Minute Item
92

09/17/01
W 25440
A. Scott
C. Fossum
J. Smith

CALIFORNIA STATE LANDS COMMISSION
(PARTY)

Regular Item 92: Staff and members of the public made presentations to Commissioners pertaining to Shoreline Protective Structures.

The item was approved as presented

CALENDAR PAGE
MINUTE PAGE 12313

MINUTE ITEM
This Calendar Item No. 92 was approved as Minute Item No. 92 by the California State Lands Commission by a vote of 3 to 0 at its 9-17-01 meeting.

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CONSIDERATION OF REPORT ENTITLED "SHORELINE PROTECTIVE STRUCTURES, STAFF REPORT TO THE CALIFORNIA STATE LANDS COMMISSION" AND COMMISSION PRACTICES AND STAFF RECOMMENDATIONS RELATED TO THE ISSUANCE OF LEASES FOR COASTAL SHORELINE PROTECTIVE STRUCTURES

Background

At the November 27, 2000, California State Lands Commission (CSLC or Commission) meeting, several issues were raised with respect to the issuance of leases for the construction and maintenance of shoreline protective structures along open coastal waters of the Pacific Ocean. For example, is it appropriate for the CSLC to continue issuing leases for such structures that do not require the payment of rent? Does the placement of hard protective structures negatively impact beach sand supply, or cause additional erosion, thereby reducing beach areas available for public use? Similar concerns were raised by Mr. Marco Gonzalez, Chairman of the San Diego County Chapter of the Surfrider Foundation, and legal counsel to the National Office of the Surfrider Foundation.

The Commission directed staff to prepare a report to address these and related issues, including the development of alternatives and recommendations. Staff reviewed existing scientific research and published works that address coastal processes and coastal erosion issues and developed a preliminary report, dated April 2001. More detailed background information is contained in that report, a copy of which is attached as Exhibit A. The report is also available on the Commission's web site at www.slc.ca.gov.

Two recent events emphasize the statewide importance and timeliness of the CSLC's concern. Earlier this year, the State Department of Boating and Waterways announced the award of $10,000,000 in grant monies, allocated in the 2000-2001 State Budget, to cities and counties throughout the state to implement sand nourishment projects and shorezone related studies. Potential studies will include the effects of waves on beach

CALENDAR PAGE
MINUTE PAGE 12332

erosion and alternatives to seawalls, revetments and other armoring structures that can impact beach and coastal erosion, beach access, and other coastal resources.

Also, the State Resources Agency, on March 29, 2001, after months of research and analyses, released its "Draft Policy on Coastal Erosion Planning and Response and Background Material" for public comment. The proposed new policy would guide and coordinate the activities of the various state resource agencies with jurisdiction over projects that affect coastal erosion planning and response. The policy is intended to encourage projects to be designed and implemented in a manner that will insure maintenance of critical infrastructure and protection of natural resources.

Public meetings were held in seven communities -- Carpinteria, Newport Beach, Encinitas, Santa Monica, Sausalito, Santa Cruz and Sacramento -- to solicit public comments on the draft policy. The deadline for submitting comments was also extended by the Resources Agency to July 9, 2001 in order to accommodate the substantial public response to the Draft Policy.

It should be noted that most protective structures are placed on lands above the mean high tide line and thus beyond the CSLC's jurisdiction. They are placed not to deflect the ordinary wash of the daily tides, but to protect property from storm waves and surge. Also, shoreline protection is often placed on the beach during emergency situations (e.g. El Niño storms) and retroactive approval is then sought from agencies. The Legislature, through the Coastal Act (PRC § 30235) has mandated the California Coastal Commission to allow protective structures "when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger of erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply..."

The Commission will continue to receive requests from both public entities and private parties for protective structures along open coastal waters of the Pacific Ocean. There are many other federal, state and local government agencies that also regulate and permit such structures. Many of these agencies have regulatory jurisdiction beyond that of this Commission. CSLC staff coordinates its efforts with the California Department of Fish and Game, the California Coastal Commission, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and local governments when reviewing such requests. CSLC coordination with and reliance on the regulatory agencies, together with the land use planning ordinances of local governments, are critical in the review and authorization by the CSLC of any protective structure.

Staff works with these other public entities, especially local governments, the California Coastal Commission and the U.S. Army Corps of Engineers to ensure that CSLC

CALENDAR PAGE 00355
MINUTE PAGE 02213

concerns are addressed, to control and limit the impacts of these structures on the shoreline, and protect the public's use of the beach.

Identification of Issues

A number of diverse issues were considered in staff's analyses. These are:

Public Trust

- Public loss of access to or use of its property and the potential to lose additional beach areas at lease locations to erosion or rising sea level.
- Considerations of rent to compensate the public for use of its lands versus the benefit(s) the public may receive from that same use.
- Public facilities, i.e. a road, utilities, etc. may be directly or indirectly benefited by a public or privately installed shorezone structure.
- Benefits received solely by the applicant from a shorezone structure.

Environmental

- Potential environmental impacts of protective structures to the shorezone, such as induced erosion, loss of beach sand to coastal processes, and the like.

Process

- The number of existing and potential leases for these shorezone structures.
- Additional staff resources that may be required and the costs incurred to administer leases with provision of rent, e.g., determining the amount of rent and collecting that rent.
- Efforts and costs required to determine the boundary between sovereign and private lands along the coast. This process is very complex and requires a specialized expertise to establish a legally defensible boundary that may be in a constant state of change. Costs of locating this boundary can become considerable, averaging $25,000-$100,000 or more, especially if there is a challenge to the state's determination. Challenging the determination of the boundary can also be costly to a private party as well.

The following is a discussion of the extent of the CSLC's jurisdiction and current approach to shorezone protection.

CALENDAR PAGE
MINUTE PAGE

Shorezone Jurisdiction

The shoreward boundary of the state's ownership of the Pacific Ocean is the Ordinary High Water Mark, adopted by statute in 1872 (Civil Code § 670 and 830). The federal and state courts have interpreted this boundary to be the intersection of the elevation of mean high tide and the shore (approximately two feet above sea level for most of California). The CSLC's jurisdiction and the location of the landward boundary that separates upland ownership from the sovereign lands of the state along the coast is, by law and with the exceptions discussed later, a moving line. Staff estimates that 1±% of the state's sovereign land boundaries have been permanently fixed by adjudication or agreement. The remainder of the coast is either in a natural state with the boundary migrating with accretion and erosion, or if modified by human activities, no agreement has been reached as to the boundary's fixed location.

In certain instances, the boundaries may have become legally fixed due to human activities along the shoreline. As an example, the tideland boundary in Santa Monica is fixed at the 1921 mean high tide line, which is located several hundred feet inland across dry sandy beach from the current mean high tide line. The difference between the actual boundary and the perceived boundary is a result of the large groin field and sand fill placed on tidelands since 1921.

Staff recently completed a two-year study of a 300-foot stretch of undeveloped beach in Malibu. In that case, after expending nearly 600 hours of staff time and $25,000 of reimbursement from the upland owners, staff was able to determine a line behind which the owners could construct improvements without CSLC staff objection and for which no lease would be necessary.

Many, if not most, seawalls, bulkheads and revetments being approved and constructed today are located as close to the upland improvements as possible. Staff's review of protective structure projects often results in finding no evidence that the structure is or is proposed to be located within the CSLC's jurisdiction. In these instances, no lease is being required. Where staff has evidence the structure exists or is proposed to be located waterward of the current or an historical location of the mean high tide, staff will either interpose an objection to its proposed location or notify the developer/owner that a lease from the Commission will be required. Staff has recommended that the proposed structure be redesigned and moved inland, wherever possible. Should a dispute arise as to the Commission's jurisdiction, significant staff time and resources may be necessary to determine and affirm the Commission's jurisdiction, with legal challenge to that determination still possible.

Instead of pursuing lengthy and costly boundary determinations, a lease is entered into without prejudice to the parties' boundary claims [standard lease ~~covenant (Section 4, Paragraph 3)~~]. Entering into the lease does not resolve the question of state

CALENDAR PAGE
MINUTE PAGE

ownership, but, assuming cooperation from an applicant, simply removes the otherwise costly need to prove either public or private ownership of the site.

Rent Considerations/Public Benefit/Mitigation

California Code of Regulations (CCR) § 2003 (a) (4) provides that annual rent for general permits is based on nine percent of the appraised value of the leased lands or a minimum of $50 per annum. Subparagraph (A) provides that no rent shall be charged to public agencies if the Commission determines their project provides a statewide benefit. Subparagraph (B) allows the waiver of rent for protective structures if the Commission determines a public benefit results from the structure.

The Commission's standard covenants [Section 4, Paragraph (a)(2)] state that if the specified consideration for the lease is the "public use, benefit, health or safety," the Commission has the "right to review the consideration at any time and set a monetary rental" if the Commission "determines that such action is in the best interest of the State." Public Resources Code Section (PRC §) 6217 currently requires that all revenues generated from the use of state sovereign lands are deposited in the General Fund.

Most leases for shoreline protective structures during the 1970s and 1980s identified an estimated annual rental value for the land being leased and then waived the rent due to the public benefit being derived. Although protective structures have a direct benefit to the adjoining property owner by providing protection and preventing erosion, it was also determined that there was an indirect public benefit, i.e., providing protection for public roads, highways and utilities inland of the private property. In coastal areas, protective structures that are designed and located to protect the base of eroding coastal bluffs may also provide a measure of safety to the public by reducing the potential of bluff collapse.

Historically, only a few protective structure leases issued provided for payment of rent. Currently, only one active lease requires the payment of rent. This one lease also contains provisions acknowledging "the public use and benefit", as well as mitigation for impacts. In many instances, applicants for shoreline protective structures have objected to paying rent and also questioned the Commission's assertion of jurisdiction. As described above, resolving such boundary or ownership disputes can be expensive for both parties.

Staff offers the following program alternatives for consideration and recommendations for consideration and approval by the Commission.

CALENDAR PAGE 0958
MINUTE PAGE 2826

ALTERNATIVE 1

The Commission can continue its current practice of approving the construction and maintenance of shoreline protective structures on sovereign lands with the rental consideration being --public benefit and/or the public health and safety. If the Commission chooses to continue this practice, there will be no change in the current processing of such transactions by Commission staff. Each project is evaluated on its merits, but in accordance with recent practice, no monetary consideration (rent) is charged.

ALTERNATIVE 2

The Commission can modify its current practice and require private parties and public agencies, in certain instances, to pay an annual rent. This annual rent would be a source of increased revenue to the State General Fund. Lease revenue would depend on the location and size of the structure, the actual area of the structure occupying sovereign land, and the term of the lease. Each protective structure project would be evaluated and rent, if any, would be charged based on the specific factors in each case. One consideration is the primary purpose of the protective structure and whether a public benefit is also derived. If the Commission's assertion of jurisdiction were to be challenged, a precise boundary determination study would be necessary. Staff would seek to have the costs of that study borne by the challenging party.

ALTERNATIVE 3

The CSLC can issue leases that would require compensation from the private party in the form of the Public Benefit or monetary rent plus mitigation for impacts that the protective structure has on Public Trust uses or resources.

Staff looked at the possibility of assessing an impact fee. Because of the cost and uncertainty involved in determining a monetary value for impacts on various public trust resources, staff believes that calculating such a fee was infeasible.

ALTERNATIVE 4

The Commission could require a title settlement agreement involving the property where a hard protective structure is to be or has been placed. The purpose of the structure is ostensibly to prevent further landward erosion and the Commission could fix the boundary of the sovereign lands at the foot of the shoreline protection device, and negotiate a title settlement that would compensate the public for the loss of any claims of property rights it might have within the filled in area. The money or land accepted as part of such a settlement would be pursuant to the Kapiloff Land Bank Act (PRC §§

CALENDAR PAGE 00959
MINUTE PAGE 002217

8600, *et seq.*) and would not go to the General Fund, but rather be earmarked for acquisition of lands to be held for Public Trust purposes by the Commission.

ALTERNATIVE 5

Prohibit the construction of private protective structures on sovereign lands. Such a policy by the Commission could result in the potential loss of some valuable tax base to local government agencies if structures or property were adversely affected. It also would be inconsistent with the state policy established in the Coastal Act by the Legislature, which allows for protection of existing development.

EXHIBIT

A. "Shoreline Protective Structures, Staff Report to the California State Lands Commission, April 2001"

RECOMMENDATIONS

IT IS RECOMMENDED THAT THE COMMISSION:

1. DIRECT STAFF TO CONTINUE TO COOPERATE WITH LOCAL, STATE AND FEDERAL AGENCIES THAT REGULATE AND PERMIT SHORELINE PROTECTION STRUCTURES.

2. CONTINUE TO WORK WITH PROJECT PROPONENTS TO REDESIGN PROJECTS SO THAT THEY WILL BE LOCATED ON PRIVATE PROPERTY, WHEREVER POSSIBLE.

3. ENCOURAGE AND RECOMMEND SOFT SOLUTIONS, SUCH AS SAND REPLENISHMENT, WHEREVER POSSIBLE.

   IF SOFT SOLUTIONS ARE NOT PRACTICAL OR POSSIBLE AND A HARD STRUCTURE IS THE ONLY FEASIBLE ALTERNATIVE, STAFF RECOMMENDS THAT THE CSLC ISSUE PROTECTIVE STRUCTURE LEASES BASED ON A CASE BY CASE ANALYSIS, EVALUATING INDIVIDUAL SITUATIONS TO DETERMINE WHETHER OR NOT THE CONSTRUCTION OF SUCH A PROTECTIVE DEVICE WILL HAVE AN IMPACT ON: 1) THE PUBLIC'S ABILITY TO UTILIZE SOVEREIGN LANDS, 2) THE ENVIRONMENT AND 3) PUBLIC TRUST RESOURCES IN THE AREA. WHERE A PROTECTIVE STRUCTURE WOULD HAVE AN UNMITIGATED ADVERSE IMPACT ON THE PUBLIC'S CONTINUED ENJOYMENT OF SOVEREIGN LANDS, AND INSUFFICIENT PUBLIC BENEFIT EXISTS, THE CSLC RETAINS THE ABILITY, DEPENDING ON THE FEASIBILITY OF ALTERNATIVES AND SEVERITY OF IMPACTS, TO REQUIRE MITIGATION OR DENY A PROJECT.

CALENDAR PAGE
MINUTE PAGE

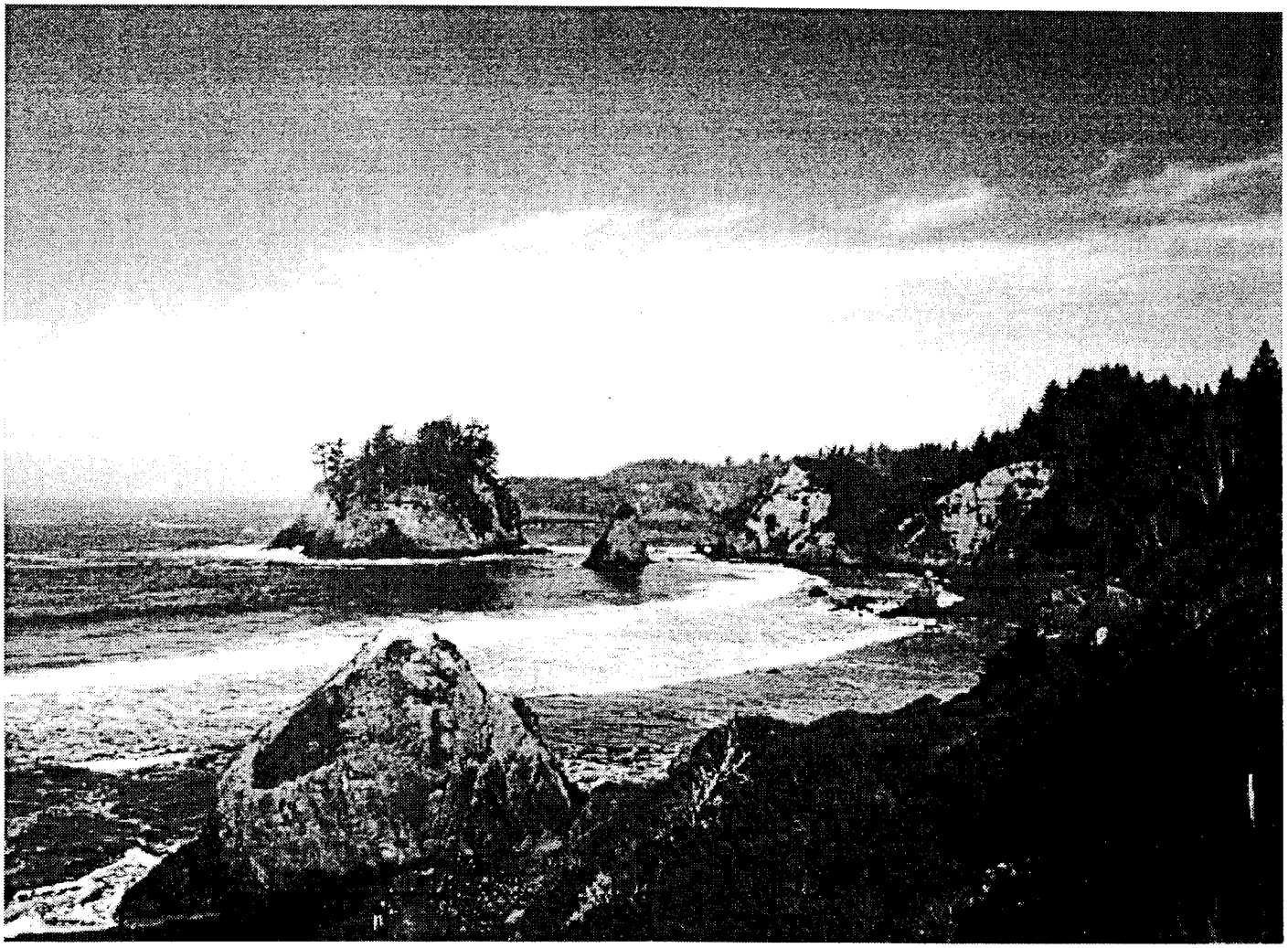
4. ISSUE PROTECTIVE STRUCTURE LEASES TO PUBLIC AGENCIES AND PRIVATE PARTIES WHERE THERE IS SUFFICIENT EVIDENCE THAT THE STRUCTURE WILL OCCUPY LANDS UNDER THE COMMISSION'S JURISDICTION, CHARGING RENT CONSISTENT WITH EXISTING REGULATIONS, WAIVING OR ADJUSTING RENT TO REFLECT THE DEGREE OF PUBLIC BENEFIT THAT IS DERIVED.

5. DIRECT STAFF TO CONTINUE RESEARCH AND REVIEW OF COMMISSION PRACTICES TO SEEK SOLUTIONS THAT WILL PROTECT SOVEREIGN PUBLIC TRUST LANDS.

CALENDAR PAGE	[illegible]
MINUTE PAGE	[illegible]

EXHIBIT A

Shoreline Protective STRUCTURES



Patricks Point, Humboldt County

Staff Report to the

California State Lands Commission

April 2001

CALENDAR PAGE	0982
MINUTE PAGE	0220

Shoreline Protective Structures

Staff Report to the

California State Lands Commission

April 2001

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CALENDAR PAGE
MINUTE PAGE

SHORELINE PROTECTIVE STRUCTURES
STAFF REPORT TO THE CALIFORNIA STATE LANDS COMMISSION

EXECUTIVE SUMMARY

Approximately 80% of all people in California live within 30 miles of the Pacific Ocean and four million of those live within three miles of the shoreline.[1] Because of this significant population pressure on coastal areas, a great deal of residential, commercial, industrial and public infrastructure development occurs near the shore. Development along and adjacent to the shore often impacts natural shoreline processes. Significant development on top of coastal bluffs has contributed to shoreline armoring to protect those developments from the effects of wave generated erosion.

The most frequently used approach by public agencies and private property owners to shoreline erosion along California's coast has been the placement of protective structures, primarily seawalls or rock revetments. Such structures seem to be the most effective in protecting private property for the most economical cost. However, such structures may also have adverse impacts on the shoreline environment. The major issues related to protective structures include negative environmental effects, such as modifications of landforms and drainage patterns, increased bluff and beach erosion, interference with sand supply and littoral drift, loss of public beach, constraints on public access and potential impacts on flora and fauna as a result of unnatural encroachment of facilities and/or sand onto the beach environment. Regardless, government agencies have been reluctant to deny permits in the face of pending loss of improved upland properties.

One alternative to hard structures being used to address shoreline erosion is beach building/sand replenishment. Sand replenishment projects may help to offset the gradual thinning and disappearance of a region's beaches. Recent studies on the benefits of beach enhancement have indicated that they should be combined with offshore hard structures in the form of sand retention groins.[2] Beach replenishment has a two-fold benefit for the public in that it provides significant protection from the effects of coastal erosion on inland properties, as well as enhancing sand-starved beach areas. Enhanced beaches benefit the citizenry and the state's tourist industry with expanded recreational areas, which is of significant importance to the overall economic health of California.

In most areas of California the primary natural source for the region's beaches is sediment carried from inland areas by rivers and streams. Dams reduce the amount of fresh water flows to coastal wetlands, reduce the size of flood flows and thus reduce the flushing of sediment from inland sites through coastal estuaries. Dams trap the sand that would normally nourish the coastal beaches, which can ultimately become the primary buffer for protection of seacliffs and shoreline development from erosion and storm damage.

The California State Lands Commission (CSLC) has jurisdiction over all ungranted tidelands and submerged lands within the state. The shoreline boundary of the state's ownership of the Pacific Ocean and adjacent bays and estuaries, as well as other tidal waterways is generally a moving boundary identified as the Ordinary High Water Mark (Civil Code sections 670 and 830). Along most of California's shoreline there is uncertainty as to the exact location of that boundary. In instances where the shoreline is no longer in a state of nature the boundary may be fixed by adjudication or agreement. Only 1±% of the state's sovereign land boundaries have been permanently fixed in this manner. The law of moving boundaries along waterways often leads to considerable confusion over ownership and jurisdictional issues. What one day is public land, the next may be private and vice versa. The costs associated with determining the boundary at any given location may involve months to years of study and may reach thousands of dollars. This can be a substantial burden for private citizens or public entities seeking a determination of the boundary.

The CSLC has the discretion to waive rent for protective structure leases issued to private parties and public agencies when it is determined that a public benefit accrues therefrom. The original concept of public benefit consideration stems from inland waterways where Reclamation Districts and property owners, along the banks of rivers and streams, sought authority to protect river levees from erosion and prevent flooding of adjacent lands. For at least the last two decades, the CSLC and its staff

CALENDAR PAGE
MINUTE PAGE

have determined that although the protective structures, primarily rock riprap bank protection, did have a direct benefit to the adjoining owner, they also had an indirect benefit of providing protection for public roads, highways and utilities, and to public waterways which serve to transport fresh water to federal and state water projects.

In coastal areas, other arguments provide support for rent-free public benefit leases. Protective structures, particularly in areas open to the public, protect the base of eroding coastal bluffs, and provide safety to the public by reducing the potential of bluff collapse. The CSLC's regulations provide that if rent is charged it is to be based on nine percent of appraised land value. Given the high land values of coastal properties in Southern California, typical annual rents for protective structures could range from $1,000 - $4,000, or more. Some private parties may choose to challenge the CSLC's jurisdiction rather than pay rent for property they believe they own. The costs of such litigation can be extremely high, with both the state and the private property owners bearing the burden.

Various federal, state and local government agencies have authority to regulate and permit protective structures and beach enhancement projects. These agencies can more easily and comprehensively regulate shoreline protection because, unlike the CSLC, their jurisdiction extends well inland of the Ordinary High Water Mark. Along with the CSLC, these agencies are balancing the rights of private property owners with the rights of the public in permitting protective structures, when and where necessary. The approval of such structures is generally conditioned to provide for minimal beach encroachment, protection of the environment, maintenance of public access, and in some areas, mitigation for loss of beach sand supply.

There are very few alternatives available to public entities for solving erosion problems. Public entities can either allow armoring of eroding beaches, fund soft-structure beach enhancement to protect eroding shorelines or, as a last alternative, provide for the normal retreat of the shoreline by purchase or relocation of existing improvements or through zoning restrictions. If private property owners are not allowed to build protective structures to protect their private property, then ultimately and eventually governmental entities may be required to do so to protect the public infrastructure that would be placed at risk if the coastal bluffs are allowed to erode unheeded.

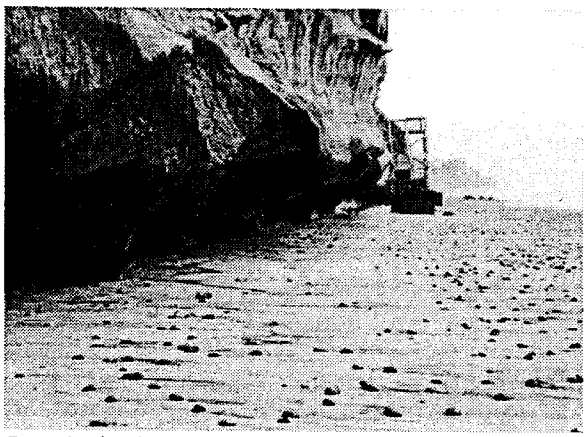
This report will discuss the various types of protective structures, the responsibilities of the federal, state and local governments, the role and current practices of the CSLC, and alternatives for the CSLC to consider in determining whether to continue its current practice.

BACKGROUND

This report has been prepared to address concerns expressed by members of the California State Lands Commission (CSLC) at the Commission meeting held on November 27, 2000. Commissioners asked specific questions regarding the current policies of the Commission with respect to issuance of leases for the construction and maintenance of protective structures, primarily along coastal areas of the state. Specifically the Commissioners expressed concerns regarding whether it was appropriate for the CSLC to continue issuing protective structure leases that did not require the payment of rent. Commissioners expressed additional concern as to whether the placement of hard protective structures negatively impacts beach sand supply, or causes additional erosion thereby reducing beaches available for public use.

Approximately 86% of the coastline of California is under active erosion.[3] The extent and rate of erosion varies depending on the location and the physical characteristics of the coastline. Most experts on coastal processes in California agree that the constant process of erosion and accretion is not necessarily equated with loss of beaches. Under the normal process of erosion and bluff retreat, the beach itself remains relatively stable in size and depth but progresses inland as the bluff or shoreline erodes. Beaches along an eroding coast, if unaltered by human activity, simply migrate landward naturally. Shoreline retreat may vary from a few inches to a few feet a year and sometimes more during severe weather conditions, such as El Niño events.[4] The projected rise in sea level may in the long term also play a major role in shoreline retreat. Partly offsetting the effects of sea level rise is the upward movement of the North American Plate. However, the current offset is unlikely to eliminate the effect of sea level rise in submerging beaches.

CALENDAR PAGE
MINUTE PAGE



Example of undercutting in sandstone bluffs near Stone Steps in Encinitas.

Depending on the location along the California coast, generally it is agreed that 75-95% of all beach sand is or was provided by rivers that empty onto the coastal plains.[5] Human actions, however, have had a major impact on the ability of rivers to deliver sand, thus affecting the shoreline. Activities that have hindered or eliminated natural sediment transport by rivers and streams include reservoir dam building, flood control systems, sand mining, and covering of natural landscape with pavement and structures. Dams reduce the amount of fresh water flows to coastal beaches and wetlands, where reduced flood flows prevent the flushing of sediment from inland sites through estuaries and onto coastal beaches. Dams trap sand that would normally nourish the coastal beaches that would otherwise become the primary natural buffer acting as protection for seacliffs and coastal development from erosion and storm damage.

Approximately 80% of all people in California live within 30 miles of the Pacific Ocean and four million of those live within three miles of the shoreline. Because of this significant population pressure on coastal areas, a great deal of residential, commercial, industrial and public infrastructure development occurs near the shore.

Development along and adjacent to the shore often impacts the natural shoreline processes. Significant development on top of coastal bluffs has contributed to the need for shoreline armoring in order to protect those developments from the effects of erosion. Erosion of coastal bluffs is caused by two primary actions: 1) wave energy impacts that erode the base of the bluff, sometimes causing seacaves and undercutting to develop; and 2) bluff top activities (domestic landscaping) that increase subsurface water percolation into the bluff resulting in loosening of the upper bluff materials and sloughing. The construction of residential and commercial buildings and the paving of roads and surface areas associated with construction has concentrated rainwater and domestic water runoff onto relatively small surface areas resulting in exacerbation of this second cause of bluff collapse.

Although most construction projects may have a negative impact on normal shoreline processes, some have resulted in expanded sand beaches. Restoration of coastal lagoons, such as at Batiquitos Lagoon in San Diego County, have provided significant sandy materials for deposit on and enhancement of existing beaches. Under study are several projects which will result in the removal of historic dams (Rindge and Matilija Dams) on Southern California watersheds (Malibu Creek and Ventura River, respectively) that will return those watersheds to a more natural regime, thereby allowing significant sediment to be transported naturally from inland sources to the beach.

The California Environmental Quality Act (CEQA) plays a role in addressing beach erosion issues. CEQA issue areas that should be analyzed when a proposal involves construction of protective structures and/or beach replenishment projects include, but may not be limited to, impacts on biological resources, noise, land use planning, geology and soils, transportation, aesthetics, recreation and tourism, commercial and recreational fishing, human health and public safety, cultural and paleontological resources, hydrology/water quality, air quality, natural resources, public services, and energy.

ALTERNATIVE METHODS FOR ADDRESSING SHORELINE EROSION

There are three principle methods used in California to address shoreline erosion. They are shoreline protection devices, beach replenishment, and land use planning.

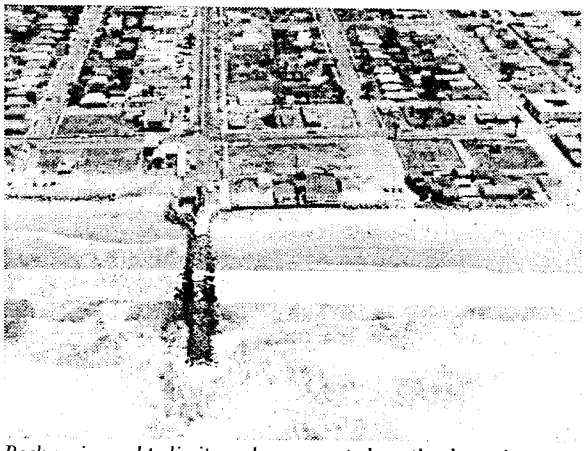
Hard Structures

The most frequently used approach by public agencies and private property owners to shoreline erosion along California's coast has been the placement of protective structures, primarily seawalls or rock revetments. These structures are used to help slow down bluff erosion and prevent future

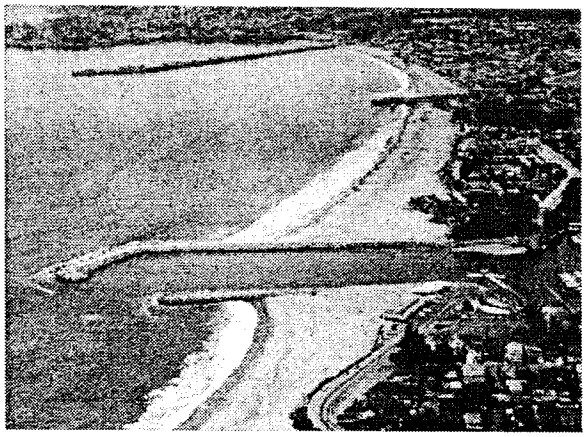
CALENDAR PAGE
MINUTE PAGE

failure of shoreline cliffs and bluffs, ultimately protecting existing structures, beaches, upland and bluff top homes, and public utility infrastructure. However, such structures may also have negative impacts on the shoreline environment. They may compound erosion by reducing beach width; steepening offshore gradients; decreasing/disrupting sand supply in areas where seacliff or bluff erosion is a major source of beach sand; disrupting littoral drift; redirecting or impeding ground water and surface water runoff; increasing the scouring action of waves; accelerating erosion on adjacent unprotected properties; and, modifying shoreline erosion patterns and rates.

Approximately 12% of California's coastline has some form of armoring.[6] Armoring the coastline (i.e. construction of seawalls, revetments, bulkheads, etc.) can be a factor in eliminating sources of beach sand contributed through bluff erosion. However, bluff erosion is a less significant source of sand when compared to the loss of sand from dammed rivers and streams, particularly in Southern California. Rates of bluff erosion vary greatly from location to location; primarily because of the difference in the material makeup of the bluffs themselves. For example, the granite bluffs found on some areas of the Monterey Peninsula erode at a negligible rate compared to the up to eight feet of erosion that can occur annually in areas of unconsolidated sand dunes such as those found at Pajaro Dunes in Santa Cruz County. Typically the average rate of retreat in sedimentary rocks or sandstone (which is the primary composition of coastal bluffs in Southern California) ranges from a few inches to perhaps a foot in a year. As these bluffs erode, the sand that is created normally accounts for less than 20% of the sand found on any particular beach.

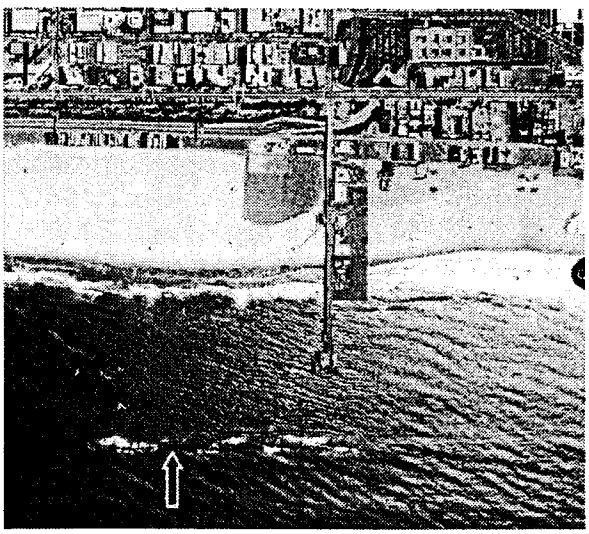


Rock groin used to limit sand movement along the shore. An effective shore protection device if sand fill is made on the up coast side. Source: Shore Protection in California.



Example of rock jetties protecting a harbor entrance. Source: Shore Protection in California.

There are various types of hard structures that are typically built along California's coastline. The type of structure built depends on the location and its intended purpose (i.e. bank protection, bluff protection, beach building). Generally these structures include groins, breakwaters, rock revetments, seawalls, and seacave fills. Groins (jetties at harbor entrances) are constructed perpendicular to the shoreline to interrupt the migration of sand along a beach. Because of the effects of littoral drift, they typically trap sand on one side and starve the beach on the opposite side. They are normally constructed of rock, reinforced concrete, steel sheet piling, wood planking or a combination thereof. If properly engineered and backfilled with sand, groins can be very effective in limiting the impact of wave erosion on a shoreline. Examples of the success of this type of structure are the beaches in Santa Monica that are roughly 400-600 feet in width today. They were created by the construction of a series of groins perpendicular to the shore and backfilled with sand materials excavated during the construction of the Hyperion

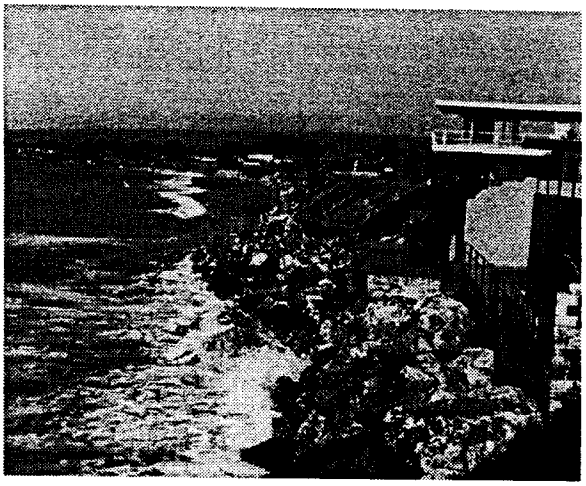


Offshore breakwater at the Santa Monica Pier. Note buildup of sand behind breakwater.

CALENDAR PAGE
MINUTE PAGE

Wastewater Treatment Plant near the Los Angeles International Airport.

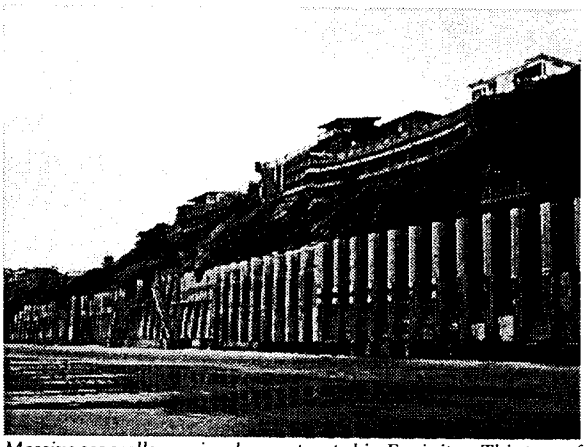
Breakwaters are generally installed offshore to provide harbor protection. Breakwaters may have the additional effect of preventing the shoreline from eroding and may result in sand buildup. An example of this is the offshore breakwater constructed in front of the Santa Monica Pier. After construction of this offshore breakwater, the beaches around the foot of the Santa Monica Pier accreted substantially. Generally these types of onshore accretions do not cause any significant loss of sand to downcoast locations once they have stabilized and reached equilibrium.



Example of rock revetment used as shore protection device.
Source: Shore Protection in California.

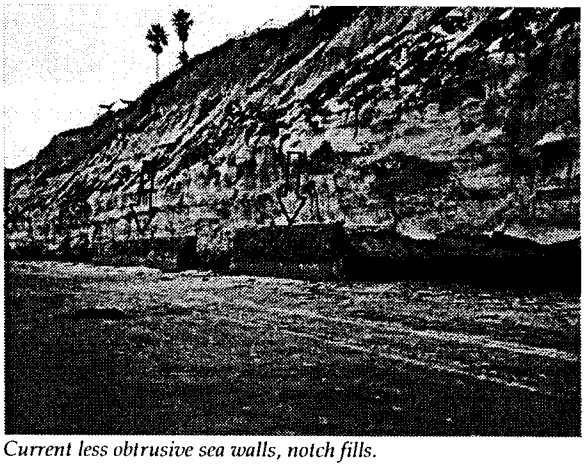
Rock revetments (the onshore version of an offshore breakwater) will generally be constructed at a 2:1-1/2 to 2:1 slope and therefore can extend for some distance out onto the beach.

Seawalls are normally parallel to the shoreline and generally occupy less sandy beach area than other types of structures. Seawalls are usually constructed of reinforced concrete, steel sheet piling or wood planking. Wood planking is the least desirable material in that it has a much greater failure rate than seawalls constructed of either steel sheet piling or reinforced concrete.



Massive sea walls previously constructed in Encinitas. This type of sea wall is no longer typical.

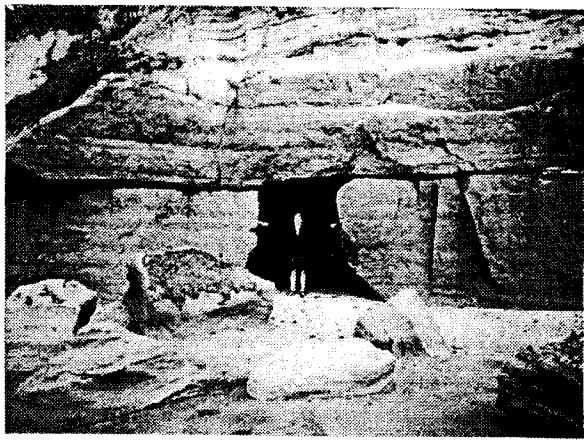
Seacave fills, or bluff notch fills, are located completely within and behind the bluff face and, according to the California Coastal Commission, have less impact on beaches. In northern San Diego County, seacaves or notches form as a result of waves and wave thrown cobble impacting the Torrey Sandstone bluffs. This rapid erosion causes an undercutting on the face of the bluff and can ultimately lead to a catastrophic collapse of the bluff face, undermining public and private structures located on the bluff top. These bluff top structures can be either private residential development, commercial developments or public infrastructure such as roads, water lines, waste water lines, power lines, etc. Because of the nature and location of these structures, most have relatively high monetary value. Loss of private structures impacts state and local government in that it removes high value properties from the tax base and often involves the Federal Emergency Management Agency (FEMA) program.



Current less obtrusive sea walls, notch fills.

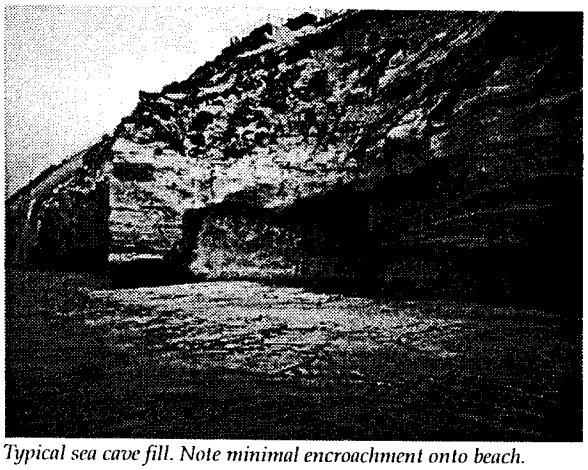
Recent seacave fills use a "leaner" cement mix intended to allow the fill to erode at the same rate as the adjacent bluffs. Thus, the fill of seacaves does not result in a loss of beach area otherwise available for public recreational use, and the back of the beach is not permanently fixed in place. The seacave fill will not prevent the erosion of unprotected bluff face material onto the beach since it will not cover any portion of the bluff as a seawall or upper bluff work would. The upper portion of bluffs may continue to erode from natural causes of wind, rain, and surface run off.[7]

CALENDAR PAGE
MINUTE PAGE



Sea cave, note rocks in foreground from past bluff failure.

Protective structures built at the toe of bluffs can impact the beach depending on the existing volume of sand located on that beach. If the beach, as an example, is similar to those found in northern San Diego County, where the underlying structure of the beach is a hard shelf (rock cobble) with a very thin coating of sand, then the construction of a protective structure against the bluff will have a minimal impact on the beach profile because of an already severely limited sand supply. Most of the northern San Diego County beaches are shallow in sand depth, not because of the hard structures that have been constructed to protect the coastal bluffs from erosion, but because of sand starvation caused by the elimination of sand from inland sources and local geology. Under natural conditions bluff face erosion may provide approximately 20% of sand supply to an adjoining beach. The amount of sand that is lost due to the protection of the toe of a bluff by a seawall notch fill project is often minimal because it allows the upper portion of the bluff face to provide a sand supply through continued upper bluff erosion.



Typical sea cave fill. Note minimal encroachment onto beach.

Notch fill. Note colored material used to blend with natural bluff face.

Any structure placed on a beach will interact to some degree with the natural physical processes operating in the dynamic shore environment. Based on information contained in, *California's Coastal Hazards: A Critical Assessment of Existing Land Use Policies and Practices*, (Griggs, et al.), hard structures have three potential impacts relating to physical processes:

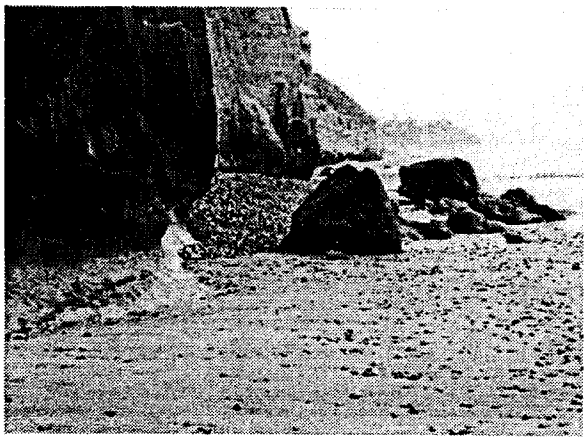
1. Impoundment or placement loss. When a structure is built seaward of the base of a bluff, cliff, or dune, a given amount of beach is going to be covered, resulting in immediate beach loss. Depending on the type of structure this may be a relatively small area (i.e. a foot or two for a vertical seawall).

2. Passive erosion. Whenever a hard structure is built along an eroding shoreline, whether the erosion represents net retreat due to the erodibility of the bluff or cliff or from sea level rise, and erosion continues to occur, the shoreline will eventually migrate landward beyond the structure, resulting in the gradual loss of the beach in front of the seawall or revetment as the water deepens and the shoreface profile migrates landward. The property, structure, utility or facility is temporarily protected, but the beach is lost.

3. Active erosion. The ability or potential for a seawall or revetment to induce or accelerate erosion...

Protective structures may also have the potential to interfere with [illegible] of the beach and may impede both horizontal and vertical access. Projection of such structures can serve as barriers

CALENDAR PAGE
MINUTE PAGE



Sand and cobble beach. Note beginnings of notch and large sandstone blocks from previous bluff failure.

to horizontal access, isolating actual stretches of beach during modest tides. These structures may also alter the scenic/visual character of the contrasting natural beach, coastal cliffs and bluffs, which may ultimately affect the site as a desirable recreational and tourist attraction area.

The major issues related to protective structures include negative environmental effects, such as modifications of landforms and drainage patterns, increased bluff and beach erosion, interference with sand supply and littoral drift, loss of public beach, constraints on public access and potential impacts on flora and fauna as a result of unnatural encroachment of facilities and/or sand onto the existing beach environment. An additional issue related to placement of protective structures includes funding and equity considerations and the use of public monies for protection of private property.

There are many miles of coastal protection devices located on lands along the California shoreline. In the past, many of these structures were not designed to eliminate or mitigate adverse impacts on local shoreline sand supply or to be as visually unobtrusive as feasible. Many have been built in such a fashion that they do not fully protect existing structures, public access, or the shoreline environment. Today, such structures would need to meet specific engineering standards and mitigate for adverse impacts, if necessary. Generally, contemporary protective structures are only allowed where it can be shown that they are necessary protection to existing improvements.

Upper bluff failure in Encinitas. Note sea wall at lower right.

Contrary to the popular belief that hard structures tend to cause loss of beach sands, one recent long term study conducted on beaches within Monterey Bay seems to indicate that this is not the case.[8] During the period of this study there was no significant loss of beach profile between beaches with and without hard protective structures. The beaches tended to expand and contract at similar rates from season to season. However, this study has not removed the controversy over the impact that hard structures have on beaches. Some continue to believe that hard structures contribute to loss of sand from beaches, but this study is providing evidence that at least in some locations this may not necessarily be the case.

Beach Replenishment

Another strategy used to address shoreline erosion includes beach building/sand replenishment. This strategy involves placing large amounts of sand on eroded beaches. Sand replenishment projects may help to offset the gradual thinning and disappearance of a region's beaches. They may also limit the loss of environmental, recreational, economic, and aesthetic benefits, and reduce the increasing destruction of coastal property and development. However, beach replenishment projects may also negatively impact sensitive marine and/or biological resources if, under certain circumstances, beach material is deposited on those resources. Increased turbidity resulting from sand replenishment activities has the potential to impact plankton, fish, marine mammals, birds, vegetated reefs, and benthic invertebrates. This process may also impact shorebird foraging or nesting areas. Many of these potential impacts, however, are mitigable with modifications to project design, mitigation measures, monitoring efforts and a variety of other appropriate measures.

Beach replenishment is very expensive and in order to be effective, physically and economically, it must be done over large sections of the shore on an ongoing basis. It is because of this that

CALENDAR PAGE
MINUTE PAGE

beach replenishment projects are generally undertaken only by local, state and federal governments.

Studies are currently underway in San Diego County that will address the potential impact of offshore movement of sand used to enhance existing beaches. Recent studies on the benefits of beach enhancement have indicated that they should be combined with hard structures in the form of sand retention groins. Groin fields should be constructed so as to create what may amount to a series of pocket beaches. Continued maintenance of these pocket areas would be required in order to preclude the normal loss of sand between the groins, which will naturally occur over the long term. These artificially constructed pocket beaches will act like natural pocket beaches, protecting the backshore from all but the most severe winter storm wave actions. Such a system can limit the continued erosion and retreat of either existing bluffs or, in the case of dune areas, the foredunes.

Land Use Planning

An additional approach to beach erosion issues includes the development of ... regulations regarding the use of the shoreline and its development such as building setbacks on bluff tops, changes to local zoning that restricts certain private development, and control of surface water drainage.

It appears that there are very few alternatives available to public entities for solving erosion problems. Public entities can either allow armoring of eroding bluffs and shorelines, fund soft-structure beach enhancement to protect eroding shorelines or, provide for the normal retreat of the shoreline. This last alternative would require some significant changes in the policies of both local and state governments: 1) restrict development in eroding coastal areas, 2) where existing improvements are located in eroding areas, require relocation of facilities, both public and private, to allow for the natural retreat of the coastline.

OTHER FEDERAL, STATE AND LOCAL GOVERNMENTS

The following is a discussion of the primary federal, state and local government agencies that have authority to regulate and permit protective structures and beach enhancement projects. For purposes of this report, the local government discussion is primarily focused on San Diego County.

U.S. Army Corps of Engineers

Section 10 of the Rivers and Harbors Act authorizes the Corps to regulate all activities that affect the course, capacity, or coordination of navigable waters of the United States.

Congress has authorized federal participation in shore protection projects to prevent or reduce damage caused by wind and tide generated waves along the nation's coasts and shores. One requirement for federal participation is that benefits must exceed costs. The Corps can participate in shore protection plans that result in recreation benefits only if those benefits are incidental to storm damage reduction features and not the primary goal. Since the passage of the Water Resources Development Act of 1986, feasibility studies must be cost-shared evenly between the federal government and the local sponsor.[9]

One such effort proposed for northern San Diego County is a $3 million, three-year study of shoreline erosion in Encinitas and Solana Beach. The study will examine several options to fight erosion, such as supplying beaches with sand dredged from the mouth of San Elijo Lagoon to keep the inlet open to the ocean, or building breakwaters to keep beach sand from washing away. Other possibilities include buying bluff top properties and allowing a natural retreat of the bluffs, or increase bluff stability by using seawalls.[10]

The Corps has been very reluctant to deny permits for protective structures where there is a continuing possibility for damage or loss of improved upland properties.

CALIFORNIA STATE RESOURCES AGENCY

A committee of representatives from various Resources Agency departments and the CSLC is in the process of revising the State Policy on Shoreline Erosion Protection. The current policy has been in place since 1978, and major changes have occurred along the coast of California, not the least of which

CALENDAR PAGE
MINUTE PAGE

has been the dramatic increase in population. The committee is arranging public workshops that will be conducted at various locations along the coast in the near future to seek public input to the process of preparing a revised policy. The title of the proposed new revised policy is "Policy on Coastal Erosion Planning and Response".

California Coastal Commission

The California Coastal Act permits the construction of protective structures when required to protect existing development for improved areas that are in imminent danger. Section 30235 of the Coastal Act states, in part:

> "Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted 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 shoreline sand supply ... "(emphasis added)
>
> Section 30253 of the Coastal Act states, in part:
> "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 bluffs and cliffs. ..."

In approving new development in coastal areas, the California Coastal Commission (CCC) has included permit conditions that prohibit protective structures for new development, thus requiring applicants to design their development so that there should be no future necessity for a protective structure. On bluff top development this may include sufficient setback from eroding bluff tops. However, the CCC has been under recent pressure to allow protective structures for any improved property, regardless of whether or not there is a restriction in the original coastal development permit that prohibits such structures. The CCC may be facing litigation from private property owners seeking to protect their property challenging the CCC's right to prohibit protective structures.

To address the impacts of protective structures on shoreline processes in San Diego County, the CCC has developed an in-lieu fee program to provide mitigation for the quantifiable effects of seawalls on the shoreline. The methodology estimates the total quantity of sand necessary to replace: a) the reduction in the beach quality material contributed from the seacliff over the life of the armoring; b) the reduction in beach width which will occur when the landward migration of the beach profile is stopped, over the life of the structure; and c) the reduction in beach area which will occur from the seaward encroachment of the seawall. The methodology uses site specific information provided by the seawall applicant as well as estimates, derived from region-specific criteria, of both the loss of beach material and beach area which could occur over the life of the structure, and of the cost to purchase an equivalent amount of beach quality material and to deliver this material to the beaches in the project vicinity. Once the effects are quantified and the costs totaled, an in lieu fee is paid for beach sand replenishment projects as mitigation for impacts of the development on beach sand supply.

The applicant deposits the fee in an interest bearing account designated by the CCC's Executive Director. The CCC is named as trustee of the account, with all interest earned payable to the account to be used for establishment of a beach sand replenishment fund to aid the San Diego Association of Governments (SANDAG), or a CCC approved alternate entity, in the restoration of the beaches in San Diego County.

In the case of seacave fills, the CCC has not applied the in-lieu mitigation fee. Because the fills are intended to be located completely within the bluff, the accelerated erosion, increased wave reflection and "edge effects" to adjacent properties associated with seawalls should not occur. The

CALENDAR PAGE
MINUTE PAGE

CCC requires the applicant to monitor the performance of the seacave fill. The report(s) are to contain recommendations for necessary maintenance, repair, changes or modifications. If the seacave fills are found to extend seaward of the face of the natural bluff by more than six inches in any one location, the report is to include alternatives and recommendations to remove or otherwise remedy this condition such that no seaward extension of the plug will remain.[11]

California Department of Boating and Waterways - Beach Erosion Control

Objectives of the program are to preserve and protect the California shoreline, minimize economic losses caused by beach erosion and maintain urgently needed recreational beach areas. In 1998, California's beaches generated $14 billion of direct revenue (lodging, food, gas, parking, etc.). Sections 65 through 67.3 of the Harbors and Navigation Code authorize the Department to study erosion problems; act as shore protection advisor to agencies of government; and plan, design and construct protective works when funds are provided by the Legislature. The Rivers and Harbors Act of 1962, as amended, allows the Department to participate in beach erosion control projects undertaken by the U.S. Army Corps of Engineers.[12]

In the last two years, the California Department of Boating and Waterways has received funding from the California Legislature to implement sand replenishment projects on a statewide basis (Ch. 798, Statutes of 1999). Ten million dollars was allocated for fiscal year 2001-2002 for grants to local governments for beach enhancement projects. Ongoing efforts stressing the importance of maintaining California's beaches will be necessary in order to continue the funding in years to come.

LOCAL GOVERNMENT

Hard structures and beach replenishment have generally been the popular methods used by local governments to assure protection of existing public and private facilities. Very little effort, at the local level has been shown in restricting development in coastal areas. The development of policies and regulations regarding the use of the shoreline and its development such as building setbacks on bluff tops are typically addressed in Local Coastal Programs mandated by the Coastal Act. However, only a limited number of jurisdictions require mitigation for building within or on an eroding coastline in the form of sand mitigation fees.

In San Diego County, several cities have existing ordinances or are proposing amendments to their General Plans/Local Coastal Programs to address the issues of shoreline and bluff protection. Through enactment of these various ordinances/general plan amendments, these cities are attempting to balance the rights of private property owners with the rights of the public. The approval of protective structures is generally conditioned to provide for minimal beach encroachment, protection of the environment and maintenance of public access. A summary of how some cities have addressed coastal protection within their jurisdiction is contained in Appendix A.

INTERAGENCY AND SCIENTIFIC ORGANIZATIONS

There are a number of associations, committees and groups that are currently studying coastal erosion issues and potential solutions.

California Shore and Beach Preservation Association

The California Shore and Beach Preservation Association (CSBPA) is the state chapter of the American Shore and Beach Preservation Association (ASBPA). The CSPBA is an educational and professional association with members from government, academics, coastal engineering and other professions, as well as property owners and individuals and groups interested in the protection, proper utilization, economic development and preservation of the coast of California. They act as a forum for presenting various scientific studies and reports dealing with coastal issues and coastal processes. CSLC staff has attended numerous conferences of this organization.

CALENDAR PAGE
MINUTE PAGE

Coastal Sediment Management Work Group

The Resources Agency's Coastal Sediment Management Work Group was established by the U. S. Army Corps of Engineers and the California Resources Agency to facilitate regional approaches to protecting, enhancing and restoring California's coastal beaches and watersheds through federal, state and local cooperative efforts.[13] At the present time, it is composed of representatives from the Corps, Resources Agency, Department of Boating and Waterways, the California Coastal Commission, the California Department of Parks and Recreation, the CSLC, and the State Coastal Conservancy. The California Coastal Coalition, a non-profit organization comprised of cities, counties and regional government agencies along the coast provides the group with local perspective.

Los Angeles County Beach Replenishment Task Force

The Los Angeles County Beach Replenishment Task Force was created by the Board of Supervisors on July 21, 1998. The Task Force is composed of representatives of elected officials, various federal, state and local governments, and public interest groups. Its focus is, in part, to inventory the condition of county beaches; identify funding sources to accomplish beach restoration; formulate a long-term maintenance plan with assigned jurisdictional responsibilities.[14] The CSLC is a member agency of the task force.

San Diego Association of Governments

The San Diego Association of Governments (SANDAG) is composed of various local government agencies to assure overall area-wide planning and coordination for the San Diego region. By Resolution dated July 23, 1993, the SANDAG adopted the Shoreline Preservation Strategy for the San Diego region.

The Strategy has four main objectives:

1. Manage the region's shoreline to provide environmental quality, recreation and property protection.
2. Develop and carry out a cost-effective combination of shoreline management tactics that will have a positive impact on the region's economy.
3. Develop a program to pay for the shoreline management strategy that equitably allocates costs throughout the region, and among local, state and federal sources.
4. Obtain commitments to implement and finance the Shoreline Management Strategy.

The Strategy recommends a beach building and maintenance program for each of the region's shoreline problem areas. These programs emphasize the nourishment of narrow beaches with sand to make them wide enough to provide property protection and recreational capacity. The design of each beach building and maintenance program should consider a full range of shoreline management tactics that can support beach widening and make it more cost effective, including shoreline stabilization, shoreline protection, and shoreline development regulation.[15]

In furtherance of this strategy, SANDAG is in the final stages of acquiring permits for a county-wide beach replenishment project involving the placement of approximately two million cubic yards of sand at eight receiver sites. The CSLC has jurisdiction over both the offshore borrow sites and the receiver sites and, at its meeting of November 27, 2000, authorized the issuance of a Public Agency Lease for this beach replenishment project. This project is the first comprehensive, region-wide beach replenishment effort on the West Coast.[16] CSLC staff serves on the Technical Advisory Panel of SANDAG's Shoreline Preservation Committee.

Beach Erosion Authority for Clean Oceans and Nourishment

The Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) is a joint powers agency composed of the counties of Santa Barbara and Ventura and the cities of Port Hueneme, Oxnard, San Buenaventura, Carpinteria and Santa Barbara, established to address coastal erosion and beach issues on the Central Coast. CSLC staff monitors and occasionally attends BEACON meetings.

CALENDAR PAGE
MINUTE PAGE

ROLE OF THE CALIFORNIA STATE LANDS COMMISSION

Public Resources Code section 6301 gives the CSLC jurisdiction over all ungranted tidelands and submerged lands. Public Resources Code section 6321 states in part that "The commission, may upon written application of the littoral owner, grant authority to any such owner to construct, alter or maintain, groins, jetties, sea walls, breakwaters, and bulkheads, or any one or more such structures ... if, at the time of construction ... such structures do not unreasonably interfere with the uses and purposes reserved to the people of the State. ..."

Public Resources Code section 6321.2 states that "In addition to the fees provided in section 6321, the commission may fix and collect reasonable charges or rentals for the use of lands upon which any of the structures authorized under 6321 are situated." The CSLC's regulations as contained in California Code of Regulations, Title 2, Article 2, Section 2003 Rental (4) General Permits provides for rent to be based upon nine percent of appraised value. Section 2003 (4) (B) provides that the CSLC may waive rent for protective structures if it determines that a public benefit accrues from [illegible] such structures.

In addition to the sovereign lands directly managed by the CSLC, the Commission has a general oversight responsibility for tide and submerged lands legislatively granted in trust to local jurisdictions. Most of the urban waterfront areas in California are granted to local jurisdictions. These grantees assume the day-to-day management and permitting responsibilities to ensure that the uses of sovereign lands are consistent with the Public Trust and the legislative statutes under which these lands are held.

Commission data base records indicate that the CSLC has issued approximately 321 leases/permits for protective structures statewide. Eighty-eight of the leases/permits are for structures along the coast, the majority of which are located in southern California. The remainder are located on inland waterways or within bays (such as San Francisco). The 321 leases/permits by type of structure are as follows:

Seawalls - 69
Bank Protection (Riprap) - 206
Breakwaters - 15
Beach Enhancement Project - 31

The 88 leases/permits issued for coastal areas by type of structure are as follows:

Seawalls - 48
Bank Protection (Riprap) - 22
Breakwaters - 6 (primarily to public agencies)
Beach Enhancement Projects -12

It should be noted that these numbers were taken from the existing Lease Data Base and do not necessarily reflect the exact numbers of leases/permits that have or may have been issued by the CSLC or its predecessor offices of the Surveyor General and Division of State Lands.

Boundary Consideration

Along most of California's coastline there is uncertainty as to the exact location of the boundary that separates upland ownership from the Public Trust lands of the state. Only 1±% of the state's sovereign land boundary have been permanently fixed by adjudication or agreement. The shoreward boundary of the state's ownership of the Pacific Ocean and adjacent bays and estuaries, as well as other tidal waterways within the state, is the Ordinary High Water Mark, adopted by statute in 1872 (Civil Code sections 670 and 830). The federal and state courts have interpreted this boundary to be the intersection of the elevation of mean high tide and the shore (approximately two feet ± above sea level). Because sandy and even cobble beaches are subject to erosion and accretion the location of this intersection (i.e. the boundary) is in a constant state of flux. Some sandy beaches in California have been known to erode away and accrete back nearly 100 feet on an annual basis.

CALENDAR PAGE
MINUTE PAGE

The law of moving boundaries along waterways often leads to conflict and confusion relating to ownership and jurisdiction issues. This is particularly true when people are unaware of either the physical dynamics of the shoreline or the law that seeks to reflect that dynamic. What one day is public land, the next may be private and vice versa. The dynamics may also create difficulty in determining the need for a lease from the CSLC. The costs associated with determining the boundary between uplands and sovereign lands at any given location may reach thousands of dollars. In addition, the length of time to make such a determination could range from several months to years. This can be a substantial burden for private citizens or public entities, including the CSLC, seeking a determination of that boundary. There is even an exception to the mean high tide line and moving boundary line rule, where man made or caused changes interrupt the natural movement of the line. If the intersection of the mean high tide line moves seaward due to such artificial activities (fill or accretion caused by a groin are examples) the legal boundary remains at the location of the mean high tide line prior to those activities. Therefore the public does not lose title to its property caused by such artificial influences. This is particularly important because protective structures are designed to prevent erosion landward of their placement but sometimes cause erosion of beaches seaward of the toe of the structure. This result is often the basis for opposition to such structures by public access advocates.

In certain instances, CSLC staff has reviewed projects where the location of the boundary is uncertain and the project is allowed to proceed forward without permit from the CSLC. Such projects are allowed to proceed with the caveat that if the boundary is established and shows the improvements to be located on sovereign lands, the private party will enter into a lease with the CSLC or remove the structure occupying state lands. Where a proposed project has the potential for a significant negative impact on the public's property rights, it is important that CSLC staff resources be directed to analyze the boundary issue.

Public Benefit

The current application of public benefit consideration to justify rent-free protective structure leases stems from inland waterways where the Corps of Engineers, Reclamation Districts or property owners along the banks of rivers and streams, sought authority to protect river levees from erosion and prevent flooding of adjacent lands. For at least the last two decades, the CSLC and its staff have determined that although the protective structures, normally rock riprap bank protection, did have a direct benefit to the adjoining property owner, they also had an indirect benefit of providing protection for public roads, highways and utilities, and to the public waterways which serve to transport freshwater to federal and state water projects. An additional benefit was the reduction of the depositing of materials into navigable channels that ultimately needed to be removed at public expense. There were active programs administered by the Corps of Engineers to dredge waterways to provide navigable channels for commercial and public navigation. The cost of conducting these dredging activities was borne by the public in general, through federal taxes that paid for federal navigation projects. Therefore, staff was able to show a direct connection between the placement of the riprap and the public benefit derived, i.e. lowering the needed and costly process of dredging navigable channels and, in addition to that, providing additional protection to public infrastructure in the form of flood control levees without additional public cost.

In coastal areas other arguments provide support for rent-free public benefit leases. Protective structures, particularly in areas open to the public, protect the base of eroding coastal bluffs, and provide a measure of safety to the public by reducing the potential of bluff collapse. Last year, a bluff failure in northern San Diego County resulted in the death of a beach-goer. Such catastrophic failures can occur without warning and present a hazard to the beach going public. This type of hazard can be partially limited through the construction of protective structures along the base of bluffs that are subject to undercutting.

The CSLC has also taken the position that a public benefit was derived in protecting critical and high value public infrastructure located in close proximity to the edge of coastal bluffs such as major public roads, sidewalks, water, sewer, power and gas facilities. Some of the lower coastal bluffs areas in Malibu and along north coast San Diego and Orange counties have major roads either along the

CALENDAR PAGE
MINUTE PAGE

beach or in close proximity to eroding bluffs which require protection. In the city of Pacifica in San Mateo County, several oceanfront homes and public infrastructure were threatened and/or destroyed during the El Niño storms of 1998. The Federal Emergency Management Agency (FEMA) and the State Office of Emergency Services approved a $1.5 million grant to the city to construct a protective structure at the base of the bluffs, with the understanding that the bluff top homeowners would agree to maintain the protective structure. The city applied to FEMA for a grant to purchase ten upland properties from the homeowners through FEMA's Hazard Mitigation Grant Program. That grant money, along with additional grant money received from HUD, enabled the city to offer the homeowners 90% of the fair market value of their homes. The city is in the final stages of closing escrow on the ten properties. The lots will permanently be dedicated as open space.[17]

If private property owners are not allowed to build protective structures to protect their private property, then ultimately and eventually governmental entities may be required to do so to protect the public infrastructure that would be placed at risk if the coastal bluffs are allowed to erode unheeded. As an example, portions of Pacific Coast Highway in Malibu that are adjacent to the Pacific Ocean and are not sheltered by existing residential developments, must continually be protected by Cal Trans at public expense.

Rent Consideration

As stated earlier, a consideration as to when and whether the CSLC should charge rent at a particular location is the frequent uncertainty and difficulty in locating the boundary that separates public and private property (i.e. the CSLC's jurisdiction for leasing). Where there is evidence that a protective structure will occupy lands under the CSLC's jurisdiction, staff has recommended that a protective structure lease be issued. In many cases the reason that the private party enters into a lease with the CSLC for such structures is to expedite the protection of their private property. These leases are generally non-prejudicial with respect to the actual location of the boundary. Given the high land values of coastal properties in Southern California and the CSLC's existing regulations, typical annual rents could range from $1,000 - $4,000, or more. Some private parties may choose to challenge the CSLC's jurisdiction rather than pay rent for property they believe they own. The costs of litigation can be extremely high, with both the state and the private property owners bearing the burden. Some private parties may choose to litigate at any cost. Several years ago the CSLC was sued in a quiet title action over the boundary between uplands and sovereign lands near Las Tunas in Malibu and the property owner was ordered by the Court to remove the portion of his existing house from state owned lands. The CSLC's most recent legal dispute involving a boundary is the ongoing Lechuza case that has been in the courts for over five years, including two trips to the Court of Appeal. Because of the difficulties of proving ownership and the cost of defending ownership claims, staff has continued its practice of providing protective structure leases to private parties without requiring annual rent.

Beach replenishment projects have an obvious two-fold benefit for the public in that they provide significant protection from the effects of coastal erosion on inland properties, as well as enhancing sand-starved beach areas. Enhanced beaches benefit the state tourist industry and are of significant importance to the overall economic health of California. Therefore, waiver of monetary consideration by the CSLC for this type of project is warranted.

If rent is to be assessed for use of sovereign lands, the CSLC's regulations establish the methods by which rent is calculated. As previously stated the CSLC's regulations provide that rent is to be based on nine percent of appraised value, but the CSLC has the discretion to waive rent for protective structure leases issued to private parties and public agencies when it is determined that a public benefit accrues from the installation of such structures.[18] It has been the practice of the CSLC over the last 15± years to waive rent for protective structures based on such public benefit.

For purposes of this report, CSLC staff conducted a limited review of the land values in the north coast San Diego area and the Malibu area of Los Angeles County to establish a basis for setting rents for protective structures. Land values in the coastal area of northern San Diego County for typical oceanfront residential lots (50 feet wide) range between $110 - $150 per square foot. In the Malibu area of Los Angeles, land values for typical oceanfront residential lots (40 feet wide) range from $250 to $300

CALENDAR PAGE
MINUTE PAGE

per square foot. Based on the CSLC's regulations that require rent to be based on nine percent of the appraised value for the use of state sovereign lands, the rent could range between $10 to $13.50 per square foot in San Diego County, and from $22.50 to $27.00 per square foot in Malibu. Assuming that a seawall might extend four feet out onto state sovereign land, typical average annual rents could range from $2,000 to $4,000, or more, depending on location. As these rent amounts indicate, the cost to an upland property owner for a protective structure adjoining their property that extends out onto state sovereign lands could be more than nominal.

Mitigation

When CSLC staff is reviewing proposed protective structure projects that have the potential to encroach on or impact sovereign lands, it is necessary to determine if the location of the boundary between public and private property has been established. In 1993, the staffs of the CSLC and the CCC implemented a process that requires applicants for coastal development permits to obtain a written jurisdictional determination from the CSLC as a component of an application to the CCC. This coordination has enabled both agencies to closely examine potential impacts of proposed development projects on a case by case basis. If the location of the boundary has been established, then the CSLC may impose mitigation requirements as conditions of a protective structure lease. However, generally the CSLC relies on the regulatory authority of the CCC to impose mitigation in the form of public access dedications and, in some instances, monetary compensation to be used to fund beach replenishment projects. Because of the cost and length of time to determine the state's boundary at any given location, this coordination with the CCC, other regulatory agencies, and local governments is the primary method of ensuring that potential impacts to sovereign lands are adequately mitigated.

CONCLUSIONS

The causes of loss of shoreline to public use are many; one of the primary ones being shoreline erosion. Hard, shoreline protective devices can create additional impacts by physically occupying a beach and by altering shoreline processes. Beach replenishment projects have the advantage of improving the size of the beach but are expensive and must be repeated periodically to maintain the desired beach width. Beach replenishment is not a practical remedy for individual property owners because it must occur on a large scale. Other potential solutions to erosion include requiring that sand now trapped behind dams to be transported to the shoreline and adopting development siting regulations to maintain a safe setback from the ocean.

The CSLC is involved with erosion and shoreline protection because it is responsible for managing public lands below the mean high tide line for the benefit of the public. Proponents of shoreline protective devices on ungranted state tidelands must obtain a lease from the CSLC. It is obligated by the public trust doctrine and other law to review these projects for their impact on the environment, recreation and other public uses of the land.

The CSLC's jurisdiction over shoreline protection is limited for several reasons. First, many shoreline protective devices are not on property subject to its review because they are located above the mean high tide line. Further, this line changes continually and is very difficult to identify. Charging rent and mandating mitigation is legally problematic when public ownership of the site of the shoreline protective device is uncertain. California law also favors rent-free leases of state lands for shoreline protection where there is some public benefit. The CSLC does not have jurisdiction over those tidelands granted to local governments. Finally, the CSLC has difficulty addressing the primary cause of shoreline erosion - loss of sand to dams – because these facilities are generally constructed in river locations beyond the extent of the CSLC's jurisdiction. As a result of these limitations, the CSLC alone cannot comprehensively address the issues of shoreline erosion and the effects of shoreline protection.

CALENDAR PAGE 578
MINUTE PAGE 2336

Because the causes and solutions are complex, many local, state and federal agencies are working on problems associated with shoreline erosion. Some of these are conducting research, others fund and carry out large-scale projects and others regulate development and shoreline protective devices. The agency with the most comprehensive regulatory authority over shoreline protection along the coast is the CCC. Unlike the CSLC, it has the authority to uniformly regulate projects on either side of the mean high tide line and on ungranted tidelands. It has used this authority to establish meaningful mitigation and design review requirements for shoreline protection projects.

The CSLC actively utilizes the authority it has to address shoreline erosion. It reviews every application for shoreline protection submitted to the CCC. It advises the CCC when projects appear to be on public land and establishes setback lines which often are used, where feasible, to keep projects off public property. The CSLC provides its engineering expertise to the CCC and other agencies for the review of these projects. Staff of the CSLC actively participates in several interagency working groups. The CSLC also accepts the public access easements often required by the CCC as mitigation for approval of shoreline protective devices.

The impact of shoreline erosion and shoreline protective devices on the public's tide and submerged lands is of utmost concern to the CSLC. To better protect the public's tidelands, it will continue to appropriately utilize its authority to review shoreline protection projects and to work with other public agencies on research, planning and regulation.

CALENDAR PAGE
MINUTE PAGE

APPENDIX A

City of Carlsbad

The City of Carlsbad has established a Beach Erosion Committee comprised of seven citizens appointed by the Mayor with concurrence of the City Council. The committee investigates and reports on topics or studies related to beach and bluff erosion (including lagoons and jetties) as directed by the City Manager and City Council.

The City's Municipal Code includes a Coastal Shoreline Development Overlay Zone intended to provide land use regulations along the coastline area including the beaches, bluffs, and the land area immediately landward thereof. The purpose of the overlay zone is to provide for control over development and land use along the coastline so that the public's interest in maintaining the shoreline as a unique recreational and scenic resource, promoting public safety and access, and in avoiding the adverse geologic and economic effect of bluff erosion, is adequately protected."[19] The Overlay Zone provides for the construction of protective structures when necessary to protect coastal dependent uses, existing structures or public beaches in danger of erosion, and when designed to mitigate for the impacts on public access and sand supply (i.e. beach replenishment).

City of Encinitas

The City of Encinitas is in the process of completing a *Comprehensive Coastal Bluff and Shoreline Plan* addressing coastal bluff recession and shoreline erosion. The Plan takes a comprehensive look at the bluff and shoreline issues within the City of Encinitas and establishes goals, policies, standards and strategies that the city will pursue for the life of the General Plan. The Plan contains a section entitled "Shore Protection, Cobble Management and Bluff Protection" that includes policies addressing shore protection.

In 1994, after receiving numerous requests from individual property owners to construct seawalls along Neptune Avenue, the CSLC issued a Public Agency Lease to the City of Encinitas authorizing the City to enter into agreements to construct and maintain vertical seawalls beginning at the northerly limits of Encinitas down to the northerly limit of Moonlight State Beach, a distance of approximately one mile. Each individual project must, however, still be reviewed and approved by the CSLC.

City of Solana Beach

The City of Solana Beach adopted Ordinance No. 195 on June 6, 1994, amending the Municipal Code by the addition of Chapter 17.62, *Shoreline and Coastal Bluff Protection* that provides for the construction of seawalls, revetments, bluff retaining walls and other shoreline and coastal bluff protection measures. The ordinance provides a regulatory framework that protects vested private property rights and important public interests in shoreline resources that can be harmed by the construction of coastal bluff protection measures. The City is also in the process of updating its General Plan to include the addition of a Beach and Bluff Element to assist in the management of its shoreline and coastal bluff areas.

City of Del Mar

The City of Del Mar adopted an Initiative on April 12, 1988, establishing the Beach Overlay Zone (Chapter 30.50). The Initiative was established to regulate the uses of the Del Mar beach area. Chapter 30.50.060 addresses the circumstances under which protective structures may be authorized within the Beach Overlay Zone.

City of Oceanside

Ordinance No. 83-11 was adopted on April 13, 1983, amending the City Code by the addition of Chapter 19.B. This chapter established regulations for the construction of seawalls, revetments, and other protective structures. The ordinance was amended on May 8, 1985, pursuant to Ordinance No. 85-12, addressing permit requirements for repair and maintenance of protective structures.

CALENDAR PAGE
MINUTE PAGE

City of Coronado

The City of Coronado adopted Ordinance 1532, Chapter 86.74 *Waterfront Development*, and Ordinance 1533, Chapter 86.76 *Protection of Natural Ocean and Bay Processes*. These ordinances address waterfront development and setbacks. Protective structures are permitted only to serve coastal dependent uses, protect existing structures, remove public hazards, or protect public beaches in danger of erosion.[20]

CALENDAR PAGE
MINUTE PAGE

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[2] Gary B. Griggs, *Bringing Back the Beaches - A Return to Basics*, Sand Rights '99 Conference Proceedings, American Society of Civil Engineers.

[3] Gary Griggs and Lauret Savoy, editors, *Living with the California Coast*, Duke University Press, 1985.

[4] *Ibid.*

[5] *Ibid.*

[6] Gary B. Griggs, *The Armoring of California's Coast*, California and the World Ocean '97 Conference Proceedings, March 24-27, 1997, American Society of Civil Engineers.

[7] California Coastal Commission, Staff Report for Application No. 6-00-66, September 21, 2000.

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[9] Doug Chitwood and Chris Webb, *The U.S. Army Corps of Engineers' Oceanside Shoreline Reconnaissance Study.*

[10] Lindow, Megan, "Encinitas to seek $400,000 state grant to help with study of shoreline erosion", *San Diego Union-Tribune*, December 7, 2000.

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[12] Philip King, Ph.D., *The Fiscal Impact of Beaches in California*, Public Research Institute, San Francisco State University; and the California Department of Boating and Waterways Web Site.

[13] California Coastal Sediment Management Workgroup, *Initial Report*, November 2000.

[14] Los Angeles County Beach Replenishment Task Force, *Report on the Progress and Current Recommendations of the Los Angeles County Beach Replenishment Task Force*, January 31, 2001.

[15] San Diego Association of Governments, *Shoreline Preservation Strategy for the San Diego Region*, July 1993.

[16] San Diego Association of Governments, *SANDAG Board Actions*, February 23, 2001.

[17] Eric Brazil, "Crumbling Coastline; Slowly but surely, erosion eats away at California's beachfront property", *San Francisco Examiner*, March 6, 1998, Pg. A-1; "El Niño woes won't go away. Pacific homeowners had insurance when storms sent their houses crashing into the sea, but now the companies refuse to pay damage claims", *San Francisco Examiner*, October 4, 1998, Pg. B-1. www.lexis.com.

[18] *California Code of Regulations*, Title 2, Article 2, § 2003.

[19] City of Carlsbad, *Ordinance NS-365*, § 22 (part) 1996.

[20] City of Coronado, *Chapter 86.74 Waterfront Development (Ordinance 1532), and Chapter 86.76 Protection of Natural Ocean and Bay Processes (Ordinance 1533).*

CALENDAR PAGE
MINUTE PAGE

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CALENDAR PAGE 0502

MINUTE PAGE 02042

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CALENDAR PAGE
MINUTE PAGE

GLOSSARY

Accretion: the gradual addition of material to pre-existing material, opposite of erosion

Beach: the area of unconsolidated material periodically covered and uncovered by ocean waters, from low water to line of vegetation

Benthic: located on the bottom of the sea

Breakwater: an offshore structure (as a wall) protecting a harbor or beach from the force of waves usually constructed of concrete or rock

Bulkhead: a retaining wall constructed of concrete, steel or wood that is backed with solid fill and erected along the water to extend the upland out to the bulkhead line; serves as protection against tidal or watercourse erosion of land and may also serve as a retaining wall, thereby allowing placement of structures near the water

Erosion: the wearing away of material by natural forces due to waves, currents or wind

Estuary: an area in which freshwater flows of a river mix with salt water of the ocean

Foredunes: area of sand mounds closest to the ocean and subject to wave action

Groin: a rigid structure of rock, concrete, steel, wood or combination of these materials, usually built out from a shore to protect the shore from erosion, to trap sand, or to direct a current for scouring a channel

Headlands: a point of land, typically of stable material extending into the ocean

Horizontal and vertical access: land capable of being used to traverse along the beach (horizontal) or get to the beach from an upland location (vertical)

Jetty: A structure of stones, piles, etc., that projects into a body of water to direct and confine a stream or tidal flow to a selected channel, often found at harbor entrances to preventing shoaling

Littoral drift: the movement of suspended material in the water along the shore, caused by waves and current

MHTL: Mean high tide line; the location of the intersection of the elevation of the arithmetical average of 19 years of measured high tides and the shore.

Offshore gradients: the slope or elevation of underwater lands

Pocket beaches: small beaches formed between two points or headlands

Revetment: a cement or rock facing used to support and protect an embankment, bluff or structure from wave attack and prevent erosion

Riprap: a foundation or wall of stones or rocks that are loosely placed together; usually constructed adjacent to areas subject to heavy wave action to prevent scour or erosion

CALENDAR PAGE
MINUTE PAGE

Scour: removal of material by waves and currents, especially at the base or toe of a shoreline structure

Seacave: a concaved bluff area caused by the erosive forces of wave action

Seawall: a normally vertical solid wall, embankment or structure built along the coastline to protect the shore from erosion, wave action.

Shoreline: intersection of the ocean with land

Tide: The periodic rising and falling of the water that results from the gravitational attraction of the moon and sun acting upon the rotating earth. Horizontal movement of the water resulting from the same causes, although sometimes referred to as *tide*, should be called tidal current.

Turbidity: character of water containing sediment or particles causing cloudiness

Upland: land above the surface of a body of water

CALENDAR PAGE 1086
MINUTE PAGE