woodland

52. Include erosion and sediment control measures in coastal permits.

53. Minimize disruption to vegetation in all grading operations, placement of fills, or construction of structures.

Pygmy Forest

54. Prohibit construction of permanent structures except for those necessary for scientific and educational uses of this particular habitat.

55. Prohibit off-road motor vehicles, except for those required for management or emergency use in the forest area.

Windbreaks

56. Promote retention and proper management of existing windbreaks which are predominantly east-west oriented and do not block extensive coastal views.

57. Discourage new windbreaks that would interrupt coastal views.

Rare or Endangered Plants and Animals

58. Protect designated sites of rare or endangered plants. Prior to any development in or adjacent to designated sites, conduct precise botanical surveys to determine the distribution of any rare or endangered plants. Botanical surveys should be conducted during natural blooming season of species in question. Development should be sited and designed and constructed to prevent impacts of grading, paving, construction of roads or structures, runoff, and erosion from significantly degrading rare or endangered plant habitats, and shall be compatible with the continuance of such habitat areas.

59. Assure compliance with the Federal Endangered Species Act of 1973 and the California Endangered Species Act of 1970 as amended.

Osprey Nest Sites

60. Limit recreational activities near identified osprey nesting sites to low intensity passive recreation. These limitations are especially important during May through July when incubation takes place.

61. Protect osprey nesting sites located along the Willow Creek, Freezeout Creek and Russian River uplands from disturbance by logging activities.

62. Prohibit removal of snags and dead tops of live trees in areas surrounding identified osprey sites.

63. Prohibit removal of osprey nests.

64. Prohibit development of structures and avoid development of new roads if at all possible within the nesting site areas.

Heron Rookeries

65. Prohibit public access in areas of identified heron rookeries. Access to Penny Island should be limited to low intensity usage for scientific and educational purposes. Scientific and educational use should be managed so as not to interfere with heron nesting. (February to mid July).

66. Prohibit new development (construction of structures or roads) within 600 feet of a rookery.

Spotted Owl Territory

67. Minimize impacts of development near identified Spotted Owl nesting and breeding areas.

Anadromous Fish Streams

68. Maintain flows in streams identified as anadromous fish habitat at a minimum flow level as required to continue their use as an anadromous fish spawning area.

69. Stop all stream diversions when stream flow falls below minimum flow standards until stream flows return to levels above the minimum standards.

70. Prohibit dredging in all anadromous fish streams.

71. Prohibit dams or other structures which would prevent upstream migration of anadromous fish in streams designated as "anadromous fish habitat" unless other measures are used to allow fish to bypass these obstacles. Any bypass measures should be approved by the Department of Fish and Game.

Marine Mammal Haul-out Grounds

72. Limit recreational activities near and prohibit disturbance of designated areas used for harbor seal and sea lion hauling-out grounds to passive recreation to insure continued viability of these habitats.

73. Encourage annual monitoring by the Department of Fish and Game of designated marine mammal hauling-out grounds to determine the condition of hauling out grounds and to take counts of mammals for long term management of marine mammals.

Kelp

74. To the extent consistent with all applicable provisions of law, including but not limited to Section 30260 of the Coastal Act, encourage the appropriate State and Federal jurisdictions to:

    Monitor the size and habitat viability of kelp beds and their associated fisheries resources,

    Monitor and regulate activities such as sewage disposal, dredging, and renewable energy development which may adversely affect near shore marine water quality and thus kelp resources. Prohibit petroleum and other forms of energy development which may significantly impact the environment through normal operations or accidents (oil spills, well blowouts, etc.).

75. Require specific site investigations prior to any kelp harvesting.

Open Water

76. Prohibit construction of new structures, and dredging, filling or diking in open water except in accordance with Section 30233 of the 1976 Coastal Act. Open water shall be defined in a manner consistent with the Commission's Wetlands Guidelines.

77. Prohibit dredging during periods of fish migration and spawning, and limit dredging to the smallest area feasible.

Designated Sanctuary Preservation and Conservation Areas

78. Implement Sanctuary-Preservation and Conservation Area limitations in order to assure special consideration and protection for unique resources of the coastal zone.

Archaeological Resources

79. Require an archaeological study when proposed projects are within designated archaeological site areas, and require implementation of reasonable mitigation measures when recommended by the study.

80. Continue to send all projects subject to CEQA to Sonoma State Anthropology Laboratory for review.

ENVIRONMENTAL HAZARDS

INTRODUCTION - COASTAL ACT POLICIES

Various environmental hazards are constraints to human activity in the coastal zone. Geologic, seismic, flood, and fire hazards are found throughout the planning area and must be respected. Coastal Act policies direct new development to minimize risks to life and property from environmental hazards and to avoid substantial alteration of natural land forms:

30253. New development shall:

(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluff and cliffs.

GEOLOGIC HAZARDS - DESCRIPTION

The Sonoma County Coastal Zone is subject to earthquake hazards. The San Andreas fault runs parallel to the coast coming inland at Bodega Harbor and Fort Ross. Geologic and historic records indicate that earthquakes have and will occur on this portion of the San Andreas fault. An earthquake could be accompanied by surface fault rupture, ground shaking, and ground failure. Earthquakes and their associated hazards will affect both the man-made and natural environments within the coastal zone. Related seismic hazards should be anticipated and respected, and considered in the planning process.

Seismic Hazards

The four major seismic hazards in the coastal zone are: surface fault rupture, ground shaking, ground failure, and tsunami.

Surface Fault Rupture. Surface fault rupture is associated directly with fault movement and is more limited in area than ground shaking and ground failure. The hazard of surface rupture accompanying earthquakes can be severe and damaging to structures.

Ground Shaking. As earthquake generated seismic waves pass through the earth they cause ground shaking. The magnitude of the earthquake, distance from the quake epicenter, type of geologic material and wave amplitude also determine the intensity of ground shaking. Unconsolidated and poorly consolidated alluvium and terrace deposits will undergo greater ground shaking than consolidated bedrock formations. Landslides also may undergo greater shaking intensities, thus increasing the risk of ground failure, depending on their depth, water content, and the amount of firm bedrock they contain.

Ground Failure. Earthquakes can produce ground failure causing landsliding, lurching, and differential movement. Earthquake magnitude is a major factor in ground failure, but other conditions, such as slope, moisture in the ground, and type and content of bedrock are also factors.

Shaking on gentle and moderate slopes in poorly consolidated surface deposits can result in special effects such as differential compaction and settlement, and liquefaction. Earthquakes also increase the possibility of bedrock landslides, small mudflows, and rock falls.

Tsunami. Low-lying coastal areas, such as Bodega Harbor, beaches and the lower courses of streams and rivers are subject to the hazard of tsunamis, or seismic sea waves. Tsunamis may inundate low-lying coastal areas and pose a threat to public beaches, parks, and residences near the coast.

Distant earthquakes, whether on land or underwater, can generate tsunamis. The size of the tsunami is related to the type and size of earthquake and the distance traveled through open water. Upon striking the coast, the wave achieves an elevation about tide level that varies with topography along the coast. Although the San Andreas fault is nearby, geologic evidence indicates that movement on this is dominantly horizontal. Apparently for this reason, no damaging tsunami was generated by submarine movement during the 1906 earthquake. Locally damaging tsunamis could be generated as a result of submarine landsliding or rapid massive landsliding into the sea. Extensive deep slides on precipitous slopes between Russian Gulch and Fort Ross could be the source of such an event.

Landslides and Erosion

Ground failure also occurs without being caused by an earthquake. Landslides, shallow soil slippage, and sea cliff deterioration are the most prevalent. Dwellings have been built on or near the edge of sea cliffs and on steep slopes. The Franciscan and Merced Formations are the geologic formations most affected by these types of failure. Intensive grazing, tillage of slopes, and road construction have resulted in extensive erosion through shallow slippage, gullying, sheet wash and wind action. This erosion, combined with extensive landsliding, has contributed greatly to historic sedimentation of Bodega Harbor, the Estero Americano, and other areas.

Slope Stability. Slope stability is a classification of rock and soil according to susceptibility to landsliding and various forms of mass movement. Some construction activities, such as grading and filling, placement of culverts and the installation of septic tank filter systems, may affect stability, depending on the nature, design, construction and maintenance of the work. Logging, grazing, and removal of

vegetation may adversely affect slope stability. Unstable areas may require installation of drainage culverts and removal of unstable materials, to prohibit sliding.

Coastline Erosion. The location, rate and type of coastal erosion is determined by the relative resistance of the shoreline rocks. Factors which determine resistance are the rock type, the extent of shearing and fracturing, and the inclination of bedding.

The coastline west of the San Andreas fault is characterized by points and coves which reflect the relative resistance of the rocks. Franciscan rocks, the dominant geologic unit on the east side of the San Andreas fault, erode more rapidly than those on the west.

GEOLOGIC HAZARDS - MAPPING PROCEDURE

Slope stability, coastal cliff stability, surface fault rupture, and tsunami hazards are mapped at a scale of 1:12,000. Information was derived from three **Geology for Planning** documents prepared by the California Division of Mines and Geology and the Alquist-Priolo Special Studies Zone.

This information provides general knowledge of the type, location and extent of geologic conditions and permits comparison of alternative land uses over large areas. Site evaluations may require more precise information such as detailed geologic mapping, subsurface exploration by drilling and trenching, soil sampling or laboratory testing.

Flooding

Flooding along the coastal rivers and creeks is a natural, annual phenomenon. Floods become hazards because of human occupation or use of natural flood plains. Continued use of flood plains will lead to continued and increased flood damage. Flood plain regulation can reduce flood damage and its associated problems.

Flood plains have historically been among the finest lands for food production. Other uses of flood plains include their hydrological importance as natural flood plains, deposits of sand and gravel, riparian wildlife habitats, and recreation.

The Russian River is the only stream in the coastal zone which has been mapped and studied in detail for flood information. Data are not available for flood levels on the other coastal rivers and streams. Prior to any development in the vicinity of a stream or creek, flood levels should be carefully evaluated, and any conflict avoided.

Fire Hazard

Fire hazard is defined as the potential for large and destructive wildland fires characterized by rapid spread and high intensity. Hot, dry weather combined with highly flammable vegetation and rugged topography produce hazardous fire conditions. Human activity in conjunction with these hazardous conditions accounts for 98 percent of the wildland fires in Sonoma County.

While property damage represents a monetary loss, the potential loss of life and the destruction of natural resources from fire is difficult to measure. Wildland fires destroy vegetation and wildlife and scar the land. Removal of vegetation alters watersheds, affecting natural stream flow and the water storage capacity of the soil.

The California Division of Forestry considers weather, fuel loading, and slope steepness the most important criteria in classifying fire hazards into three categories: moderate, high, or extreme hazard. Because of the mild climate conditions in the Sonoma County coastal zone, no areas of extreme fire hazard exist. All heavily wooded areas and brush areas with very steep slopes (greater than 61 percent) are considered a high fire hazard.

Wildland fire is a process occurring on a normal cycle in nature. As residential and recreational developments encroach further into the wild lands, the natural cycle is disturbed and the potential for disaster increases. Mitigation measures must be implemented to reduce the risk to humans and the environment.

RECOMMENDATIONS

Geologic Hazards

1. Anticipate the effects of, and develop a plan in response to a major earthquake generated along the San Andreas fault zone.

2. Prohibit development within 100 feet of a bluff edge or within any area designated unstable to marginally stable on Hazards maps unless a registered engineering geologist reviews and approves all grading, site preparation, drainage, leachfield and foundation plans of any proposed building and determines there will be no significant impacts. The engineering geologist report shall contain, at a minimum, the information specified in the Coastal Administrative Manual.

3. Enforce the requirements of the Alquist-Priolo Special Studies Zone Act for protection from fault rupture hazard.

4. Design and construct all structures for human occupancy, including mobile homes, in accordance with Zone 4 standards of the Uniform Building Code.

5. Enforce the geologic provisions of Chapter 70 of the Uniform Building Code.

6. Require engineering geologic reports in accordance with the Permit and Resource Management Department geologic review procedure.

7. Encourage grazing practices of steep slopes which mitigate erosion problems.

8. Encourage resource use where suitable on lands which are hazardous to development and other uses.

9. Prohibit new dwellings within designated Tsunami Hazard Zones.

Flooding

10. Prohibit construction of structures within 100 feet of the top of any embankment, natural or man-made which defines a channel, except where flood hazard has been found to be remote in review by the Sonoma County Water Agency. Where this policy conflicts with General Plan Public Safety Policy PS-2n, the more restrictive of the two shall apply.

11. Grade and construct in such a manner as to minimize: (a) ponding or accumulation of storm water not necessary for silt control, or groundwater recharge enhancement, (b) alterations to the natural drainage system, and (c) siltation of adjacent or downstream water courses.

12. Design new residential developments to minimize both volume and velocity of surface runoff and soil erosion.

Fire Hazards

13. Require fire management plans with applications for subdivisions and for new or expansion of existing recreational facilities in non-urban areas, including the development of State and County park holdings. Such plans should include, but not be limited to, adequate water storage, adequate ingress and egress for emergency vehicles and occupant evacuation, and building siting to minimize fire hazard.

14. Support the Division of Forestry and local fire districts in creation and maintenance of a complete pre-suppression fire plan (fuel breaks, fire breaks, control burning, water development) for fire prevention.

15. Urge the State Department of Parks and Recreation, and the County Regional Parks Department to continue efforts to educate the public to fire hazards and fire prevention.

16. Encourage private individuals and communities to construct small-scale water impoundments for back-up use in fires and for back-up non-potable demand in coastal communities. Agricultural Extension Service advice and credit assistance now available to farmers and ranchers should be made available to those interested in such construction.

17. Require any construction to comply with the standards prescribed by comprehensive Building Codes and Fire Prevention Codes which give special consideration to different degrees of hazard.

18. Insure the safety of grazing lands and forest areas from wildland fire by the continued use of agricultural and forestry burning procedures and regulations.

19. Regulate the use of spark retarding devices on all equipment.