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STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, Governor

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RECORD PACKET COPY

DATE: March 25, 1999

TO: Commissioners and Interested Persons

FROM: Charles Damm, Senior Deputy Director
Gary Timm, District Manager
Steve Hudson, Coastal Program Analyst

SUBJECT: **Proposed Major Amendment (1-98) to the University of California Santa Barbara** Certified Long Range Development Plan for Public Hearing and Commission Action at the April 13-16, 1999, Commission Meeting in Long Beach.

STAFF NOTE

The proposed Lagoon Management Plan (LMP) was presented to the Commission as a component of Major Amendment 2-97 to UCSB Long Range Development Plan (LRDP) at three previous hearings on March 12, April 9, and June 9, 1998. The amendment was continued at both the March and April hearings. At the June 1998 hearing, UCSB LRDP Amendment 2-97 was approved by the Commission with a suggested modification added by the Commission during the hearing that the LMP be deleted from UCSB LRDP Amendment 2-97 to allow the LMP to be heard as a separate amendment application. On October 13, 1998, the University submitted several revisions dated October 6, 1998, to the proposed LMP (the originally submitted LMP has been included for reference as Exhibit 8c and the revisions submitted on October 13, 1998 have been included as Exhibit 8b). In addition, on March 18, 1999, the University submitted further revisions to the LMP included as Exhibit 8a.

SYNOPSIS

The University of California at Santa Barbara is requesting an amendment to its Long Range Development Plan (LRDP) to incorporate the Lagoon Management Plan (LMP) as part of the certified LRDP. The LMP identifies specific policies for the management of the campus lagoon and surrounding area including management of public access, wetland, and environmentally sensitive habitat resources.

Preparation of the LMP was required by the Commission as a condition of the University Center expansion project and associated LRDP Amendment approval in 1992. The LMP encompasses an area of approximately 94 acres, nearly a quarter of

the entire Main Campus of UCSB, and includes coastal bluffs and terraces, ocean beaches, sand dunes, the rocky Goleta Point, wetlands, and the lagoon itself. Three special-status plant species and approximately 0.80 acres of wetlands are located on the bluff top area west of the Campus Lagoon. The majority of the area where the special-status plant species are located will be designated as ESHA and included as part of the proposed Lagoon Management Area. However, the LMP, as proposed, will exclude the majority of the identified wetlands from Lagoon Management Area.

The proposed amendment would allow for the construction of the 200-unit/800-student San Rafael Housing Project immediately adjacent to identified wetlands located on the blufftop west of the Campus Lagoon without providing for any open-space buffer areas between the existing wetlands and the new development. Although not part of this amendment application, the student housing project is proposed as part of the related UCSB Notice of Impending Development (NOID) 1-98 which is also scheduled for the April Commission meeting in Long Beach.

The proposed amendment is **inconsistent** with the Coastal Act. The policies of the proposed Lagoon Management Plan are not adequate to ensure that: existing ESHA and wetland areas on campus are protected consistent with Sections 30230, 30231, and 30240 of the Coastal Act; future improvements to existing dirt roads will be consistent with habitat protection; bluff stabilization projects will be consistent with the protection of habitat resources and public access; the public is made aware of all parking areas available for coastal access parking; future dredging of the Campus Lagoon is consistent with Section 30233 of the Coastal Act; and that the construction of any shoreline protective projects to protect the eastern lagoon barrier will be consistent with Section 30235 of the Coastal Act and with the certified LRDP as amended by LRDP Amendment 1-97.

SUMMARY OF STAFF RECOMMENDATION

Staff is recommending that the Commission, after public hearing, ***deny*** the amendment to the certified LRDP as submitted; then ***approve, only if modified***, the amendment to the LRDP. The modifications are necessary because, as submitted, the LRDP amendment is not consistent with the Chapter 3 policies of the Coastal Act. **The motions to accomplish this recommendation are found on pages 4 and 5.** The suggested modifications are found on pages **5 through 9**.

Additional Information: Please contact **Steven Hudson**, California Coastal Commission, South Central Coast Area, 89 So. California St., Second Floor, Ventura, CA. (805) 641-0142.

STANDARD OF REVIEW

The standard of review for the proposed amendment to the certified LRDP, pursuant to Sections 30605, 30512(c), and 30514(b) of the Coastal Act, is that the proposed amendment meets the requirements of and is in conformance with the Chapter 3 policies of the Coastal Act.

COASTAL ACT CONSISTENCY

The proposed LRDP amendment does not meet the requirements of the Coastal Act. The matters that are at issue are discussed in the following sections according to the issue raised under the LRDPA proposal and the related Coastal Act analysis.

PUBLIC PARTICIPATION

Section 30503 of the Coastal Act requires public input in preparation, approval, certification and amendment of any LRDP. The University circulated a Notice of Preparation and a Draft Environmental Impact Report. In addition, the University held a public hearing and received written comments regarding the project from public agencies, organizations and individuals. The hearing was duly noticed to the public consistent with Sections 13552 and 13551 of the California Code of Regulations which require that notice of availability of the draft LRDP amendment (LRDPA) be made available six (6) weeks prior to the Regents approval of the LRDP amendment and Final EIR. Notice of the subject amendment has been distributed to all known interested parties.

PROCEDURAL REQUIREMENTS

Pursuant to Section 13551(b) of the California Code of Regulations, the University resolution for submittal must indicate whether the LRDPA will require formal adoption by the Board of Regents after the Commission approval, or is an amendment that will take effect automatically upon the Commission's approval pursuant to Coastal Act Sections 30512, 30513 and 30519. Because this approval is subject to suggested modifications by the Commission, the University must act to accept the adopted suggested modifications and the requirements of Section 13547, which provides for the Executive Director's determination that the University's action is legally adequate, within six months from the date of Commission action on this application before the LRDPA shall be effective.

CAMPUS DEVELOPMENT/PAST COMMISSION ACTIONS

On March 17, 1981, the University's Long Range Development Plan (LRDP) was effectively certified by the Commission. The LRDP has been subject to eight major amendments. Under LRDP Amendment 1-91, the Commission reviewed and approved the 1990 UCSB LRDP; a 15-year long range planning document, which substantially updated and revised the certified 1981 LRDP. The 1990 LRDP provides the basis for the physical and capital development of the campus to accommodate a student population in the academic year 2005/06 of 20,000 and for the new development of no more than 830,000 sq. ft. of site area on Main Campus for buildings other than parking garages and student housing. Since the certification of the 1990 LRDP by the Commission, approximately 349,709 sq. ft. of available area on campus has been developed or approved for development.

I. ACTION ON UNIVERSITY OF CALIFORNIA, SANTA BARBARA LRDP AMENDMENT 1-98

Following a public hearing, staff recommends the Commission adopt the following resolutions and findings. The appropriate motion to introduce the resolution and a staff recommendation are provided just prior to each resolution.

A. RESOLUTION I. Resolution to deny certification of the University of California, Santa Barbara Long Range Development Plan Amendment 1-98, as submitted

MOTION I

I move that the Commission **certify** the University of California, Santa Barbara Long Range Development Plan Amendment 1-98, as submitted.

STAFF RECOMMENDATION

Staff recommends a **NO** vote and the adoption of the following resolution and findings. An affirmative vote by a majority of the appointed Commissioners is needed to pass the motion.

RESOLUTION I

The Commission hereby **denies certification** of the University of California, Santa Barbara Long Range Development Plan Amendment 1-98 and adopts the findings stated below on the grounds that the amendment will not meet the requirements of and conform to the policies of Chapter 3 of the Coastal Act and that approval of the amendment as submitted will have significant adverse environmental effects for which feasible mitigation measures have not been employed consistent with the California Environmental Quality Act. There are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant adverse effects which the approval of the Long Range Development Plan amendment would have on the environment.

B. RESOLUTION II. Resolution to approve certification of the University of California, Santa Barbara Long Range Development Plan Amendment 1-98, if modified.

MOTION II

I move that the Commission **certify** the University of California, Santa Barbara Long Range Development Plan Amendment 1-98, if it is modified in conformity with the suggested modifications set forth in this staff report.

STAFF RECOMMENDATION

Staff recommends a **YES** vote and the adoption of the following resolution and findings. An affirmative vote by a majority of the appointed Commissioners is needed to pass the motion.

RESOLUTION II

The Commission hereby **certifies** the University of California, Santa Barbara Long Range Development Plan Amendment 1-98 for the reasons discussed below, on the grounds that the amended Long Range Development Plan meets the requirements of and conforms to the Chapter 3 policies of the Coastal Act if modified according to the suggested modifications stated in Section II of this report. The Long Range Development Plan amendment, if modified, will not have significant environmental effects within the meaning of the California Environmental Quality Act. The Commission further finds that if the University adopts and transmits its revisions to the amendment to the Long Range Development Plan in conformity with the suggested modifications, then the Executive Director shall so notify the Commission.

II. SUGGESTED MODIFICATIONS

The staff recommends the Commission certify the following, with modifications as shown. Language proposed by the University of California, Santa Barbara in the subject LRDP amendment and language presently contained within the certified LRDP is shown in straight type. Language recommended by Commission staff to be ~~deleted~~ is shown in ~~line out~~. Language proposed by Commission staff to be inserted is shown **underlined**. Other suggested modifications to revise maps or figures are shown in italics.

Modification 1

Lagoon Management Plan
(pages 3-19, 3-20)

Vernal Pool Creation **and Wetland Area Restoration**

~~Prior to conducting a wetland delineation it was considered possible that s~~Several shallow and degraded **wetlands** ~~vernal pools might be~~ **are** present in the west bluff area of the West Lagoon Park management zone. A wetland delineation that was conducted on the adjacent San Rafael Student Housing Addition project site (Padre Associates, 1998) determined that ~~based on the absence of the topography or zonation of vegetation characteristic of vernal pools, the project site does not support vernal pools~~ **0.80 acres of wetland area is present on site**.

The wetland delineation also concluded that based on the absence of hydric soils, the project site does not contain Federal jurisdiction wetlands. However, based on the presence of hydrophytic vegetation (saltgrass and alkali heath), wetlands, as defined by the California Coastal Commission, are located at the project site. As part of the implementation of the Lagoon Management Plan, the University ~~will~~ **may** create at least an acre of **additional** suitable habitat (e.g. wetland, vernal pool) ~~in lieu of a 100-foot setback from the identified "wetlands" as part of the San Rafael Student Housing Addition project~~. The identified wetlands are comprised of patches of vegetation containing saltgrass or alkali heath, with no other characteristics that distinguish them from surrounding non-wetlands (Padre Associates, 1998). The location of the wetland areas on the blufftop within the West Lagoon Park Management Zone are shown on Figure 1-5.

~~Two~~ **Three** special-status plant species also occur there **(Coulter's saltbush, Southern tarplant, and Long-leaf plantain)**; therefore, this unique and valuable habitat should be protected and, if possible, restored. In conjunction, with the environmental analysis conducted for the proposed San Rafael Housing Addition Project, a delineation of the exact locations of the ~~vernal pools~~ **wetlands** and special-status plants in the management zone was prepared and resource protection measures were identified ~~including the following~~. **Restoration and enhancement measures shall be undertaken and shall include the following**:

- **In conjunction with the proposed development, the University shall conduct a restoration and enhancement program for all disturbed existing wetland areas on site. Degraded upland areas surrounding existing wetlands shall also be restored or enhanced consistent with the provision of a 100 ft. open-space buffer area from new development.**

- **The University shall** Provide controlled public access through the proposed ESHA located on the blufftop within the West Lagoon Park Management Zone. Improvements to provide public access and protect the ESHA from disruption should include **(1) informational and educational** signs **regarding the wetland and other ESHA resources on site**, **(2) low-lying and visually unobtrusive** fences, **(3)** stairs, and **(4)** a boardwalk, through the proposed ESHA area as shown on Figure 1-5.

- There **shall** ~~should~~ be no grading within the proposed ESHA area other than that necessary to provide public access and for resource protection **or wetland enhancement projects**.

- **The** ~~R~~remov**al**~~e~~ **of** invasive exotic plants from the area.

As part of the implementation of the Lagoon Management Plan, the University ~~will~~ **may** create at least an acre of **additional** suitable habitat (e.g. wetland, vernal pool)**, as follows:** ~~in lieu of a 100-foot setback from the identified "wetlands" as part of the San Rafael Student Housing Addition project.~~

- The vernal pool creation project should include monitoring the vernal pools for 3 years to determine the species richness, dominance, and distribution of the plants and aquatic

invertebrates in each pool. Monitoring for invertebrates should occur when the pools are inundated and monitoring for plants should be conducted during spring after much of the water in the pools has evaporated. After 3 years, the monitoring data ~~would~~ **shall** be **made** available for further study and action by interested departments and research units at UCSB **and to the California Coastal Commission**.

Modification 2

Lagoon Management Plan:
(complete document))

Revise all figures consistent with the following:

All wetlands areas (approximately 0.80 acres), as defined by the California Coastal Commission and identified in the Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 (identified in Exhibit 2b), shall be shown as ESHA and included as part of the Lagoon Management Area. A 100 ft. open space buffer area around all ESHA and wetland areas shall be shown and also included as part of the Lagoon Management Area.

Modification 3

Long Range Development Plan:
(Figure 27)

Update Figure 27 of the Long Range Development Plan to show all designated ESHA areas on Main Campus as consistent with Modification Two (2) and with the proposed LMP.

Modification 4

Lagoon Management Plan:
(Figure 1-5)

Revise Figure 1-5 of the Lagoon Management Plan to delete all references to wetland areas (FACW) to be graded. Delete all references to any development proposed in conjunction with the San Rafael Housing Project (with the exception of pedestrian and bicycle trail improvements) that will be located within the required 100 ft. open space buffer areas surrounding the existing wetlands identified in the Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998.

Modification 5

Lagoon Management Plan:
(Figure 2-12)

Revise Figure 2-12 to indicate that the existing emergency access roads located on Lagoon Island are not paved and shall be maintained in their current unpaved state unless

additional improvements are approved by the Commission in order to protect ESHA and wetland resources.

Modification 6

Lagoon Management Plan:
(Figure 3-1)

Revise Figure 3-1 of the Lagoon Management Plan to delete new portion of vehicle access road and hammerhead turnaround at terminus of road on Lagoon Island and to indicate that the existing emergency access roads located on Lagoon Island and the east Lagoon barrier are not paved and shall be maintained in their current unpaved state unless additional improvements are approved by the Commission in order to protect ESHA and wetland resources. Show existing path on bluff slope between the top of the bluffs located to the west of the lagoon and the beach to be improved through the construction of a boardwalk and stairway as shown in Figure 1-5.

Modification 7

Lagoon Management Plan
(page 3-28, Paragraph 5

Protecting public safety **in conjunction with the protection of wetland and ESHA resources** is a primary concern for the management area. Parts of the management area are remote, hazardous areas such as steep slopes and bluffs are present, and some areas pose a fire danger. Maintaining access for emergency vehicles is a high management priority. All existing emergency access roads should be maintained in the lagoon area, including all vehicle entry points and paved **and dirt** roads shown in Figure 3-1. For any improvements that occur in the West Lagoon Park management zone, emergency vehicle access should be maintained and improved in consultation with UCSB emergency services departments. Access to the bluffs in the West Lagoon Management Zone would be provided via existing partially paved roads along the northern and western sides which would be maintained and improved for emergency vehicle use. The paved roads along the northern and western sides should also be maintained and improved for emergency vehicle use. **Existing dirt roads within areas designated by the LRDP as ESHA or open-space buffer shall not be paved unless required to protect those resources. If improvements to existing roads located within ESHA and open-space buffer areas are required, then such roads shall be maintained or improved using permeable or semi-permeable road materials.**

Modification 8

Lagoon Management Plan:
(Page 4-7, Paragraph 5)

Repair damaged areas (bluff edges and steep slopes) using **revegetation** ~~structural~~ techniques. **The use of any structural techniques to stabilize bluff edges and steep**

slopes will require further review by the California Coastal Commission in the form of LRDP amendment. References: ES-2.1, and PU-3.5.

Modification 9

Lagoon Management Plan:
(Figure 2-13)

Revise Figure 2-13 (Existing Coastal Access) of the Lagoon Management Plan to show all parking lots available for public coastal access on Main Campus including Lot 24.

Modification 10

Lagoon Management Plan:
(Page 3-8, Paragraph 5)

Lagoon Capacity

Over the long term, sediments entering the lagoon could reduce lagoon capacity and depth, decreasing both circulation and water quality. Dredging could increase water depths, thus reducing water temperatures and increasing capacity. Dredging could also increase circulation if a small channel were dredged to enhance flows to the northwestern and western portions of the lagoon. Dredging would be very expensive, however, and **adequate** studies should be conducted before dredging begins to evaluate sediment quality and disposal requirements. **If suitable, dredged material should be utilized for beach replenishment or lagoon habitat restoration projects. If the dredged material is determined to be not suitable for beach replenishment or lagoon habitat restoration projects, then such material shall be disposed of in an appropriate manner.**

Modification 11

Lagoon Management Plan
(complete document)

Delete all of the following: (1) all references to the use or construction of a revetment to protect the eastern lagoon barrier and (2) all references to the construction of any improvements to the eastern lagoon barrier that are dependent upon the construction of a rock revetment (including, but not limited to, stairways and ramp improvements, grading of the lagoon barrier, pavement of the lagoon barrier access road, or the construction of a turnaround).

Figure 1-3 shall be revised consistent with this modification.

III. FINDINGS FOR THE APPROVAL OF THE LONG RANGE DEVELOPMENT PLAN IF MODIFIED AS SUGGESTED

The following findings support the Commission's denial of the LRDP amendment as submitted, and approval of the LRDP amendment if modified as indicated in Section II (*Suggested Modifications*) above. The Commission hereby finds and declares as follows:

A. Amendment Description and Background

The University of California at Santa Barbara is requesting an amendment to its Long Range Development Plan (LRDP) to incorporate the Lagoon Management Plan (LMP) as part of the certified LRDP. The LMP identifies specific policies for the management of the campus lagoon and surrounding area including management of public access, wetland and environmentally sensitive habitat resources, and ensures that activities occurring outside the lagoon area do not create adverse impacts within the lagoon area.

The LMP encompasses an area of approximately 94 acres, nearly a quarter of the entire Main Campus of UCSB, and includes coastal bluffs, ocean beaches, sand dunes, the rocky Goleta Point, wetlands, and the lagoon itself. The lagoon has a surface area of approximately 31 acres and a surface elevation of approximately 6 ft. above mean sea level. The Campus Lagoon and much of its surrounding area has been designated as ESHA in the LRDP. The proposed LMP will provide for the designation of approximately 100,000 sq. ft. of additional area as ESHA.

The University has submitted a Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 which indicates that approximately 0.80 acres of wetlands and populations of three special-status plant species are located on the bluff top area west of the Campus Lagoon: Coulter's Saltbush, Southern Tarplant, and Long-leaf Plantain. The majority of the area where the special-status plant species are located will be designated as ESHA and included as part of the proposed Lagoon Management Area. However, the LMP, as proposed, will exclude the majority of the 0.80 acres of identified wetlands from the Lagoon Management Area.

Preparation of the LMP was required by the Commission as a condition of the University Center expansion project and associated LRDP Amendment approval in 1992. The proposed LMP was presented to the Commission as a component of Major Amendment 2-97 to the UCSB Long Range Development Plan (LRDP) at three previous hearings on March 12, April 9, and June 9, 1998. The amendment was continued at both the March and April hearings. At the June 1998 hearing, UCSB LRDP Amendment 2-97 was approved by the Commission with a suggested modification added by the Commission during the hearing that the LMP be deleted from UCSB LRDP Amendment 2-97 to allow the LMP to be heard as a separate amendment

application. Since that time, the University has submitted several significant revisions to the proposed LMP. On October 13, 1998, the University submitted revisions dated October 6, 1998, to the proposed LMP (the originally submitted LMP has been included for reference as Exhibit 8c and the revisions submitted on October 13, 1998, have been included as Exhibit 8b). In addition, on March 18, 1999, the University submitted further revisions to the LMP included as Exhibit 8a. The LRDP, as previously certified, allows for the construction of the 200-unit/800-student San Rafael Housing Project proposed as part of the related NOID 1-98. However, the proposed revisions to the LMP would allow for the construction of the San Rafael Housing Project immediately adjacent to identified wetlands located on the blufftop west of the Campus Lagoon without the 100 ft. open-space buffer required for protection of the ESHA and wetland areas on site and as required by the certified LRDP. Although not part of this amendment application, the related NOID 1-98 for the construction of the student housing project is also scheduled for the April Commission meeting in Long Beach with a special condition regarding the submittal of revised plans to eliminate all proposed development within 100 ft. of all ESHA and wetland areas on the project site.

B. Environmentally Sensitive Habitat Area

Section **30230** of the Coastal Act states:

> ***Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.***

Section **30231** of the Coastal Act states that:

> ***The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.***

Coastal Act Section **30240** states:

> ***(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values and only uses dependent on such resources shall be allowed within such area.***
>
> ***(b) Development in areas adjacent to environmentally sensitive habitat areas shall be sited and designed to prevent impacts which would significantly degrade such areas and shall be compatible with the continuance of such habitat areas.***

Sections 30230 and 30231 of the Coastal Act require that the biological productivity and the quality of coastal waters and wetlands be maintained and, where feasible, restored through among other means, minimizing adverse effects of waste water discharge and entrainment, controlling runoff, substantial interference with surface water flows, and maintaining natural buffer areas. In addition, Section 30240 of the Coastal Act states that environmentally sensitive habitat areas must be protected against disruption of habitat values. Furthermore, the Coastal Act requires that development adjacent to an ESHA be sited and designed to prevent impacts that would degrade the value of the habitat.

The LMP includes several policies to protect the environmental resources of the Lagoon Management Area. The LMP provides for the removal of invasive and exotic plant species, protection of special-status plant species, protection of coastal dunes, and the gradual replacement of eucalyptus trees with native species. In addition, the LMP will provide for the designation of approximately 100,000 sq. ft. of area located immediately west of the Campus Lagoon (previously designated as "open-space" by the LRDP) as ESHA in order to provide protection for several species of special-status plants located in the Lagoon Management Area.

The University has submitted a Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 which indicates that three special-status plant species are located on the bluff top area west of the Campus Lagoon: Coulter's Saltbush, Southern Tarplant, and Long-leaf Plantain. Special-status plant species are either listed as endangered or threatened under the Federal or California Endangered Species Acts, or rare under the California Native Plant Protection Act, or considered to be rare by the scientific community. The majority of the populations for the special-status plants would be located in the area to be included in the Lagoon Management Area and designated as ESHA.

The Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 also indicates that approximately 0.80 acres of wetlands are also located on top of the bluffs immediately west of the Campus Lagoon (Exhibit 2b). However, the University is proposing to exclude the majority of the 0.80 acres of identified wetlands from the proposed Lagoon Management Area (Exhibit 2a). The Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 states:

> ***The results of the wetland delineation indicate that approximately 0.17 acres of State wetlands occur in the direct impact area, and another 0.63 acres occur immediately to the south and southeast. These wetlands are comprised of patches of vegetation containing saltgrass or alkali heath, with no other characteristics that distinguish them from surrounding non-wetlands. Wetlands found on the project site do not exhibit the topography or zonation of vegetation characteristic of vernal pools. Therefore, these wetlands can be characterized as vernal or seasonal wetlands, but not vernal pools.***
>
> ...

> ***Impacts to wetlands and special-status plant species associated with implementation of the proposed project include direct and indirect impacts. Direct impacts are the loss of wetlands and special-status plants due to earth disturbance associated with grading and trenching. Indirect impacts are the degradation of wetlands and plant habitat associated with hydrologic impacts and human disturbance impacts.***

In certifying the LRDP, the Commission found that the basis for determining the existence of wetlands on campus is whether the area in question qualifies as a wetland under the regulations of the California Coastal Commission. The LRDP states that, in addition to Devereux Slough, Storke Campus Wetland, and the Campus Lagoon, the Campus also includes certain areas "that qualify as wetlands under Section 404 of the Clean Water Act and/or the Regulations of the California Coastal Commission" such as the wetlands located on the subject site. The Commission's definition of wetlands includes any area where any one or more of the following indicators are present: wetland plant species, wetland hydrology, or hydric soils. Title 14, Section 13577 of the California Code of Regulations states in part that:

> ***Wetlands are lands where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent or drastic fluctuations of surface water levels...***

The 0.80 acres of wetlands located on the project site do constitute "wetlands" as defined by the Commission. The Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 found that the 0.80 acres of wetlands on the project site are characterized by the presence of wetland plant species and, therefore, are considered wetlands as defined by the Commission. The Commission notes that all coastal wetlands are extremely valuable, even if degraded, because of the dramatic loss in wetlands throughout the state, and the unique habitats that wetlands provide. In urban areas, the remaining wetlands can still support important plant and/or animal species. Though many of these wetlands are disturbed by human activities, they can still be a significant resource. Because of their transient nature, it is often argued that seasonal wetlands, such as those located on the bluff top west of the Campus Lagoon, are more limited in function, and, therefore, of lower value than perennial wetlands. While the transient hydrology of seasonal wetlands may reduce the time period of a function, the performances of that function and its overall value are not necessarily diminished relative to perennial wetlands. Additionally, seasonal wetlands can, during certain times of year, provide greater value for certain functions (e.g.; ground water recharge, floodwater storage, habitat for endangered species, or feeding and resting spots for migratory birds), relative to nearby perennial wetlands. Such wetlands, including the 0.80 acres of wetlands located on the project site, also have important educational and scientific value.

Although a small portion of the wetlands, and many of the areas containing special-status plant species, will be located within the new area to be designated as ESHA and

included as part of the proposed Lagoon Management Area, the Commission notes that the majority of the 0.80 acres of identified wetlands adjacent to the Campus Lagoon will be excluded. Although not part of this amendment application, the construction of the 200-unit/800-student San Rafael Housing Project is proposed as part of the related UCSB Notice of Impending Development (NOID) 1-98 which is also scheduled for the April Commission meeting in Long Beach. The LMP, as proposed, would allow for the construction of the new development proposed by NOID 1-98 without providing for any open-space buffer areas between the 0.80 acres of existing wetlands and the new development. To mitigate for the adverse effects to the habitat and wetland resources on site that would result from such development, the University proposes to create approximately one acre of replacement wetland habitat within the currently designated ESHA on Lagoon Island. The proposed LMP, as revised by the University on March 18, 1999, states:

> ***As part of the implementation of the Lagoon Management Plan, the University will create at least an acre of suitable habitat (e.g. wetland, vernal pool) in lieu of a 100-foot setback from the identified "wetlands" as part of the San Rafael Student Housing Addition project.***

However, Section 30240 of the Coastal Act, requires that existing environmentally sensitive habitat areas, such as wetland areas, shall be protected against any significant disruption of habitat values and that development in areas adjacent to ESHA and wetland areas shall be sited and designed to prevent adverse effects which would significantly degrade such areas and shall be compatible with the continuance of such habitat areas. Applications for proposed development that have come before the Commission have typically provided for a 100 ft. open-space buffer between new development and ESHA and wetland areas, and when not proposed by the applicant, such buffer areas have been required by the Commission to protect those resources. Buffer areas are undeveloped lands surrounding resource areas, such as wetlands, to be protected. These areas act to protect the wetland or ESHA resource from the direct effects of nearby disturbance (both acute and chronic), and provide the necessary habitat for organisms that spend only a portion of their life in the wetland such as amphibians, reptiles, birds, and mammals. The Commission notes that development proposed in conjunction with the related NOID 1-98 for the construction of student housing, if constructed immediately adjacent to the ESHA and wetland areas on site without any open-space buffer (as provided for by the proposed LMP), will result in adverse effects to sensitive habitat resources including: contaminated and increased runoff, increased erosion, and displacement of habitat. In addition, the daily presence of the 800 students to be housed by the proposed development will also result in several adverse effects to the habitat resources on site including: trampling of vegetation, increased erosion from volunteer trails, and disturbance to wildlife. The Commission further notes that the provision of a 100 ft. open-space buffer between the proposed development and the existing significant habitat resources on site will serve to minimize both the direct and indirect adverse effects to ESHA and wetland areas located adjacent to the proposed development.

In addition, consistent with Sections 30230, 30231, and 30240 of the Coastal Act, which are included in the certified LRDP, Policy 30231.2(*l*) of the LRDP provides for the protection of wetlands on campus not otherwise identified (such as the wetlands located on the proposed project site). LRDP Policy 30231.2 states, in part, that:

> ***Projects shall be designed to minimize soil erosion and, where possible to direct surface runoff away from coastal waters and wetlands, according to the following policies:***
>
> ...
>
> ***(l) New development adjacent to the required 100-foot building setback surrounding the upland limit of the wetland shall not result in significant adverse impacts due to additional sediment, nutrients, pollutants, and other disturbants (1980 LRDP policy).***

In addition, Policy 30231.3 of the certified 1990 LRDP specifically requires that a specific area surrounding any wetland on campus shall be reserved as an undevelopable buffer. Policy 30231.3 states that:

> ***Drainage and runoff shall not adversely affect the Campus wetlands (1980 LRDP policy, as amended).***
>
> ***a. The near slopes along the edge of wetlands shall remain an undisturbed buffer area (1980 LRDP policy, as amended).***

Therefore, the Commission notes that University's proposed amendment to allow new development to be located immediately adjacent to Campus wetlands without the provision of an adequate open-space buffer area is not consistent with the Coastal Act or the policies of the certified LRDP. The Commission further notes that at the time of the 1990 LRDP amendment, it appears that the 0.80 acres of wetlands identified in the Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 were not known or discovered such as to have been included with other mapped wetland areas on campus. The LRDP, did not intend to exclude from the definition of wetland any wetland that was not identified as such in the LRDP, but was intended to include all areas that meet the Commission's definition of "wetland." Therefore, Modification Two (2) has been suggested to ensure that all wetlands that have been identified in the Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998 are properly designated as ESHA by the LRDP and included in the LMP management area. Modification Three (3) has been suggested to ensure that Figure 27 (Environmentally Sensitive Habitats) of the LRDP is updated consistent with the proposed Lagoon Management Plan and with Modification Two (2). In addition, Modification One (1) has been suggested to ensure that new development, including the construction of the new student housing project proposed as part of NOID 1-98 will be consistent with the100 ft. buffer required by past Commission action and by other policies of the Coastal Act and the LRDP and that the University shall restore or enhance the existing degraded wetlands identified by the Wetland and Special-Status Plant Species Impact Assessment Report by Padre Associates, Inc. dated August 1998.

The Commission further notes that Figure 1-5 of the proposed LMP indicates that areas of wetland will be graded. Although the University had originally intended to grade approximately 0.17 acres of wetland areas in conjunction with the San Rafael Housing project, the University has since revised its application to delete the placement of any direct fill in wetland areas. Therefore, Modification Four (4) requires that Figure 1-5 of the proposed LMP is revised to delete all references to wetland areas to be graded and that all other references to development proposed in conjunction with the San Rafael Housing Project located within the 100 ft. open-space buffer surrounding existing wetlands are deleted, with the exception of pedestrian and bicycle trail improvements which will serve to protect sensitive habitat areas. Enhanced in order to ensure that the proposed amendment is consistent with the Coastal Act and with the LRDP.

In addition, Figure 3-1 of the proposed LMP indicates that the existing dirt emergency vehicle road will be extended approximately 200 ft. from the currently existing turnaround located in the central portion of the eastern end of Lagoon Island to the edge of the south facing bluff where a new hammerhead turnaround will be constructed (Exhibit 5). The Commission notes that the proposed extension of the road to the bluff edge is not required for emergency vehicle access to Lagoon Island. The Commission further notes that Lagoon Island has been previously designated as ESHA by the certified LRDP and is designated as ESHA in the LMP. Section 30240 of the Coastal Act requires that environmentally sensitive habitat areas shall be protected from disruption to their habitat value and that only new development dependent upon those habitat resources may be allowed in such areas. The Commission notes that the extension of the existing road is not dependent upon the ESHA resources and that, therefore, the construction of new roads or expansion/extension of existing roads within areas designated as ESHA is not consistent with Section 30240 of the Coastal Act. In addition, the University has not submitted any information regarding adverse effects to the habitat value of the site that would result from the construction of new roads in the designated ESHA. Therefore, Modification Six (6) has been suggested to ensure that Figure 3-1 of the LMP is revised to delete the reference to a new portion of the vehicle access road and a new hammerhead turnaround at the terminus of the road on Lagoon Island.

In addition, the Commission notes that the construction of non-permeable surfaces, such as asphalt roads, often intensifies storm runoff in a destructive manner, thereby contributing to an increased potential for erosion and increased sedimentation of coastal waters and wetland areas. Figure 3-1 and 2-12 of the proposed LMP indicate that the existing unpaved emergency vehicle access roads located on the east lagoon barrier and on Lagoon Island either are paved or will be paved in the future (Exhibits 5 & 6). Therefore, Modifications Five (5) and Six (6) have also been suggested in order to ensure that Figures 3-1 and 2-12 are revised to clarify that the existing roads located in the areas designated as ESHA and open-space buffer by the LRDP (Lagoon Island

and the east Lagoon Barrier) are not paved and shall be maintained in their current unpaved state unless additional improvements are required to protect ESHA and wetland resources. In addition, in order minimize adverse effects to wetland and ESHA resources from increased erosion and stormwater runoff, Modification Seven (7) has been suggested to ensure that existing service and emergency vehicle dirt roads located in areas designated by the LRDP as ESHA or open-space buffer should not be paved unless required to protect those resources and that if such improvements are necessary, then such roads shall be improved using permeable or semi-permeable road materials.

Therefore, for the reasons stated above, the Commission finds that the proposed amendment to the LRDP, as modified, is consistent with the Chapter 3 policies of the Coastal Act.

C. Public Access

One of the basic mandates of the Coastal Act is to maximize public access and recreational opportunities along the coast. The Coastal Act has several policies which address the issues of public access and recreation along the coast. Coastal Act Sections 30210 and 30211 mandate that maximum public access and recreational opportunities be provided and that development not interfere with the public's right to access the coast. Likewise, Section 30212 of the Coastal Act requires that adequate public access to the sea be provided to allow use of dry sand and rocky coastal beaches. In addition, Section 30213 requires that lower cost visitor and recreational opportunities be protected, encouraged and, where feasible provided. Finally, Section 30220 of the Coastal Act requires coastal areas suited for coastal recreational activities, that cannot be provided at inland water areas, be protected.

Coastal Act Section **30210** states:

> ***In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.***

Coastal Act Section **30211** states:

> ***Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.***

Coastal Act Section **30212** states (in part):

(a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects...

Coastal Act Section **30213** states (in part):

Lower cost visitor and recreational facilities shall be protected , encouraged, and, where feasible, provided. Developments providing public recreational opportunities are preferred.

Coastal Act Section **30220** states:

Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

The LRDP identifies a commitment and specific policies to provide and maintain public access and educational opportunities within the Lagoon Management Area while providing for management and restoration of its natural resources. Consistent with sections of the Coastal Act regarding public access, the UCSB Long Range Development Plan provides for maximum public coastal access on campus. Public pedestrian access is available to and along the entire 2 ½ miles of coastline contiguous to the campus. The parking facilities on campus constitute the majority of publicly-available beach parking in the Goleta area. Most of the approximately 6,520 parking spaces on campus may be used by the general public for a nominal charge. In addition, there is no charge for parking on campus during evenings, weekends, or holidays. Campus parking facilities provide overflow parking for the County of Santa Barbara operated Goleta Beach Park located adjacent to the campus. Several parking lots on campus, including Lot 23 and Lot 24, adjacent to the proposed Lagoon Management Area, have been specifically identified in the LRDP to accommodate public coastal access parking.

In addition, pedestrian trails, available for public use, are located throughout the proposed Lagoon Management Area along the scenic coastal bluffs and to and along the beach. Access improvements proposed in the LMP include the placement of informational signs and interpretative exhibits to educate the public regarding the special resources of the lagoon area. Policy 30240(a).9 of the certified LRDP provides that bicycle access to the lagoon island shall be prohibited in order to minimize blufftop erosion. Consistent with Policy 30240(a).9, the LMP includes additional policies which allow for the construction of barriers at entry points, as used in other locations on campus, which discourage the use of bicycles to Lagoon Island in order to avoid adverse effects to the coastal bluffs from increased erosion while allowing for access by wheelchairs and pedestrians. The LMP proposes to discourage the use of "volunteer trails," or informal trails, through the use of physical barriers and proposes to implement revegetation techniques to allow for restoration of degraded areas. All primary and essential access trails within the lagoon management area will be maintained consistent with Figure 3-1 (Exhibit 5). The Commission notes that the trail configuration shown in Figure 3-1 of the LMP will serve to provide adequate public access within the lagoon area consistent with resource protection. In addition, the LMP will provide for the use of low-lying fences of no more than 48 inches in height to be placed along the

edges of the high coastal bluffs within the management area to not only promote public safety, but also to minimize erosion of the bluff face resulting from public use of the trail system along the bluff top. The LMP provides specific policies which state that all barriers and fences shall be designed to carefully blend with their surroundings and the visual character of the lagoon area through the use of appropriate color and materials while being of small scale and low profile. The University does not propose to use any barbed wire fencing within the Lagoon Management Area.

Further, Figure 2-12 of the proposed LMP shows a stairway located on the bluff face at Goleta Point leading from the top of the bluff to the beach below (Exhibit 6). However, the Commission notes that no stairway, path, or any other form of pedestrian access from the top of the bluff to the beach below is currently located on the steep bluff face at Goleta Point and no reference to the future construction of stairs at Goleta Point is contained in the text or in any other figure of the proposed LMP. The Commission notes that the construction of the identified future stairs, in addition to any other new development referenced in the LMP, will require future review by the Commission in the form of a notice of impending development to ensure geologic and structural stability and that adverse effects to the habitat value of the site are minimized.

In addition, the Commission notes that Figure 3-1 of the proposed LMP does not show either the existing bluff top pedestrian path leading from the top of the bluff to the beach immediately west of the Campus Lagoon or the construction of a boardwalk and stairway proposed as part of the related NOID 1-98 for the construction of the San Rafael housing project and as shown in Figure 1-5 of the proposed LMP. If the proposed boardwalk and stairs are not constructed, the Commission notes that pedestrian use of the existing trail will continue to result in increased bluff erosion. The Commission notes that the construction of the proposed boardwalk and stairway will serve to minimize adverse effects to the ESHA and wetland areas in the Lagoon Management Area such as bluff erosion and increased sedimentation that result from pedestrian use of the existing bluff face path. Therefore, Modification Six (6) has been suggested to ensure that Figure 3-1 of the LMP is revised to show the existing path located on the bluff slope between the top of the bluffs west of the lagoon and the beach to be improved through the construction of a boardwalk and stairway as consistent with Figure 1-5 of the LMP.

The Commission notes that the certified LRDP requires the University to accommodate parking for public coastal access on campus. Policy 30210.9 of the LRDP provides that coastal access parking be provided in Parking Lots 1, 5, 6, 10, 23, and 24. In addition, as part of the related NOID 1-98, the University proposes to expand Lot 24 and designate 14 parking spaces for public coastal access parking. However, Figure 2-13 (Existing Coastal Access) of the proposed LMP does not indicate that Lot 24 is available for public coastal access. The Commission notes that Lot 24 is located in close proximity to both the bluff top trail system and to an existing beach access point. Policy 30210.9 of the LRDP identifies Lot 24 as available for public coastal access. Therefore, Modification Nine (9) has been suggested to ensure that Figure 2-13 of the

LMP is revised to more accurately show all parking lots available for coastal access on Main Campus (including Lot 24) as consistent with the certified LRDP.

Therefore, the Commission finds that the proposed amendment to the LRDP, as modified, is consistent with the Chapter 3 policies of the Coastal Act.

D. Marine Resources

Coastal Act Section **30233** states in part:

> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:*
>
> ...
>
> *(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.*
>
> *(7) Restoration purposes.*
>
> *(8) Nature study, aquaculture, or similar resource dependent activities.*
>
> *(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.*
>
> *(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary...*
>
> *(d) Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.*

Coastal Act Section **30235** states:

> *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. Existing marine structures causing water*

stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.

Coastal Act Section **30253** states:

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.

The proposed amendment to the Long Range Development Plan would allow for dredging of the Campus Lagoon in order to maintain the lagoon as an open body of water. Over the long term, sedimentation of the lagoon will continue to reduce capacity and depth resulting in decreased circulation and water quality ultimately creating an upland marsh or grassland habitat area. In order to maintain the lagoon in its present form as an open body of water, periodic dredging activities may be necessary. Section 30233 of the Coastal Act allows for dredging activities to be conducted in wetland areas for restoration and nature study purposes. The Campus Lagoon and the surrounding area has been previously designated as environmentally sensitive habitat area and as an educational resource. Dredging of the Campus Lagoon is consistent with the Coastal Act provided that there is no feasible less environmentally damaging alternative, adverse environmental effects are minimized, and that suitable excavated material is used for beach replenishment. However, no analysis has been submitted by the University regarding the suitability of the material that will be dredged from the lagoon or of potential beach areas suitable for replenishment. Therefore, Modification Ten (10) has been suggested to ensure that all excavated materials from the dredging of the Lagoon that are suitable for beach replenishment or habitat restoration shall be used for such purposes. The Commission notes that any future dredging of the Campus Lagoon, in addition to any other new development referenced in the LMP, will require future review by the Commission in the form of a notice of impending development to ensure that adverse effects to the habitat value of the site are minimized and that dredged material is used for beach replenishment or habitat restoration if suitable for such purposes.

Section 30235 of the Coastal Act allows for the construction of cliff retaining walls only when required to protect existing development, coastal-dependent uses, or public beaches from erosion and when designed to mitigate adverse effects. In addition, Section 30253 of the Coastal Act requires that new development may only be allowed if it will not in any way require the construction of protection devices that would substantially alter natural landforms along bluffs and cliffs. The Commission notes that retaining walls or other structural improvements which are located on coastal bluffs result in adverse effects to shoreline sand supply and public access along beach areas through the retention of beach sand material which would naturally be released to the

littoral system. The LMP, as proposed, would allow for a combination of techniques that may be used to minimize erosion of the bluff edges and steep slopes within the lagoon area such as revegetation, fences, barriers, informational signs, public education and awareness programs. The LMP also proposes to allow for the repair of damaged areas using revegetation and structural techniques. However, the LMP does not provide any specific information regarding the adverse effects to either the habitat value of the bluff slope or to beach sand supply (both areas are designated as ESHA by the LRDP). The Commission notes that although revegetation for slope stability is consistent with Sections 30235 and 30253 of the Coastal Act, any structural improvements on a bluff face such as retaining walls, caissons, and other structural stabilization techniques would require further review by the Coastal Commission on a project specific basis to determine consistency with the Coastal Act. Therefore, Modification Eight (8) has been suggested to ensure that any future structural improvements on bluff slopes within the lagoon area will be reviewed by the Commission in the form of an amendment to the Long Range Development Plan.

The construction of a rock revetment to protect the eastern lagoon barrier is not formally included as part of proposed LRDP Amendment 1-98 to certify the Lagoon Management Plan. However, the Commission notes that the LMP, as originally submitted, included numerous references to the construction of a rock revetment and related development to be located along the eastern lagoon barrier. Although, on October 13, 1998, the University submitted several revisions dated October 6, 1998, to the Lagoon Management Plan which deleted several of the references to the construction of a rock revetment and related development, the Commission notes that the revised LMP still contains some references to the construction of a rock revetment.

The construction of a rock revetment along the eastern lagoon barrier has been the subject of past Commission action. UCSB LRDP Amendment 2-97, which included the construction of a rock revetment and various improvements to the eastern lagoon barrier, including the placement of fill, pavement of the barrier road, and the construction of a vehicle turnaround, was previously approved by the Commission on June 9, 1998, with the suggested modification that the proposed revetment, and all related improvements to the eastern lagoon barrier, be deleted from LRDP Amendment 2-97. The Commission found in its previous action on UCSB LRDP Amendment 2-97 (findings herein incorporated by reference) that alternative forms of shoreline protection that could achieve basic protection of the lagoon barrier and seawater renewal system with fewer adverse impacts had not been adequately addressed in the Environmental Impact Report or other information submitted by the University. The UCSB LRDP states that the Campus Lagoon should be prevented from naturally breaching in order to maintain its Environmentally Sensitive Habitat Area (ESHA), instructional and research value. However, although the referenced rock revetment would serve to protect the existing educational and scientific opportunities provided by the Campus Lagoon, it would also result in adverse impacts to the habitat, recreational, and public access values of the beach area which has also been certified as ESHA in the certified

UCSB LRDP. As such, the use of a rock revetment, as referenced in the proposed Lagoon Management Plan, is not consistent with the policies of the LRDP or past Commission action. Further, alternative forms of shoreline protection such as dune nourishment and beach replenishment, may not only be feasible but would also serve to enhance the habitat, educational, and scientific value of the entire Lagoon Management Area. Therefore, the Commission can not find that the rock revetment, referenced in the proposed Lagoon Management Plan, is consistent with Sections 30235 and 30253 of the Coastal Act, or with past Commission Action regarding the use of a revetment to protect the eastern lagoon barrier. The Commission notes that the University has submitted revisions to the LMP with the intention of deleting any reference to the construction of the revetment previously proposed in conjunction with LRDP Amendment 2-97. Therefore, to ensure that the remaining references to the construction of the revetment and related development, including but not limited to Figure 1-3, are deleted from the proposed amendment, Modification Eleven (11) has been suggested. Modification Six (6), as previously discussed, has been suggested to clarify that the lagoon barrier road is not paved and to more accurately depict all service roads within the Lagoon Management area many of which are also unimproved.

Therefore, the Commission finds that the proposed amendment to the LRDP, as modified, is consistent with the Chapter 3 policies of the Coastal Act.

E. California Environmental Quality Act

Pursuant to Section 21080.9 of the California Environmental Quality Act ("CEQA"), the Coastal Commission is the lead agency responsible for reviewing Long Range Development Plans for compliance with CEQA. The Secretary of Resources Agency has determined that the Commission's program of reviewing and certifying LRDPs qualifies for certification under Section 21080.5 of CEQA. In addition to making the finding that the LRDP amendment is in full compliance with CEQA, the Commission must make a finding that no less environmentally damaging feasible alternative exists. Section 21080.5(d)(I) of CEQA and Section 13540(f) of the California Code of Regulations require that the Commission not approve or adopt a LRDP, "...if there are feasible alternative or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment."

The environmental analysis for the Campus Lagoon Management Plan is tiered from the University of California, Santa Barbara, Long Range Development Plan (LRDP) 1990 Environmental Impact Report (EIR). The 1990 LRDP EIR is a Program EIR, pursuant to Section 15168 of the California Environmental Quality Act (CEQA) Guidelines. The 1990 LRDP is a long-range plan that guides development by UCSB necessary for the University to meet its broad mission of instruction, research, and public service for the period 1990-2005/2006.

The CEQA concept of "tiering" refers to the coverage of general environmental matters in broad program level EIRs, with subsequent focused environmental documents for individual projects that implement the program. In accordance with CEQA Sections 15152 and 15168(C), this project is tiered to the 1990 LRDP EIR (SCH# 87022516) which is incorporated into the Initial Study by reference and which is available for review during normal operating hours at the UCSB Office of Budget and Planning at 1325 Cheadle Hall and at the California Coastal Commission's Ventura office.

For the reasons discussed in this report, the LRDP amendment, as submitted is inconsistent with the Chapter 3 policies of the Coastal Act and that there are feasible alternatives or mitigation measures available which would lessen any significant adverse effect which the approval would have on the environment. The Commission has modified the proposed LRDPA to include such feasible measures as will reduce environmental impacts of new development. As discussed in the preceding section, the Commission's suggested modifications bring the proposed LRDP amendment into conformity with the Coastal Act. Therefore, the Commission finds that the LRDP amendment, as modified, is consistent with CEQA and the Chapter 3 policies of the Coastal Act.

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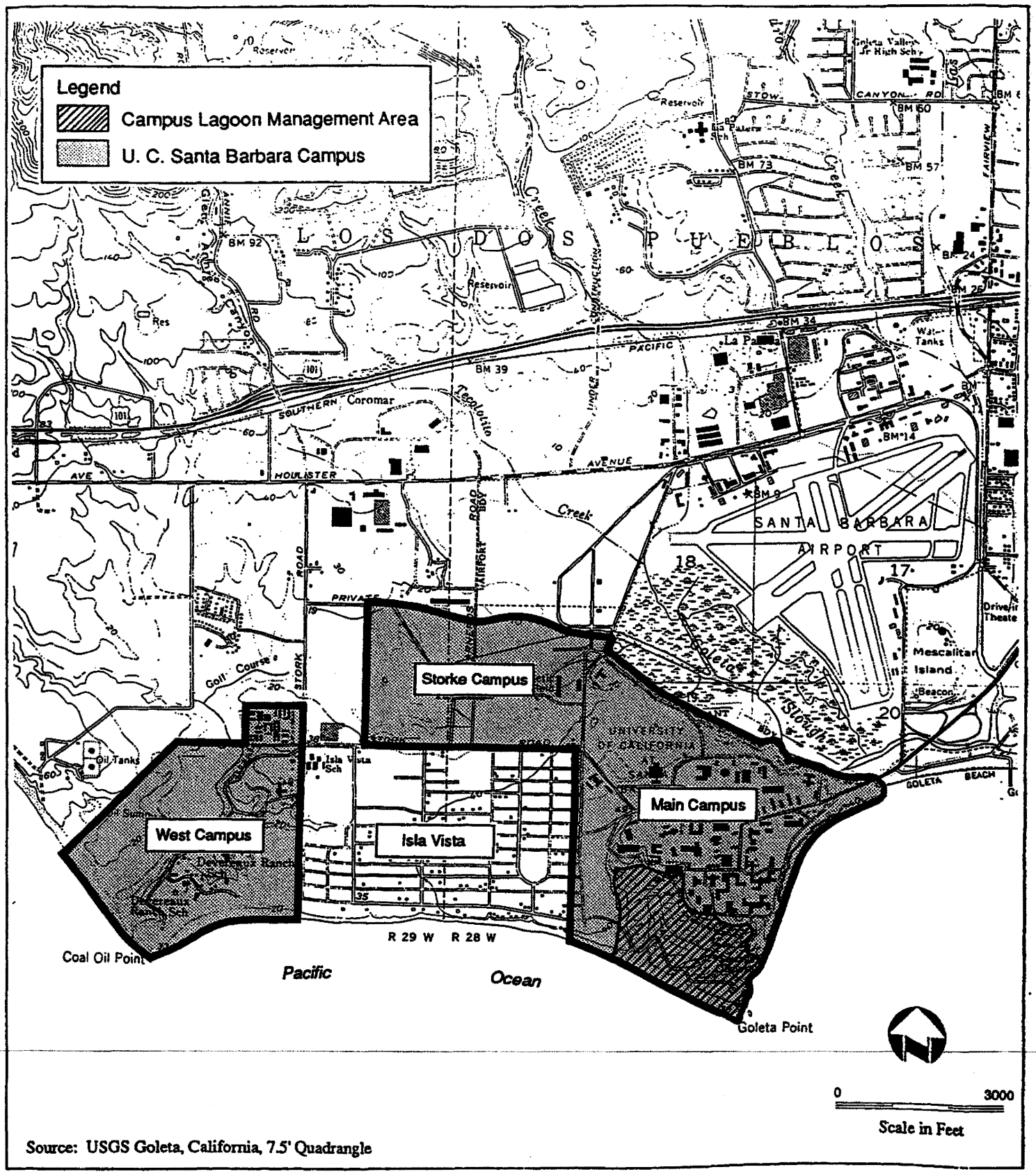
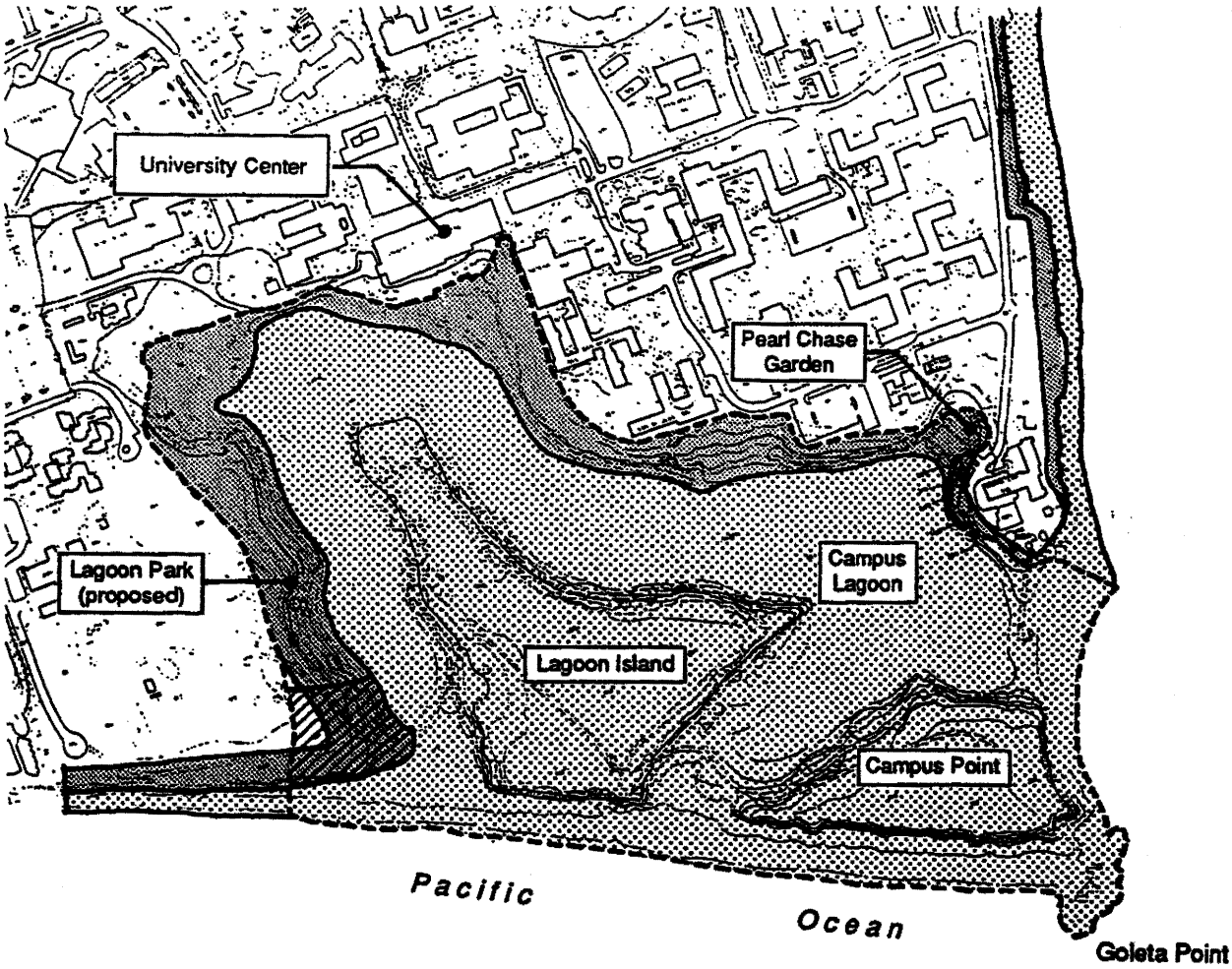


Source: USGS Goleta, California, 7.5' Quadrangle

Jones & Stokes Associates, Inc.

EXHIBIT 1
UCSB LRDPA 1-98
Regional Map



Legend

- Boundary of the Campus Lagoon Management Area
- Environmentally Sensitive Habitat Area (ESHA) [1]
- Areas Adjacent to ESHA and Open Space [1]
- Area Containing Special-Status Plant Species Proposed to be Included as ESHA [2]

0 75 150 300 600
Scale in Feet

[1] Source: 1990 Long Range Development Plan as amended (UCSB 1990)
[2] Source: Ferren 1994

Jones & Stokes Associates, Inc.

Figure 1-4.

EXHIBIT 2a
UCSB LRDPA 1-98
Proposed ESHA Map

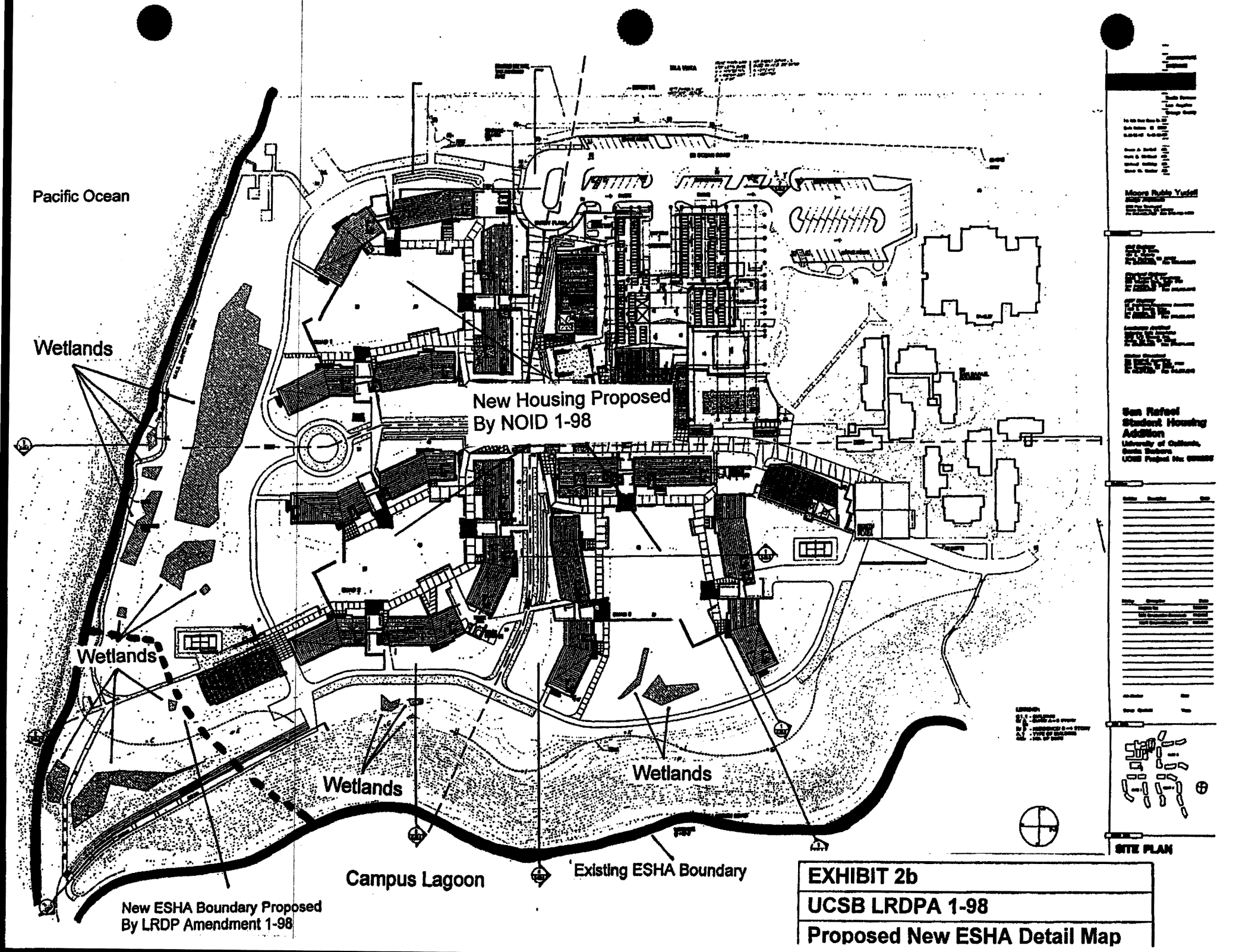
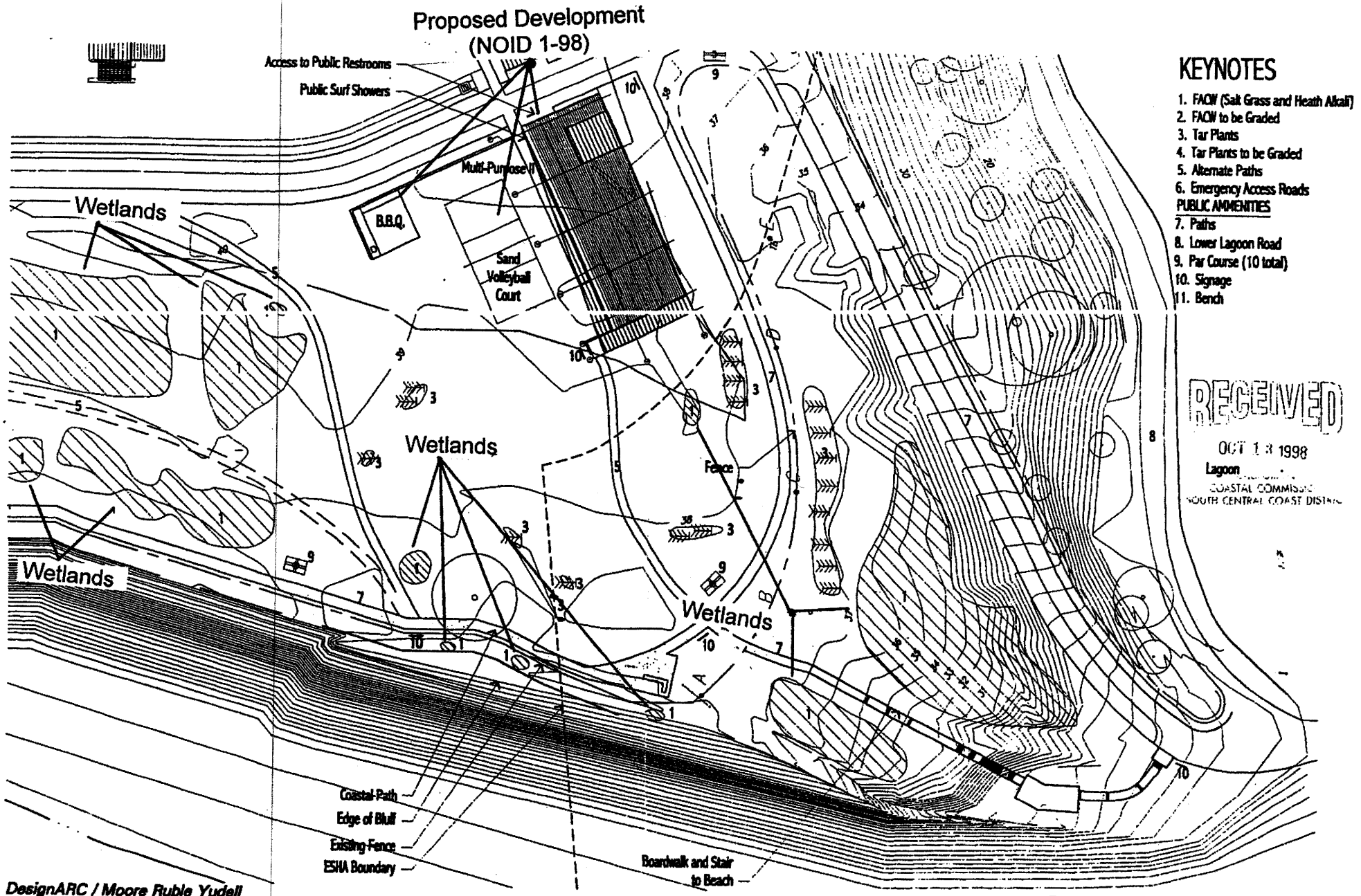


EXHIBIT 2b

UCSB LRDPA 1-98

Proposed New ESHA Detail Map



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SOUTH CENTRAL COAST DISTRICT

DesignARC / Moore Ruble Yudell

Enlarged Partial Site Plan - East Bluff
Figure 1-5
1"=40'-0"

EXHIBIT 3
UCSB LRDPA 1-98
Wetlands/Special Status Plant Species Map

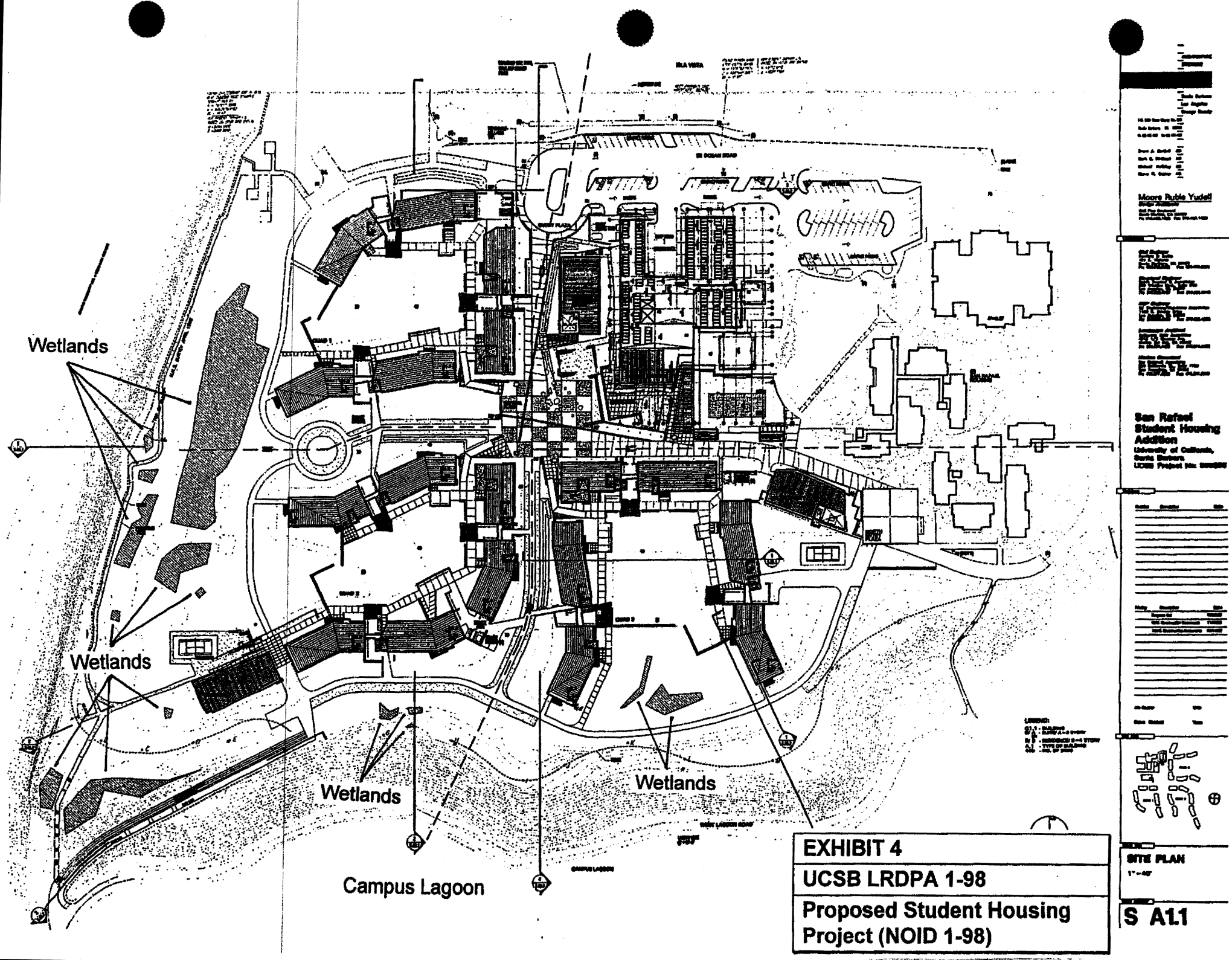

EXHIBIT 4

UCSB LRDPA 1-98

Proposed Student Housing Project (NOID 1-98)

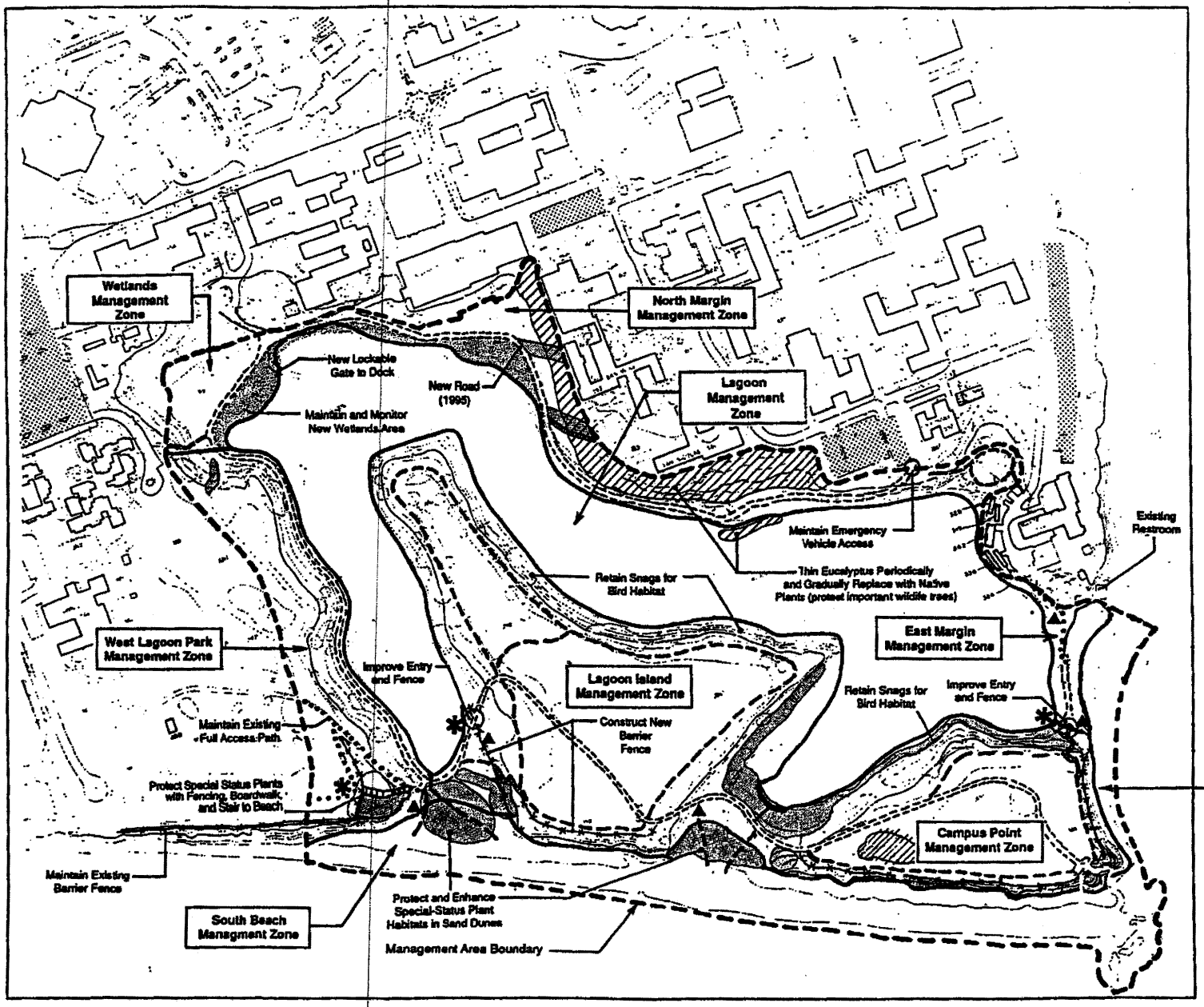

Figure 3-1.

Campus Lagoon Management Actions Summary Plan

Legend:

- Paved Emergency Access Road to Maintain
- Essential Path to Maintain or Improve
- Full Access Path to Maintain or Improve
- Eroded Areas to Protect and Allow to Revegetate
- Public Parking for Coastal Access
- Low Barrier Fence
- Stairs to Improve or Construct
- Information Sign
- Interpretive Exhibit

Source: Landscape Master Plan, Part III, U. C. Santa Barbara, 1992

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0 150 300 600
Scale in Feet

EXHIBIT 5
UCSB LRDPA 1-98
Summary Map

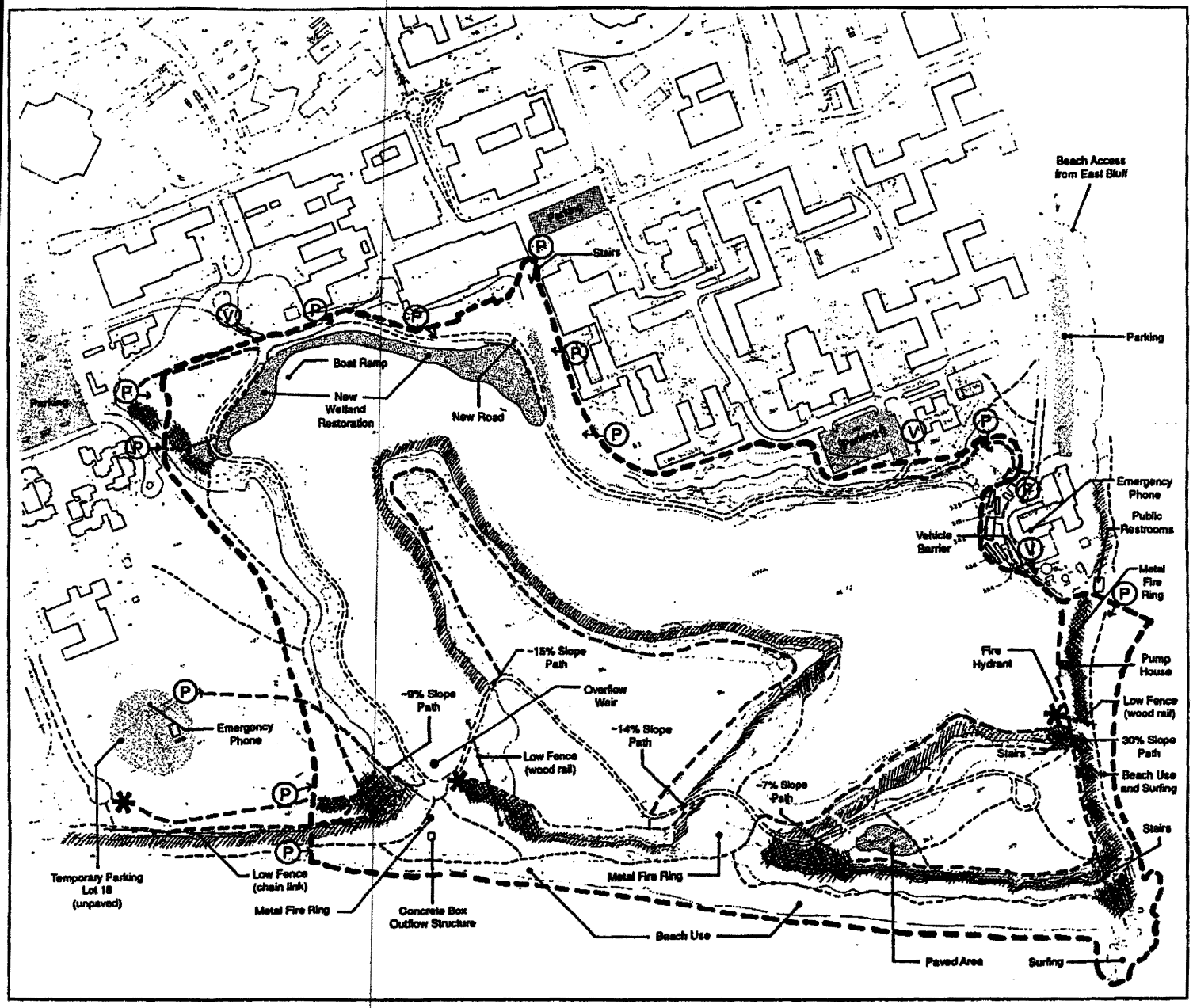


Figure 2-12.

Existing Public Use Features

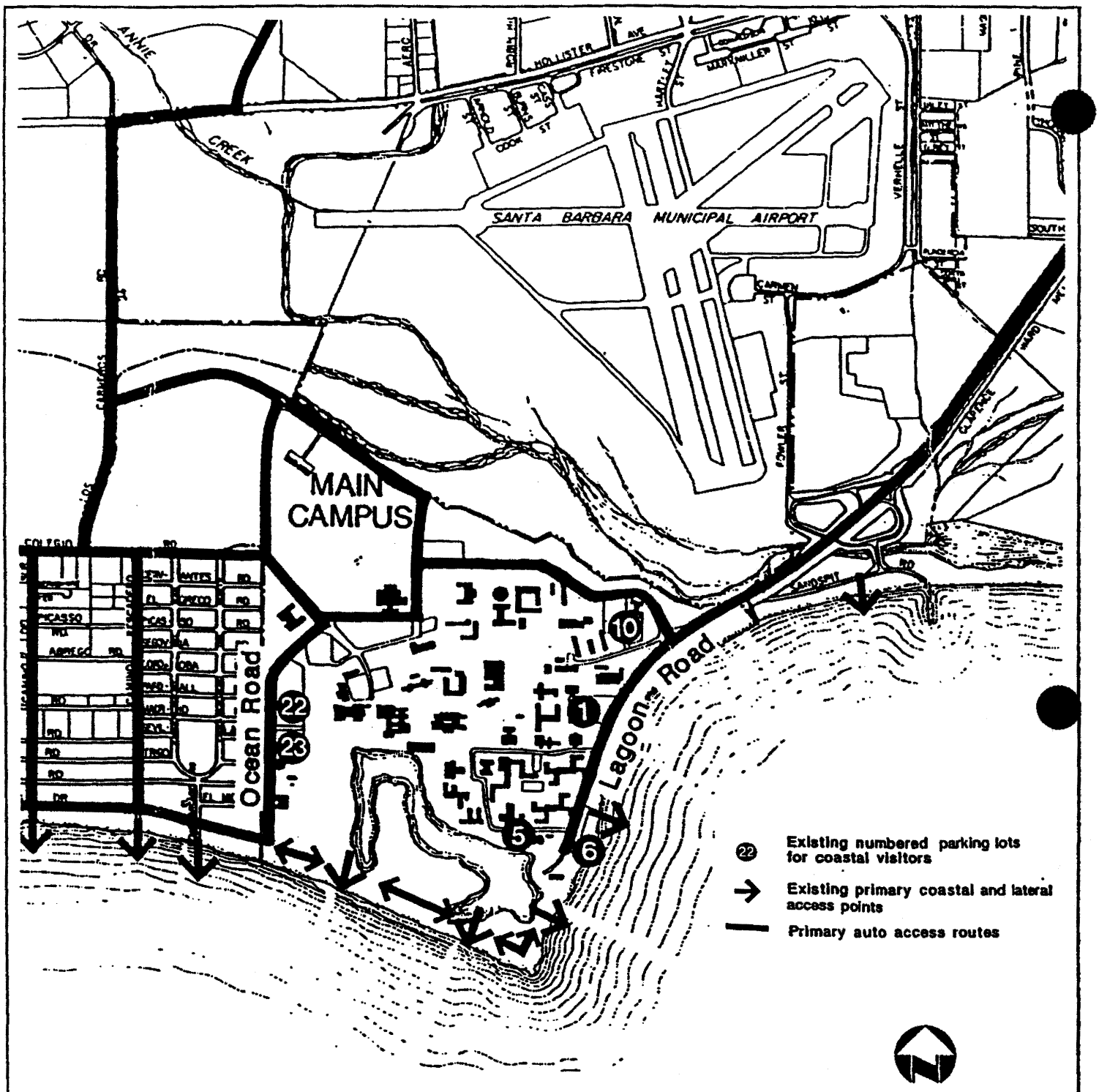
Legend:

- Management Area Boundary
- Paved or Partially Paved Road
- Primary Pedestrian Path
- Secondary/Informal Pedestrian Path
- Vehicle Entry to Management Area
- Pedestrian Entry to Management Area
- Eroded Slope or Area
- Hazardous Steep Slope or Cliff
- Coastal Access Information Sign

Source: Jones & Stokes Associates, 1994

0 150 300 600
Scale in Feet

EXHIBIT 6
Permit 4-98-212
Existing Public Use Features



Source: Long Range Development Plan, 1990

Jones & Stokes Associates, Inc.

Figure 2-13.

EXHIBIT 7

UCSB LRDPA 1-98

Existing Coastal Access

EXHIBIT 8a

Revisions to Lagoon Management Plan Submitted by University on March 18, 1999

RECORD PACKET COPY

UCSB Draft Lagoon Management Plan

Errata List

The following minor revisions to text are provided for the revisions to the Draft Lagoon Management Plan that were submitted to your office on January 22, 1999.

Page 1-4, Paragraph 3, Last sentence
Delete, ", and to reflect actions proposed in conjunction with the San Rafael Student Housing Additional Project on the blufftop point in the south west corner of the management area".

Insert, ", and to reflect actions proposed in conjunction with the San Rafael Student Housing Addition Project on the blufftop in the southwest corner of the management area".

Page 3-11, Paragraph 4, Sentence 5
Replace the word "welands" with the word "wetlands".

Page 3-19, Paragraph 2, Sentence 3
Delete entire sentence, "Approximately 0.17 of an acre of wetland vegetation occurs in areas that are proposed to be developed by the proposed San Rafael Student Housing Addition Project, and approximately 0.63 of an acre of wetland vegetation exists in areas immediately to the south or southeast of the proposed development area."

Insert, "As part of the implementation of the Lagoon Management Plan, the University will create at least an acre of suitable habitat (e.g. wetland, vernal pool) in lieu of a 100-foot setback from the identified "wetlands" as part of the San Rafael Student Housing Addition project.

Page 3-19, Last paragraph
Delete entire paragraph.

Insert, "As part of the implementation of the Lagoon Management Plan, the University will create at least an acre of suitable habitat (e.g. wetland, vernal pool) in lieu of a 100-foot setback from the identified "wetlands" as part of the San Rafael Student Housing Addition project.

Page 3-20, Partial sentence top of page
Delete entire sentence.

Page 3-28, Paragraph 4, Sentence 5
Delete, "A perimeter road around the southern and eastern edge of the proposed San Rafael Student Housing Addition project site would provide emergency vehicle".

Insert, "Access to the bluffs in the West Lagoon Park Management Zone would be provided via existing partially paved roads along the northern and western sides which would be maintained and improved for emergency vehicle use."

Page 4-3, Last paragraph
Delete entire paragraph.

EXHIBIT 8b

Revisions to Lagoon Management Plan Submitted by University on October 13, 1998

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List of Tables and Figures

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GOAL AND OBJECTIVES

The overall goal for managing the Campus Lagoon is to protect, enhance, and restore the area while maintaining it as a place for people to use and enjoy. This plan, its goals and objectives are based on the underlying presumption that the Campus Lagoon will remain an open water body. The management plan has been developed to ~~support this goal and~~ ensure that the lagoon area will continue to be a viable and valuable campus resource. The plan is intended to guide and direct management decisions and actions that may affect the lagoon area. In addition, it balances the goals of maintaining and improving habitats, public use and safety, water quality, hydrology, and aesthetics. Achieving this balance of purposes will require detailed and ongoing management that is comprehensive and adaptive to changes.

The objectives of this management plan are the following:

- Adhere to all coastal policy requirements pertaining to the Campus Lagoon area that are identified in the UCSB 1990 LRDP as amended.
- Adhere to all mitigation measures pertaining to the Campus Lagoon area that are identified in the LRDP EIR.
- Fulfill the CCC's requirement in the 1992 amendment to the 1990 LRDP for submittal of a "Campus Lagoon Wetland Management Plan as an amendment to the LRDP".
- Fulfill the CCC requirement that the management plan be consistent with the local coastal programs of adjacent communities.
- Adhere to and maintain consistency with all UCSB policies and programs for campus operations, public safety, and access.
- Identify management actions that implement LRDP policies, support the overall goal for the lagoon area, adequately address the issues of concern, are reasonable and feasible to implement, and represent UCSB priorities for balancing protection of the lagoon's ecological functions and its use and enjoyment by people.
- Adhere to all applicable federal and state regulatory compliance procedures and laws.
- Provide a basis for prioritizing funding and budgeting requests for implementing elements of the plan.
- Earn approval and support for the plan from the UCSB community, including the administration, faculty, appropriate committees, staff, and students and the public.
- Reflect specific area improvements to be developed in conjunction with the Seawater System Renewal Project and the San Rafael Student Housing Addition Project.
- Reflect the Commission's action on the proposed Seawater System Renewal Project by removing any reference to project elements that were not included in the Commission's approval.

ENVIRONMENTAL SETTING

The Campus Lagoon is located on the UCSB campus in Santa Barbara County on the south-central coast of California. The campus lies just south of the City of Goleta and about 8 miles west of the City of Santa Barbara's central downtown district (Figure 1-1). The UCSB campus is at the south edge of a coastal plain that extends from the base of the Santa Ynez Mountains to the Pacific Ocean.

Most of the UCSB campus is situated on top of a coastal terrace at an elevation of approximately 40 feet above mean sea level (msl). The campus topography also includes adjacent lowlands that contain wetlands, tidal lands, and areas of open water. The Goleta Slough and Santa Barbara Airport border the campus to the northwest (Figure 1-2). The 815-acre campus actually comprises three campuses (Main, Storke, and West) that almost surround the unincorporated community of Isla Vista. The Campus Lagoon area occupies the southernmost portion of the Main Campus, which juts into the Pacific Ocean.

The Campus Lagoon management area encompasses about 94 acres, nearly a quarter of the entire Main Campus of UCSB, and includes coastal bluffs and terraces, ocean beaches, sand dunes, the rocky Goleta Point, wetlands, and the lagoon itself (Figure 1-3). The lagoon has a surface area of about 31 acres and a surface elevation of approximately 6 feet above mean sea level (MSL). The lagoon management area is divided into nine management zones (Figure 1-3), each of which is generally distinguished by a unique signature of topographic, habitat, and cultural characteristics. These management zones help identify the locations of features, activities, and management actions in the lagoon area.

Most of the lagoon management area has been identified as an Environmentally Sensitive Habitat Area (ESHA) in the LRDP (UCSB 1990) (Figure 1-4). The ESHA designation includes the lagoon, Lagoon Island, Goleta Point, and beaches to the east and south. ESHAs are designated to preserve areas with special-status or other sensitive species or that provide unique opportunities for research and instruction (UCSB 1990). The remaining area in the management area, adjacent to the ESHA, is designated in the 1990 LRDP as open space. This area serves as a buffer between the ESHA and the more developed portions of the campus. A small area on the west bluff near the southwest corner of the management area contains special-status plant species and, because of this, is proposed in this plan to be included in the ESHA. The location of the ESHA is shown generally on Figure 1-4 and in detail on Figure 1-5.

PROJECT BACKGROUND

The Campus Lagoon has been a part of campus planning since at least 1954, when it was included in the University's Master Landscape Plan. The first LRDP was prepared for the campus in 1963. In that plan, the lagoon area was identified as a reserve with recreation and wildlife areas and designated paths (MacKay 1992). In subsequent years, the LRDP was updated several times and various new management policies were identified for the lagoon area. In 1970, the Lagoon Management Committee was formed at UCSB to help oversee management and planning of the lagoon area.

In 1981, the LRDP was certified by the CCC to conform with requirements of the California Coastal Act of 1976 (Coastal Act). The LRDP recognized the environmental sensitivity of the lagoon and established policies to help protect it (e.g., prohibiting swimming and establishing setbacks). In 1990, when the LRDP was again updated, the entire Campus Lagoon and much of

the area surrounding it was designated as either ESHA or open space, with requirements that the area be managed to protect important habitat values (UCSB 1990).

In 1992, the LRDP was amended to allow the University Center expansion project to extend into former Parking Lot 8 instead of Storke Plaza. The CCC approval of the amendment carried conditions that required, among other things, landscaping the edge of the lagoon near the University Center to essentially create salt marsh and brackish marsh wetland habitats. The CCC also required UCSB to "submit a Campus Lagoon Wetland Management Plan as an amendment to the LRDP with policies for protection, enhancement, restoration, and public interpretation and access for the Campus Lagoon" (UCSB 1992 LRDP policy 30240.[b]10).

PLAN DEVELOPMENT PROCESS

In August 1994, UCSB hired the environmental planning firm of Jones & Stokes Associates to prepare the Campus Lagoon management plan. Given the amount of existing data readily available from UCSB, an approach was developed that required only a small amount of additional fieldwork and data collection. A 1992 aerial photograph of the lagoon area was obtained from a local aerial survey company and detailed information was compiled on area biology, hydrology, water quality, and several other elements. Much of the background information, particularly information that appears in Chapter 2, was summarized from the Draft Natural Areas Plan (UCSB 1992). Key information is also summarized from Supplement I to the natural areas plan, Draft Management Plan for the Campus Lagoon and Vicinity (MacKay 1992), which was prepared as an undergraduate student senior thesis in the Environmental Studies Program.

The key steps in preparing the draft plan included:

- gathering and reviewing existing information and data for the lagoon;
- conducting an information-gathering meeting at UCSB with individuals who were knowledgeable about the lagoon area and UCSB operations;
- conducting a field visit and site inventory to verify conditions in the lagoon area and identify key issues regarding its management;
- identifying preliminary management issues, goals, and objectives;
- analyzing opportunities and constraints for management;
- identifying management actions and costs; and
- preparing a draft management plan, including general cost estimates, and an implementation strategy for eliciting review and comment from the UCSB campus community, the public and various agencies.

Jones & Stokes Associates prepared an administrative draft management plan, including general cost estimates, and an implementation strategy, for UCSB staff review. UCSB Office of Budget and Planning staff rewrote Chapter 4, the Implementation Plan, which outlines the University's strategy for implementation and identifies costs and scheduling priorities. The final plan will incorporate responses to UCSB, public and agency comments. The final management plan and LRDP amendment will be approved by the Regents and then submitted to the CCC for approval as an amendment to the LRDP. In October 1998, UCSB submitted proposed plan revisions to the CCC to bring the plan into consistency with the approved Seawater System Renewal Project ,and to reflect actions proposed in conjunction with the San Rafael Student Housing Additional Project on the blufftop point in the south west corner of the management area.

- overall growth-related issues

- issues that were evaluated in sufficient detail in the 1990 LRDP EIR for which there is no significant new information or change in circumstances that would require further analysis; and

- long-term cumulative impacts.

The Initial Study should be viewed in conjunction with the UC Santa Barbara LRDP EIR. The purpose of the Initial Study is to evaluate the potential environmental impacts of the plan with respect to the 1990 LRDP EIR to determine what level of additional environmental review, if any, is appropriate. The plan's relationship to the LRDP and the LRDP EIR is important in a number of respects:

- The Campus Lagoon Management Plan has been prepared to comply with a CCC condition for approval of an amendment to the 1990 LRDP, under provisions of the California Coastal Act.

- The Regents' action to approve the Campus Lagoon Management Plan does not commit UCSB to actions that are inconsistent with the adopted 1990 LRDP.

- The Campus Lagoon Management Plan provides more detail about proposed improvements in the management area that are consistent with the 1990 LRDP.

- Many of the actions to implement the Campus Lagoon Management Plan are ongoing operations and maintenance activities, or landscaping and habitat management activities that UCSB considers "ministerial" in nature and therefore exempt from CEQA (CEQA Guidelines Section 15268).

- ~~The one major project discussed in the plan that would be subject to future discretionary review is the Seawater System Replacement and Lagoon revetment project which is still in the planning stage. The 1990 LRDP describes the revetment in some detail (Part 2, Chapter IV, Marine Environment, D. Revetments, Breakwaters, Etc.) and recognizes that it would be subject to further Coastal Commission review under the Notice of Impending Development and CEQA procedures. An EIR will be prepared for the Seawater System Replacement Project.~~

- Based on the analysis contained in the Initial Study, it has been determined that Plan does not exceed environmental impacts previously identified in the 1990 LRDP EIR, no mitigation measures are required, and preparation of Findings consistent with this determination is appropriate.

- The Campus Lagoon Management Plan describes how UCSB will specifically implement existing LRDP coastal policies and the LRDP EIR mitigation measures to improve the environmental quality of the lagoon area.

- Mitigation measures identified in the 1990 LRDP EIR that are relevant are incorporated into the plan and are identified and discussed in the Tiered Initial Study.

- The following are the program level Mitigation Measures from the 1990 LRDP EIR that are variously: incorporated as Plan policy (during proposed construction projects and management activities); or implemented by the Plan; or support the

Seacliff Erosion

Seacliffs are eroded by high-energy waves, mostly during the winter months, in places where the toe of the cliff is unprotected by sufficient beach width. Characteristics such as the integrity of the rock material and the submarine topography influencing local wave energy determine the natural rate of this process. In addition, stormwater runoff from the cliff top is a factor that contributes to seacliff erosion.

At Goleta Point, the average rate of cliff retreat is 0.25-0.66 foot per year. In 1971, concern about the rate of cliff erosion in this area resulted in construction of rip-rap sea walls along the base of two cliffs: from Goleta Point west to the southerly lagoon entrance and between the Marine Laboratory and the restroom building (Figure 2-3). These sea walls were expected to reduce erosion of the cliff base, but not to provide protection from nonmarine erosion (such as runoff) from the mesa top (Tetra Tech, Inc. 1970 cited in MacKay 1992).

Lagoon Revetment

A revetment of beach sand and cobbles was placed along the upper beach across the former east entrance to the Campus Lagoon during construction of a road to Goleta Point in 1942. Before the 1950s, this revetment was covered by low, partially vegetated sand dunes. In 1952, the revetment was raised and widened by dumping construction debris that included soil, broken concrete, brick, and pieces of asphalt paving to form a more substantial barrier between the Campus Lagoon and the ocean. In 1952, an overflow weir was installed at the western end of the lagoon to control the maximum water level. During the 1960s, barbecue pits were installed along the revetment and seawater discharges into the lagoon associated with operations of the marine laboratory began. The revetment and the seawater discharges stabilized the water level in the lagoon, eliminating large seasonal fluctuations in water level.

A combination of beach sand depletion and severe winter storms in 1982-1983 caused damage to, and a near-breach of, the revetment~~. Sand bags have been used to reinforce the revetment each winter as UCSB has studied the problem in an effort to identify an acceptable long-term solution. One approach being considered would involve constructing a substantial rip-rap rock revetment structure to replace the existing revetment. An alternative approach that is not presently considered feasible as a long-term solution would involve replacing the eroded revetment and the eroded beach sands on the seaward side of the revetment with sand, gravel, and cobble fill material. (Tomeoni pers. comm. 1994.)~~ While sandbags have been used as a temporary measure to stem the high waters and protect the sandbar and beach from erosion, the Campus may wish to develop some form of permanent shoreline protection at that location. The beach seaward of the lagoon barrier is located within state tidal lands, and therefore the construction of any form of shoreline protection at this location will require a coastal development permit. In order to maintain the lagoon barrier for easy foot traffic, both to the beach and across the barrier to the bluffs to the south, the height of the lagoon barrier shall not be increased through the placement of fill unless necessary as an integral component of approved shoreline protection. Section 30235 of the Coastal Act allows for the use of shoreline protection measures when required to serve coastal dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to mitigate adverse impacts on local shoreline sand supply and so as not to block lateral access. Shoreline protection and enhancement programs that minimize adverse impacts to shoreline sand supply, public access and the habitat value of the beach ESHA, such as dune nourishment and/or beach replenishment, shall be considered as potential alternative forms(s) of protection for the lagoon barrier.

If shoreline protection is permitted, it shall not degrade the visual quality of the area, or become a safety hazard. Shoreline protections shall be designed to: (1) protect, and to the maximum extent feasible, enhance the environmentally sensitive habitat areas as designated by the LRDP, and (2) minimize alteration of natural shoreline processes, and to maintain coastal acess along dry sand area.

HYDROLOGY

The Campus Lagoon was created in its current form by the construction of a berm at the western terminus of the lagoon in 1942. A sandbar was also present on the east side of the lagoon near the location of the marine laboratory and, together with the berm, it impounded water in the lagoon area. The watershed for the lagoon (Figure 2-4) consists of the open space areas and bluffs around the lagoon margins and the Main Campus, which is connected to the lagoon by the campus stormwater drainage system.

Stormwater Drainage System

The campus stormwater drainage system consists of five areas, designated north, south, east, west, and central (Figure 2-4). The south, west, and central areas drain to the lagoon and comprise 24.8, 87.4, and 55.8 acres, respectively (Penfield and Smith 1992). A portion of the main campus runoff from these three areas discharges to the lagoon through eight stormwater outfalls along the northwest shore (MacKay 1992) (Figure 2-4). The peak volume of stormwater discharged to the lagoon during an average storm event (e.g., 2-year storm) greatly exceeds the volume of seawater currently discharged by the marine laboratory on a daily basis (Watson pers. comm.).

Marine Biotechnology Laboratory Seawater Discharge System

Although peak stormwater inflows can be high, the main source of water sustaining the lagoon is the seawater discharge of the marine laboratory. The seawater intake system currently has a capacity of 800 gallons per minute (gpm), and the total discharge to the lagoon is usually 400-500 gpm depending on laboratory activity (Dewitt pers. comm.). Seawater is discharged to the east end of the lagoon through two pipes. Some of the discharge is also diverted to the east beach because of the limited capacity of the western terminus overflow weir.

Lagoon Bathymetry and Circulation

The lagoon has a surface area of approximately 31 acres and a volumetric capacity of 131,000 cubic meters (Gillard 1969 cited in MacKay 1992). The surface elevation varies from 4 feet above msl during summer months to a maximum of 7 feet msl during periods of heavy storm runoff. Water depths in the lagoon range from 1 foot to 5 feet and average about 4 feet. The lagoon depths and bathymetry are shown in Figure 2-5. The lagoon has no prevailing flow pattern except during periods of heavy rain, when localized currents can develop near stormwater outfalls. Wind and convection are the main forces that promote mixing in the water column. During summer months, the pond can be stagnant because of high water temperatures and evaporation.

Lagoon Protection and Flood Potential

Lagoon Outflow System

Two outflow structures are present in the lagoon: the overflow pipes in the eastern levee and the overflow weir in the western arm of the lagoon. Two overflow pipes were placed in the eastern levee in 1991 because high levels of precipitation caused water levels to rise 2 feet above its banks (Anderson pers. comm. cited in MacKay 1992). The two pipes are placed just above the normal water elevation set by the overflow weir, so they operate when the overflow weir capacity is exceeded (Anderson pers. comm.). Both pipes were plugged until heavy storms required them to be cleaned out. One of these pipes, however, is again plugged with sand (Anderson pers. comm.).

The key part of the lagoon outflow system is the overflow weir at the western terminus of the lagoon (Figure 2-4). It was constructed in 1952 to prevent flooding and overflow of the sand bar (original levee) near the present location of the marine laboratory. The overflow weir at the western terminus maintains the lagoon water level at a maximum of 7 feet. The weir overflows during periods of heavy rain and at other times when large quantities of seawater are being discharged. During a site visit on September 14, 1994, the weir was overflowing several inches of water. Seawater discharge from the marine laboratory appeared to be minimal at the time. Water entering the weir flows through a 24-inch-diameter pipe to an outfall box on the beach where it is dispersed across the narrow beach into the surf. The capacity of the overflow weir is limited by either the weir structure or the outfall pipe. Also, the outfall box on the beach requires regular maintenance to clear sand from it that could reduce outflow capacity.

Proposed Marine Biotechnology Laboratory Upgrade and Seawater System Replacement Project

~~Before discussing the proposed Marine Biotechnology Laboratory Upgrade and Seawater System Replacement Project it should be noted that UCSB does not propose to install a revetment as part of implementing the Lagoon Management Plan. Any references to the revetment within the Lagoon Management Plan are either based on existing LRDP policies, or attempt to provide further detail about what future revetment improvements might look like, by using a description from a project that is still in the planning phase, has not been reviewed pursuant to CEQA, and has not been submitted for approval to the UC Regents or the California Coastal Commission. The 1990 LRDP describes the revetment in some detail (Part 2, Chapter IV, Marine Environment, D. Revetments, Breakwaters, Etc.) and recognizes that it would be subject to further Coastal Commission review under the Notice of Impending Development and CEQA procedures.~~

The proposed marine laboratory upgrade~~, which includes substantial improvements to the east levee revetment~~, would increase the design capacity of the seawater intake system from 800 gpm to 1,200 gpm. ~~The proposed project is currently in the planning phase of the Capital Planning Process, and is still being developed. Consistent with the 1990 LRDP, the need for permanent levee protection from ocean wave action was discussed in a report prepared by UCSB (1994). The improvements would provide much needed stabilization of the east levee and protection of the lagoon and the marine laboratory facilities. Refer to "Geology, Soils, and Coastal Processes" above for a discussion of levee protection. The proposed plans also include replacement of the two existing pipes in the levee with one 36-inch diameter pipe to provide additional overflow capability because of the current capacity limitation of the overflow weir~~.

The existing seawater discharge piping system will not be changed under the proposed plan. The effect or change in circulation patterns in the lagoon as a result of increased seawater discharge is unknown.

- plants that are listed by CNPS as "plants about which we need more information" and "plants of limited distribution" (Lists 3 and 4 in Skinner and Pavlik 1994), which may be included as special-status species on the basis of local significance or recent biological information.

Special-status animals are defined, for the purpose of this document, to include species in the following categories:

- animals that are listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.11 [listed animals] and various notices in the Federal Register [proposed species]);

- animals that are Category 1 or 2 candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (56 CFR 225, November 21, 1991);

- animals that meet the definitions of rare or endangered species under CEQA (State CEQA Guidelines, Section 15380);

- animals that are listed or proposed for listing by the State of California as threatened and endangered under the California Endangered Species Act (14 CCR 670.5);

- animal species of special concern to DFG (Remsen 1978 [birds] and Williams 1986 [mammals]); and

- animal species fully protected in California (California Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians].

Special-Status Plant Species

Three special-status plant species are known to occur in the management area: red sand-verbena (*Abronia maritima*), Coulter's saltbush (*Atriplex coulteri*), and southern tarplant (*Hemizonia parryi* ssp. *australis*).

Red Sand-Verbena. Red sand-verbena is a prostrate, succulent, sticky-haired, red-flowered perennial herb that grows in beach sand and blooms from February to November. It occurs in sand-verbena - beach bursage series vegetation in the sand dune portions of the South Beach management zone. Red sand-verbena is considered to be a plant of limited distribution (List 4) by CNPS (Skinner and Pavlik 1994) and has been declining in numbers because its habitat has been eliminated or degraded by human activities. It originally ranged along the immediate coast from Baja California to San Luis Obispo County; however, it has been extirpated from most of southern California. Red sand-verbena is reported from Ormond Beach (Jones & Stokes Associates 1994), Emma Wood State Beach (Ferren et al. 1990), and the Channel Islands (Smith 1976).

Coulter's Saltbush. Coulter's saltbush is a small, gray-leafed annual herb that grows in seasonally ponded habitats. It occurs in shallow, poorly defined vernal pools and open sites in alkaline or clay soils, and is associated with California annual grassland series and California sagebrush series vegetation. It occurs in the southern part of the West Lagoon Park management zone on the bluff just above the west arm of the lagoon in an area that receives fairly heavy public use (Figure 1-5). Coulter's saltbush is considered to be a rare and endangered plant (List 1B) by

CNPS (Skinner and Pavlik 1994) and has been declining in numbers because of habitat loss and degradation from human activities. It originally ranged along the immediate coast from Baja California to Santa Barbara County and occurred at some inland sites (i.e., Riverside County) and in the Channel Islands; however, it has been extirpated from most of southern California. Coulter's saltbush is reported from Goleta and Jalama and apparently has been introduced along railroad tracks in Santa Barbara County (Goleta) (Smith 1976).

Southern Tarplant. Southern tarplant is an upright, yellow-flowered, annual herb that grows in seasonally ponded and mesic grassland habitats. It occurs in shallow, poorly defined vernal pools and open sites in alkaline or clay soils, as well as loamy soils, and is associated with California annual grassland series and California sagebrush series vegetation. It occurs in the southern part of the West Lagoon Park management zone along with Coulter's saltbush on the west bluff near the lagoon in an area that receives fairly heavy public use (Figure 1-5). Southern tarplant is a Category 2 candidate for listing as a threatened or endangered species by the USFWS and is considered to be a rare and endangered plant (List 1B) by CNPS (Skinner and Pavlik 1994). It has been declining in numbers because of habitat loss and degradation from human activities. It originally ranged along the immediate coast from Baja California to Santa Barbara County and occurred in the Channel Islands; however, it has been extirpated from most of southern California. Southern tarplant is reported from Isla Vista at the north campus housing project site (Wallace Roberts & Todd 1994a), at the western edge of Goleta Slough at the north edge of UCSB, at Pitas Point, and apparently has been introduced along railroad tracks in Santa Barbara County (Smith 1976).

Special-Status Wildlife Species

Seven special-status wildlife species occur regularly in the management area: California brown pelican (state listed and federally listed as endangered), double-crested cormorant (state species of special concern), great blue heron (DFG special animal), black-crowned night-heron (DFG special animal), western snowy plover (federally listed as threatened), tricolored blackbird (state species of special concern and federal Category 2 candidate), and wandering (salt marsh) skipper (federal Category 2 candidate). The brown pelican and double-crested cormorant do not nest in the management area, but they forage and roost in the lagoon and along the shoreline. The removal of a wooden platform that was placed in the lagoon during the 1970s as a graduate student experiment in cormorant roosting behavior led to a decrease in available habitat for roosting pelicans and cormorants. However, brown pelicans and cormorants continue to use the lagoon and the shoreline on a regular basis.

Several pairs of great blue heron formerly nested in the eucalyptus trees bordering the northwest shore of the lagoon and continuing toward the University Center. This was one of the few nesting locations in the county for the great blue heron. Although the great blue heron has apparently abandoned this grove as a nesting area, the black-crowned night-heron does nest in these trees. These species forage in the wetlands and shallow open water habitats at the lagoon. (MacKay 1992.)

Western snowy plover is not known to nest in the management area, but it rests and feeds on the beaches during migration. Tricolored blackbird has been observed in the lagoon area, but there is no indication that it nests there. Wandering (salt marsh) skipper has not been reported from the management area; however, it could occur in the pickleweed series habitat along the margins of the lagoon.

CULTURAL RESOURCES

PUBLIC USE

The Campus Lagoon management area is perhaps the most important area of open space on the Main Campus. It provides an important setting and focus for public use activities that include recreation, nature study and enjoyment, and aesthetic enjoyment of the area. Also, it is occasionally used for university instructional activities and classroom exercises. The lagoon area is the largest area of open space on the Main Campus (UCSB 1990) and receives heavy public use, mostly by students, many of whom live in several dormitories located on the mesa adjacent to the lagoon. For the community of Isla Vista, located adjacent to the west bluff area, the lagoon provides an important natural and open space area within walking or biking distance and attracts substantial public use. In addition, the beaches provide important regional and local recreation opportunities.

Public Access

The Campus Lagoon management area is reached primarily by foot or bicycle. Paved roads are located along the edge of the lagoon on the north and west sides. The lagoon area is easily accessible from several paved parking lots north and west of the lagoon (Figure 2-12). Numbered parking lots in Figure 2-13 identify those designated for public use and coastal access. UCSB does not charge for public parking during weekends and evenings and charges a nominal fee for weekday parking. Coastal access direction and information signs are posted near the parking lots, but these are often vandalized or stolen. (UCSB 1990.) An unpaved, temporary parking lot (Lot 18) was constructed during summer 1994 on the west bluff near the lagoon to provide temporary parking spaces because of construction projects on the campus. The temporary Lot 18 site was designated for student housing in the LRDP. The campus discontinued use of the Lot 18 in September 1998.

For the most part, direct access to the lagoon from the main campus mesa is down steep hillsides, pathways, or stairs. However, access is available to the lagoon that can accommodate persons in wheelchairs or with other mobility limitations (e.g., the road entering the lagoon area from the northwest). Unassisted access for people with mobility limitations to Lagoon Island and Goleta Point is very difficult because the slope of the paved road ascending the west side of Lagoon Island exceeds 15% and the slope up the northern escarpment of Goleta Point from the east revetment exceeds 30%. Also, loose sand covers portions of the paved road, make access by wheelchairs difficult. A portion of the road grade leading from the marine laboratory into the East Margin management zone slightly exceeds slopes easily accessible for people with limited mobility (UCSB 1994).

Activities and Facilities

Most public use occurs around the fringes of the lagoon management area. Areas of greatest use are the beaches, the rocky tip of Goleta Point, the blufftop edges that face south and have views of the ocean, and the trails and open lawn areas along the northern edge in the Wetlands and North Margin management zones. Frequently used areas include the area below the University Center, the Commencement Green, and the Pearl Chase Memorial Garden. The interiors of the Lagoon Island and Goleta Point management zones and the bluff top in the West Lagoon Park management zone are not used as extensively.

Public safety is an important element of public use in the lagoon management area, particularly with regard to safety hazards (e.g., steep bluffs, slopes, and fire potential), emergency service operations, and access needs for emergency service vehicles.

The lagoon management area contains several features that may be hazardous to careless users. The most notable areas are associated with south- and east-facing coastal bluffs in the West Lagoon Park, Lagoon Island, and Goleta Point management zones (Figure 2-12). These bluffs are nearly vertical cliffs, about 25-30 feet high, and consist of extremely erosive materials. These areas may be dangerous for people who choose to walk along the edges of the bluffs because they are unstable, and eroded holes and slide areas exist within and next to some of the bluff-edge paths. Also, people often sunbathe or sit on the beaches near the base of some of the bluffs. Rocks and debris occasionally fall from the bluff face as a result of either natural erosion processes or people dislocating material from the bluff top. A low barrier chain-link fence at the top of the south-facing bluff in the West Lagoon Park management zone helps to keep people away from the steep edge and protects the bluff face from further damage. No fences have been installed along steep bluff edges in the Lagoon Island or Goleta Point zone. Steep slopes in other portions of the lagoon management area also may be hazardous (Figure 2-12) to the careless.

High public use also contributes to high potential for fires, especially during the dry season from about May through October. Because the Lagoon Island and Goleta Point management zones are isolated from the Main Campus, these areas do not represent an important fire danger (Kargard pers. comm.). However, UCSB must maintain emergency vehicle access to these areas to protect public safety. UCSB mows fire breaks in the Lagoon Island management zone, generally during late spring. The grassland in the West Lagoon Park management zone presents a higher fire danger because it is near existing buildings and contains dry, flammable vegetation, especially during summer and fall. In this area, however, fuel loads are not high and access is very good from several directions so that fires could be controlled quickly. The eucalyptus trees in the North Margin management zone pose a more serious fire hazard because they are extremely flammable and overhang or are located near existing buildings, including student residences that are occupied most of the year. However, fire truck access is available and water hydrants are provided nearby. The road along the north margin is essential for maintaining fire and other emergency vehicle access (Gawronik pers. comm.). Locations and numbers of fire hydrants in the lagoon management area are adequate for fire protection (Kargard pers. comm.).

The lagoon itself poses a low safety concern because it is shallow and not attractive for swimming. Shoreline vegetation and mud along the shallow edges, combined with algae during the warmer summer months, produce conditions not generally attractive for swimming or wading.

The number of crime incidents or accidents reported in the lagoon management area have not been high relative to those in other areas of the campus. Reported incidents over the past several years include several rapes and rape attempts; occasional flashing; and a small number of robberies, robbery attempts, and molestations. Incidents of transients sleeping and camping in remote areas of the Lagoon Island, Goleta Point, and West Lagoon Park management zones occur several times each year. ~~The recent construction of parking lot 18 on the west bluff south of San Rafael dormitory will probably discourage transient use of that area. (Bean pers. comm.)~~

The UCSB police department daily patrols the lagoon area by car. Officers drive the road along the north margin; next to the marine lab; onto the west bluff from Ocean Drive; and on the road along the west edge of the lagoon, across Lagoon Island, and onto Goleta Point. The road just described is paved, although somewhat deteriorated, and includes a turnaround on Goleta Point. Patrol cars occasionally drive past the turnaround on a narrow dirt path to within about 30 feet of the bluff edge at Goleta Point to gain an overview of the beach areas. The entire road is

important for maintaining emergency vehicle access and gaining good vantage points for patrolling the lagoon area, including the beaches. (Bean pers. comm.)

Student workers equipped with radios also periodically patrol the lagoon area by bicycle. For safety purposes, student workers do not go past the west beach area onto Lagoon Island or Goleta Point. They travel along the north margin road more often than the west margin road. For purposes of personal safety, student workers only issue verbal warnings and, in general, focus their patrols on the more populated areas of the campus. (Bean pers. comm.)

The road along the north margin is important for emergency access. In addition to using it for regular patrols, the police use this road as an east-west shortcut across campus; it saves about 5 minutes of drive time and is safer for the public than driving through the more populated sections of the campus. (Bean pers. comm.)

Some lighting is provided along the north margin road, but this is mostly near the University Center. Emergency telephones are located at the marine laboratory . ~~and at the recently constructed parking lot 18~~. No telephones, lights, or electricity lines are present in the south part of the management area, in the Lagoon Island or Goleta Point management zones. (Bean pers. comm.)

Public Use Impacts

The extensive public use in the area, combined with soils that erode easily after vegetation is damaged or removed, has resulted in many eroded areas within the management area. Substantial impacts have occurred in the management area from people creating informal trails, removing vegetation, and causing erosion. Figure 2-12 shows most of the areas of high erosion in the management area.

As described earlier in this section, mountain bikes and heavy pedestrian traffic have caused substantial damage in portions of the management area. Impacts of heavy public use are most apparent on steep slopes and along bluff edges on the south and east sides of the management area, in the northwest corner near the Commencement Green, and in both sand dune areas in the South Beach management zone. Public use of steep slopes on the northeast side of the Goleta Point management zone and at the point itself has caused substantial erosion in these areas. Heavy foot and bike traffic along the edges of bluff tops and on steep slopes near existing paths along the south and east sides of the management area have caused severe erosion problems in these areas. Also, in the southern portion of the West Lagoon Park management zone, heavy use of the bluff-top and slope down to the lagoon is threatening populations of special-status plants (see the discussion under "Special-Status Plant Species" above).

Education and Research Activities

The lagoon area, and the lagoon in particular, is occasionally used for education and research activities (UCSB 1990). Several research projects have been conducted during approximately the past 30 years (MacKay 1992). Some of these studies are described under "Vegetation Management and Habitat Improvements" above. The lagoon area is used regularly for classroom exercises and projects by undergraduate students in biology and other science courses. It is also used for classes in art and other subjects. Educational use of the lagoon depends on individual professors' interests and course educational objectives.

should be directed away from problem areas, preferably toward the interior of coastal bluff landforms.

Lagoon Barrier Protection

Maintaining the integrity of barriers that protect the lagoon from tidal inundation and wave action is essential to maintain the lagoon as an open water body and protect the management area's ecological, aesthetic, public use, educational, and research values. Three areas around the lagoon's periphery act as barriers to protect the area's important functions and values: the east lagoon barrier in the East Margin management zone and the two low areas at the sand dunes on either side of Lagoon Island.

The east lagoon barrier is essential for protecting the management area's aesthetic, recreational, and ecological values; maintaining its educational, public use, and research functions; and protecting structures and access. Should the barrier be breached, as it nearly was during severe storms in the early 1980s and several times since, much of the lagoon would drain to the ocean, and values and functions described above would be substantially affected.

Since the early 1980s, UCSB has protected the east lagoon barrier using sandbags as a temporary measure. While sandbags have been used as a temporary measure to stem the high waters and protect the sandbar and beach from erosion, the Campus may wish to develop some form of permanent shoreline protection at that location. The beach seaward of the lagoon barrier is located within state tidal lands, and therefore the construction of any form of shoreline protection at this location will require a coastal development permit. In order to maintain the lagoon barrier for easy foot traffic, both to the beach and across the barrier to the bluffs to the south, the height of the lagoon barrier shall not be increased through the placement of fill unless necessary as an integral component of approved shoreline protection. Section 30235 of the Coastal Act allows for the use of shoreline protection measures when required to serve coastal dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to mitigate adverse impacts on local shoreline sand supply and so as not to block lateral access. Shoreline protection and enhancement programs that minimize adverse impacts to shoreline sand supply, public access and the habitat value of the beach ESHA, such as dune nourishment and/or beach replenishment, shall be considered as potential alternative forms(s) of protection for the lagoon barrier. If shoreline protection is permitted, it shall not degrade the visual quality of the area, or become a safety hazard. Shoreline protections shall be designed to: (1) protect, and to the maximum extent feasible, enhance the environmentally sensitive habitat areas as designated by the LRDP, and (2) minimize alteration of natural shoreline processes, and to maintain coastal acess along dry sand area. ~~The LRDP (UCSB 1990) identifies the importance of devising a more permanent solution for protecting the barrier by improving it to maintain access and using an "aesthetically pleasing" design solution. The LRDP identifies design criteria for improving the revetment along the east face of the barrier, including protecting habitat, shoreline processes, public safety, and visual quality; maintaining access; and protecting the area from erosion. The revetment is fully discussed in Part 2, Chapter VI, Section D of the 1990 LRDP.~~

~~The Seawater System Replacement project (including improvements to the revetment) is still in the planning phase, and UCSB is not seeking approvals for this project in conjunction with the Lagoon Management plan. However, information that has been developed about the revetment, in planning for the Seawater System Replacement project, is included herein to provide further detail about what form future revetment improvements might take. As part of the seawater system replacement project focused on the marine laboratory and its surroundings, UCSB identified detailed design improvements for the barrier that adhere to or surpass the LRDP criteria for environmental protection (UCSB 1994), subject to review and approval by the Regents and the~~

~~CCC. The present schedule for the start of construction for the seawater system replacement project and the accompanying improvements is 1998. An Environmental Impact Report and Notice of Impending Development will be prepared for the project.~~

~~UCSB undertook a pre-design study for the Seawater System Replacement project to determine how to incorporate environmental and Coastal Act considerations in the project. Based on this evaluation it is anticipated that the east lagoon barrier could be improved as described in the report, Detailed Project Program – Seawater Replacement Project (UCSB 1994), and as approved by the Regents and the CCC. Figure 3-2 shows a preliminary design for the lagoon barrier revetment. This design would meet the design criteria identified in the LRDP and exceed those criteria by creating a narrower revetment that would have fewer environmental impacts than the design described in the LRDP (UCSB 1994).~~

The other two barriers, located on either side of Lagoon Island, are reasonably stable and have not been threatened by wave action recently. In recent years, however, heavy public use has damaged some vegetation in both areas, destabilizing portions of the sand dunes and causing some migration of sand. If the dunes become destabilized further, one or both of these areas could, under certain storm conditions, be breached by wave action. To reduce the likelihood of this occurring, actions should be taken to monitor and stabilize the dunes, primarily through revegetation and control of public access (see "Vegetation Management and Habitat Improvements" and "Public Use" below).

Management Actions

Management Goal ES: Reduce erosion and protect slopes, bluffs, and ocean barriers.

Objective ES-1: Reduce erosion associated with public use activities and features, such as paths and trails.

Action ES-1.1: Public access to existing eroded areas or areas that may be prone to erosion impacts should be controlled using a combination of structural and vegetative barriers and informational signs. (See also PU-1.5, PU-2.2).

Action ES-1.2: A simple gate structure should be constructed, an informational sign should be placed, and the existing fence near the base of the west slope of Lagoon Island should be improved to discourage bicycle access but allow entry by pedestrians, people with wheelchairs, and emergency vehicles. (See also PU 1.4, 1.6 and 2.3.)

Action ES-1.3: The existing wooden entry structure should be improved, an informational sign placed, and the existing fence improved to discourage bicycle access but allow pedestrian entry at the south end of the East Margin management zone near the base of the north slope of Goleta Point. (See also PU 2.3.)

Action ES-1.4: Already eroded areas and nonessential paths should be protected by using barriers at entries where appropriate and allowed to revegetate with native plants.

Action ES-1.5: For well-established paths that are determined to be essential, the existing natural surface should be maintained in a manner that is appropriate to the natural character of the area.

Also, see Action PU-2.4 concerning programs to help educate the public about trail use to reduce erosion.

Objective ES-2: Protect steep slopes and bluffs from human-induced erosion in ESHAs or other areas where special-status species or public safety considerations are present.

Action ES-2.1: A combination of techniques should be used to discourage people from damaging the bluff edges or steep slopes where ESHAs, special-status species, or public safety would be affected (e.g., fences and other barriers, informational signs, repair of damaged areas using structural and revegetation techniques, and public education and awareness programs). Low fences and barriers that blend aesthetically with the area should be placed along the south-facing edges of the coastal bluffs in the West Lagoon Park and Lagoon Island management zones, and along the south- and east-facing bluff edges in the Goleta Point management zone. (See also PU-3.8.)

Action ES-2.2: Severely eroded areas along the top of the bluffs should be allowed to revegetate with native plants, and, where possible, drainage should be directed away from problem areas and eroded drainages should be repaired or allowed to revegetate. (See also PU-2.5.)

Objective ES-3: Protect barriers that prevent ocean inundation and draining of the lagoon.

Action ES-3.1: Protect ~~T~~the existing east lagoon barrier, while providing for easy foot traffic , both to the beach and across the barrier to the bluffs to the south, by maintaining the existing height of the barrier. ~~should be improved as part of the comprehensive upgrading of the marine Laboratory and seawater system replacement project and as approved by the Regents and the CCC. (See also PU-2.7.)~~

Action ES-3.2: The two lagoon barriers located on either side of Lagoon Island should be monitored and stabilized if necessary, primarily through revegetation and control of public access. (See also PU-2.6.)

HYDROLOGY MANAGEMENT

Hydrology management at the lagoon will focus on the need to accommodate the proposed increased seawater discharge from the marine laboratory, protect surrounding areas from flooding, maintain and improve lagoon aesthetics, improve water quality, and maintain and improve vegetation and wildlife habitats.

Management Rationale

Water Level Management

Water levels in the lagoon fluctuate within a narrow range of about 4-6 feet msl, with a maximum of 7 feet msl during winter storms. Therefore, water level management should accommodate highly variable and uncontrolled inflows of both seawater and stormwater runoff while maintaining a relatively constant water level by controlling lagoon outflow. The primary method by which water levels would be controlled is the western terminus overflow weir.

Lagoon Outflows

To provide improved control and flexibility to manage lagoon outflows, a new overflow weir should be designed and constructed to replace the current structure. Controlling outflows at this location would be the primary mechanism to manage the hydrology of the lagoon. The new overflow weir should be adjustable so that water levels could either remain relatively constant, with adequate overflow capacity provided during storm events, or vary seasonally as desired. The overflow weir should have increased capacity so that all seawater discharged by the marine laboratory could go to the lagoon to increase circulation during summer. This would allow greater flexibility in lagoon water management. The Museum of Systematics and Ecology would be responsible for monitoring the overflow weir and lagoon water levels and Facilities Management will continue to maintain it.

With regard to managing water levels in the lagoon, higher water levels (at or above 6 feet MSL) may be desirable during summer to maintain water quality, and lower water levels during winter would provide runoff capacity and stimulate flushing of the lagoon. A conceptual design for operational settings and seasonal variations is presented in Figure 3-3 Water levels should also be managed to maintain wetland areas along the margins of the lagoon. Water levels and their importance to water quality are discussed in more detail below under "Water Quality Management".

~~The 36-inch pipe proposed for placement in the east levee as part of the improvements and revetment should be used to provide additional outflow capacity and water level control during winter storms when the overflow weir is near capacity. This approach would maintain maximum lagoon circulation and flushing, especially during summer.~~

A preliminary cost estimate for designing and constructing the new overflow weir and outflow system at the west terminus of the lagoon is up to $100,000 (Watson pers. comm.).

Another option for improving circulation would be to extend one of the seawater discharge pipes northward and westward into the lagoon to provide for flow directly into those parts of the lagoon. This option would likely be very expensive. ~~If this option is considered by UCSB, it should be evaluated as part of the overall marine laboratory expansion project.~~

Locating new stormwater outlets at the northern and western ends of the lagoon to flush the lagoon, is another strategy that might be considered to reduce nutrient concentrations and improve circulation. This concept would have to be implemented in conjunction with water quality protection measures such as the use of gravel filters in drainage inlets and vegetated drainage swales.

Lagoon Capacity

Over the long term, sediments entering the lagoon could reduce lagoon capacity and depth, decreasing both circulation and water quality. Dredging could increase water depths, thus reducing water temperatures and increasing capacity. Dredging could also increase circulation if a small channel were dredged to enhance flows to the northwestern and western portions of the lagoon. Dredging would be very expensive, however, and studies should be conducted before dredging begins to evaluate sediment quality and disposal requirements.

Water Level Monitoring

Lagoon water levels normally have not fluctuated substantially and therefore should continue to be managed at levels that fluctuate between 5.5 feet and 7 feet msl. To monitor lagoon water levels, a staff gauge should be installed at the overflow weir. Another staff gauge could be

Management Rationale

Increasing Water Level Control and Circulation

Objectives and actions described for hydrology management would also apply to improving water quality. The overflow weir should be the primary mechanism by which water levels should be managed, as discussed in the "Hydrology" section. The new structure should also have improved outflow capacity so that increased seawater inflows can be accommodated to improve circulation, especially during summer months. The lagoon should be managed primarily as a saltwater habitat because of the dominance of seawater in the lagoon's current condition, the increased volume of seawater proposed to be discharged to the lagoon, and the need to improve circulation using the seawater discharge. Therefore, salinity should be stabilized as much as possible throughout the year except during storms. During storms, freshwater inflows would flush the lagoon and temporarily decrease salinity, especially in and near the wetlands management zone. ~~The 36-inch pipe to be placed in the east levee should be opened only during emergencies and large storms.~~ The predominance of saltwater should not be incompatible with the recently developed small brackish marsh in the wetlands management zone where several stormwater outfalls are located.

The critical period for maintenance of water quality is during the summer because of the stimulation of algal growth. Objectives and actions to improve water quality should focus on improving these conditions, thereby greatly reducing algal growth. Although the seawater discharge has high nutrient levels relative to the intake, the increase in seawater discharge to the lagoon is expected to improve water quality by increasing circulation and flushing.

Reducing Algal Growth

Operational changes should focus on reducing water temperatures and nutrient levels by increasing circulation and reducing detention time in the lagoon. Lowering the overflow weir and flushing the lagoon with stormwater during winter storms would help reduce nutrient accumulation in the lagoon. The actions to improve water quality would require monitoring to evaluate and verify results. The recommended monitoring program is discussed below.

Dredging is another possible action that could reduce algal growth potential in the lagoon. Dredging could reduce algal growth by reducing water temperatures (as a result of increased water depth) and increasing circulation. These benefits are described above under "Hydrology". However, because of the typically high costs associated with testing, permitting, excavation, and disposal of dredged material, this action should be evaluated carefully to determine its feasibility. Additionally, some of the dredged material could be used to create shallow wetland and shorebird habitats in portions of the lagoon.

Improving Watershed Management

Improving watershed management for areas draining to the lagoon should focus on continuing best management practices (BMPs) already being used by UCSB and improving implementation of additional BMPs to reduce pollutants in the lagoon watershed and in stormwater entering specific areas of the lagoon. BMPs include both structural measures, involving treatment methods, and nonstructural measures, such as educational and regulatory actions. BMPs are usually applied as a system of practices and are selected on the basis of site-specific conditions that

reflect natural background conditions and political, social, economic, and technical feasibility. UCSB already uses several BMPs in accordance with policies and local conditions described in the LRDP. Parking lots on campus are probably the main source of pollutants in stormwater, and these areas are the focus of existing BMPs. Additional BMPs to consider for implementation are presented below. Some of the BMPs are likely to be very expensive to implement; others may require additional expenditures by UCSB for maintenance or monitoring or both.

Sources of information about available BMPs were evaluated for applicability to the lagoon and its watershed. The sources of information consulted are presented in Table 3-1.

Lagoon BMPs. The feasibility of implementing available BMPs at the lagoon is limited by the elevation and location of stormwater outfalls and by cost. Consideration of BMPs to improve stormwater quality entering the lagoon should be concentrated in the wetlands management zone because of constraints elsewhere of slope, water depth, and accessibility to stormwater outfalls.

As part of the conditions for approval of the University Center LRDP Amendment, the University installed a new brackish marsh and saltmarsh habitats in the Wetlands management zone (Figure 3-4). The design includes a brackish marsh area located near a stormwater outfall in the lower elevation habitat. The design also includes a saltmarsh habitat located at the elevation immediately below the brackish marsh. This wetlands design may not continue to function as intended if the amount of seawater discharged to the lagoon increases as proposed for the seawater system replacement project. However, this issue would be addressed in the EIR for the seawater expansion project because that project would have to consider the existing wetlands habitat in the analysis of impacts. As an alternative, actions (such as the development of a seasonal stormwater wetland) could be considered that would use or treat stormwater before it reaches the lagoon. There are two BMPs that could be implemented in this area of the lagoon if an adequate area were available. These are vegetated filter strips (VFSs) and either constructed or stormwater wetlands. A conceptual design for stormwater wetlands is presented in Figure 3-5. A combination of both BMPs could also be implemented. A VFS could replace or be added to the buffer shown in Figure 3-6. One of the main limitations of creating a brackish stormwater wetland at this location is the lack of a summertime source of fresh water. Reclaimed wastewater should probably not be used as a supplemental freshwater source because of its high nutrient levels. The wetland could be designed as a seasonal wetland using drought-tolerant species.

After evaluating various factors UCSB has determined that these BMPs are not feasible <u>at the UCen lawn or Commencement Commons</u> because of site conditions, costs and the importance of the existing land uses to the University. The stormwater wetland does not appear to be viable <u>in these locations</u> because there is no available land to construct it adjacent to the Lagoon. The lawn area between the UCen and the Lagoon has a steep slope, and is used by students for passive recreation and as a free speech area, and the lawn area between the Faculty Club and the Lagoon is used for Commencement ceremonies. UCSB does not propose to convert these existing land uses to a seasonal stormwater wetland <u>However, it may be possible to create stormwater welands along the margin of the lagoon. This is an option that could be considered if changes are proposed to the storm drain outlets or if the Museum proposes to restore or create wetlands in an area adjacent to a storm drain outlet.</u>

Watershed BMPs. The feasibility of implementing additional BMPs in the lagoon watershed is limited primarily by cost. Consideration of BMPs to improve stormwater quality entering the lagoon should focus primarily on nonstructural measures to reduce pollutant sources in the lagoon watershed. Existing measures focus on eliminating or treating runoff from parking lots and other large, impervious areas.

Nonstructural BMPs for reducing watershed pollutant sources should focus on improving the quality while maintaining the quantity of the stormwater inflow by reducing pollutant levels. The existing and recommended BMPs are presented below in Action WQ-2.1.

Structural BMPs would focus on areas of new development and construction, including parking lots and other large, impervious surface areas. Parking lots would be targeted because they are a potential source of substantial pollutant loads. These BMPs include use of water quality inlets, VFSs, and small detention basins. Conceptual designs for these BMPs are shown in Figures 3-7 through 3-9. This approach was used by the engineering firm of Penfield & Smith for constructing a temporary parking lot used during construction of the parking structure, and is proposed in conjunction associated with the ~~new~~ proposed San Rafael housing project.

Although no adverse effects on aquatic biota from pollutants in the lagoon have been observed or reported, implementing a combination of BMPs would reduce pollutant levels in stormwater inflow and improve water quality. The listed BMPs must first be evaluated for applicability and efficiency and then be integrated into an overall program with the lagoon BMPs.

Monitoring Water Quality

A modest water quality monitoring program for the lagoon should be developed by and implemented under the direction of the Museum of Systematics and Ecology, together with consultation as needed with members of the Wetlands Committee. The focus of the monitoring program should be primarily on nutrient levels and responses of algae growth to nutrients. The RWQCB has informed UCSB that it would not require further monitoring unless conditions changed (i.e., seawater discharge increases).

The monitoring program would be implemented to evaluate the effects of the recommended management actions by:

- documenting existing water quality,
- providing data for feedback about circulation and water level controls, and
- verifying the efficacy of BMPs.

The monitoring program should include periodic monitoring of inorganic parameters such as nitrate, phosphate, suspended solids, and total dissolved solids. These parameters should be analyzed every month from May through October. It is recommended that temperature, pH, specific conductance, and dissolved oxygen content be monitored at three points in the lagoon: near the seawater outfall, at west end, and at the dock at the northwest end of the lagoon. Monitoring would not be required during the wet season (November-April) but could be continued as an option for the first 1-2 years of the program. These parameters can be easily and inexpensively analyzed in the field by marine laboratory maintenance staff. The Museum of Systematics and Ecology should draw on the expertise of Wetland Committee members who are knowledgeable and experienced in collecting and analyzing these data in developing the monitoring program.

Management Actions

Management Goal WQ: Improve water quality at the lagoon.

Vegetation Management

The management area consists of two basic habitat types, natural and artificial. The natural habitats should require little, if any, additional maintenance to sustain them after restoration activities have been performed. The artificial habitats consist of ornamental landscaping and will likely need regular ongoing maintenance. Generally, the aim of this management plan is to minimize maintenance requirements for vegetation management.

Some ornamental plantings are inappropriate in their present location because they reduce habitat quality for native plants and wildlife and may be difficult to manage (e.g., from fire danger). For example, activities in certain portions of the management area may adversely affect sensitive or natural habitats or species, such as on the sand dunes or coastal bluffs. Some ornamental plantings do provide values for wildlife, such as by providing structure for roosting and nesting, cover from predators, and sources of food.

The following sections describe the rationale for implementing specific management actions to maintain and enhance the biotic and natural resources in the management area.

Protect Special-Status Species. To effectively protect individuals, populations, and habitats of special-status species, field surveys for particular species should be conducted to map them accurately. This could be accomplished by students as part of a class or individual project, as part of a research project, or as a UCSB Museum of Systemics and Ecology supervised research project.

All special-status species populations should be managed to protect them from harm as a result of human activity or management. Passive barriers (e.g., logs, low rail fences, or telephone poles) and interpretive signs should be installed at sites where impacts on special-status species from humans have occurred or could occur, such as along trails. For example, two rare annual plant species, Coulter's saltbush and southern tarplant, occur ~~in dried out, shallow vernal pools and flats~~ at the southwestern corner of the West Lagoon Park management zone, which is currently receiving considerable foot and bicycle traffic. Controlling human access by encouraging people to stay on designated trails (e.g., placing interpretive signs and access barriers along the trail) would help sustain and protect these rare plants.

Control Invasive Exotic Plants. Removing and controlling invasive exotic plants is an important component of managing sensitive species and habitats in the management area. In areas where sensitive species or habitats are being adversely affected by encroachment from exotic species, a program to control invasive exotic plants should be undertaken by UCSB. Before vegetation control treatments are begun, a qualified botanist should flag populations that need to be treated. Treatments could include hand removal or herbicide application or a combination of both.

Table 3-2 lists each invasive species and suggested control methods. Removal and control of these plants would probably require both chemical and mechanical treatment. If properly implemented, the initial removal of the invasive exotic plants would greatly reduce or possibly eliminate subsequent control measures. Glyphosate (e.g., Roundup or Rodeo) and triclopyr are two herbicides that have been used successfully to safely control most of the invasive exotic plants listed below. The use of herbicides must be supervised by a California licensed pest control applicator. Some invasive exotic plants, such as myoporum, can be eradicated by cutting them down and removing their roots. Others, such as pampas grass, giant reed, and Kikuyu grass, will likely require several herbicide treatments and removal of the plants to control them effectively. The hottentot and sea figs have been controlled successfully by applying glyphosate and leaving the dead plants in place. This discourages the seeds to germinate because they are not exposed to

racemosa), mule fat (*Baccharis salicifolia*), and arroyo willow (*Salix lasiolepis*), should be planted in the areas where the eucalyptus trees are removed. The goal would be to eventually replace all or most of the eucalyptus trees in the management area with native vegetation with a higher overall habitat value.

Vernal Pool ~~Restoration~~ Creation. Prior to conducting a wetland delineation it was considered possible that ~~S~~several shallow and degraded vernal pools might be ~~are~~ present in the west bluff area of the West Lagoon Park management zone. A wetland delineation that was conducted on the adjacent San Rafael Student Housing Addition project site (Padre Associates, 1998) determined that based on the absence of the topography or zonation of vegetation characteristic of vernal pools, the project site does not support vernal pools.

The wetland delineation also concluded that based on the absence of hydric soils, the project site does not contain Federal jurisdiction wetlands. However, based on the presence of hydrophytic vegetation (saltgrass and alkali heath), wetlands as defined by the California Coastal Commission are located at the project site. Approximately 0.17 of an acre of wetland vegetation occurs in areas that are proposed to be developed by the proposed San Rafael Student Housing Addition Project, and approximately 0.63 of an acre of wetland vegetation exists in areas immediately to the south or southeast of the proposed development area. The identified wetlands are comprised of patches of vegetation containing saltgrass or alkali heath, with no other characteristics that distinguish them from surrounding non-wetlands (Padre Associates, 1998). The location of the wetland areas on the blufftop within the West Lagoon Park Management Zone are shown on Figure 1-5.

Two special-status plant species also occur there; therefore, this unique and valuable habitat should be protected and, if possible, restored. In conjunction with the environmental analysis conducted for the proposed San Rafael Housing Addition Project ~~Under the direction of the Museum of Systematics and Ecology and in consultation with members of the Wetlands Committee,~~ a delineation of the exact locations of the vernal pools and special-status plants in the management zone ~~should be~~ was prepared ~~and to implement the following~~ and resource protection measures were identified including :

- ~~Redirect trails and roads away from the pools and rare plants and prevent public access to the vernal pools.~~ Provide controlled public access through the proposed ESHA located on the the blufftop within the West Lagoon Park Management Zone. Improvements to provide public access and protect the ESHA from disruption should include signs, fences, stairs, and a boardwalk, through the proposed ESHA area as shown on Figure 1-5.

- There should be no grading within the proposed ESHA area other than that necessary to provide public access and for resource protection.

- Remove invasive exotic plants from the area.

In conjunction with the proposed San Rafael Student Housing Addition Project and development of Lagoon Park, the degraded wetland vegetation (previously considered potential vernal pools) would be removed and planted with native grasses. The environmental analysis for the proposed San Rafael Student Housing Addition Project recommended the establishment of replacement habitat on Lagoon Island as mitigation for the removal of the degraded wetland vegetation at a ratio of three acres for each acre removed. The establishment of replacement habitat on Lagoon Island was the preferred mitigation (rather than trying to restore the existing degraded wetland vegetation) because the Island would provide a suitable environmental conditions to create new vernal pools or wetlands; similar programs to create vernal pools that have been undertaken by the Museum of

Systematics and Ecology have been successful; and unlike the existing wetland vegetation area, the proposed mitigation site is isolated from foot and bicycle traffic.

- ~~Determine the actual watershed for each pool.~~
- ~~Determine the soil profile for each vernal pool.~~
- The vernal pool creation project should include monitoring ~~monitor~~ the vernal pools for 3 years to determine the species richness, dominance, and distribution of the plants and aquatic invertebrates in each pool. Monitoring for invertebrates should occur when the pools are inundated and monitoring for plants should be conducted during spring after much of the water in the pools has evaporated. After 3 years, the monitoring data would be available for further study and action by interested departments and research units at UCSB~~.~~

Wildlife Management

Wildlife and wildlife habitats at the Campus Lagoon management area would be managed to protect and improve opportunities for native wildlife. This could be accomplished by:

- enhancing wildlife habitats and habitat features (e.g., snags, roosts, cavities, and nesting and roosting structures),
- protecting existing habitats and selected habitat features, and
- minimizing disturbance by humans and domestic animals.

Protect Some Eucalyptus Trees and Improve Habitat for Native Species. Eucalyptus trees provide winter nectar sources for several species of hummingbirds, the monarch butterfly, and some insects. Some eucalyptus trees also provide roost and nest sites for hawks, owls, and herons. Great horned owl and black-crowned night-heron are reported to nest in the eucalyptus grove at the north lagoon margin. Removal of eucalyptus from the North Lagoon management zone would help improve habitat for native vegetation and many wildlife species; however, some trees should be retained for heron and raptor nesting and winter foraging habitat until native vegetation around the lagoon provides similar or suitable habitat. To protect nesting birds, human disturbance should be minimized within 300 feet of any known heron, owl, or other raptor nesting areas during the breeding season (January 1-August 1). By minimizing human access near active nest locations, the chances of nesting success would be improved. (See earlier discussion under "Control Eucalyptus Trees and Improve Habitat for Native Species"). With the possible exception of important habitat trees, eucalyptus trees should be thinned and removed whenever opportunities are available and the campus fire marshal identifies that there is a public safety hazard. For the eucalyptus grove between the existing road and the lagoon in the North Margin management zone, trees with 4-inch or less calipers should be removed whenever opportunities are available. All new growth of eucalyptus trees should be controlled as early as possible. Some larger healthy trees that are identified as having important wildlife values should be retained until similar or suitable habitat values for native vegetation exist in the management area. As eucalyptus trees are removed, they should be replaced with native trees and shrubs.

Minimize Wildlife Disturbance by Domestic Dogs. Although domestic animals probably cause little direct mortality to wildlife, they have been observed harassing wildlife near shorelines. Domestic animals can significantly stress and disturb wildlife, causing the wildlife to be more vulnerable to disease and predation. Effective methods of reducing impacts from domestic animals on wildlife in the management area are probably limited to continuing to enforce

maintain public access, eroded portions of the slope should be protected and allowed to revegetate. An accessible path is available because the existing improved path down the slope and emergency vehicle access are maintained along the improved, full-access path from the west bluff down to the beach.

Barriers should be installed at the top of the west bluff slope to discourage people from using parts this area. All improvements should avoid impacts on special-status plants that occur in this area, and barriers should be installed to discourage access to habitat areas for these plants. The existing coastal access route from the blufftop trail to the beach can be maintained by installing a boardwalk, fencing and stairs to allow pedestrians to pass through the area while protecting special status plants. Because this is a well-used entrance to the management area, an informational sign should be located there to identify the access route to the beach and ways to help protect the habitat. An interpretive exhibit should also be placed there that discusses the plants and other natural and cultural elements of the area.

In both sand dune areas in the South Beach management zone, barriers and informational signs should placed to discourage traffic in sensitive dune area. Essential paths (at least two in each dune area) should be designated for public access, and the remaining, nonessential trails should be repaired and revegetated.

~~Potential improvements to the east lagoon barrier are described under "Erosion and Slope Management" and illustrated in Figure 3-2. Besides protecting the structural integrity of the barrier and lagoon, improvements to the barrier are intended to maintain and improve public access from the Main Campus to the beach and Goleta Point. Access improvements include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, and providing stairs to the beach at the pumphouse. Other access improvements proposed at the east lagoon barrier, which are primarily for public safety, are described below under "Public Safety".~~

Public Safety

Protecting public safety is a primary concern for the management area. Parts of the management area are remote, hazardous areas such as steep slopes and bluffs are present, and some areas pose a fire danger. Maintaining access for emergency service vehicles is a high management priority. All existing emergency access should be maintained in the lagoon area, including all vehicle entry points and paved roads shown in Figure ~~3-2~~ 3-1. For any improvements that occur in the West Lagoon Park management zone, emergency vehicle access should be maintained and improved in consultation with UCSB emergency services departments. ~~from Ocean Road into the lower lagoon area.~~ A perimeter road around the southern and eastern edge of the proposed San Rafael Student Housing Addition project site would provide emergency vehicle access to the bluffs in the West Lagoon Park management zone ~~The existing road grade down the slope is adequate and should be maintained for fire access and regular police patrols.~~ The paved roads along the northern and western sides should also be maintained and improved for emergency vehicle use. ~~Proposed improvements to the east lagoon barrier should be made as part of the proposed comprehensive upgrading of the marine laboratory seawater system and subject to approval by the Regents and CCC. The design program for the seawater system replacement project calls for placing a removable bollard across the road to provide emergency access near the marine laboratory, paving the road on top of the barrier, and providing a hammerhead turnaround at the base of the north facing bluff.~~

Police vehicles patrol the lagoon area daily on the paved roads that extend around most of the lagoon. Maintaining vehicle access is important for quick response times and personal safety. The police currently use a small path on Goleta Point to drive closer to the edge for good visibility

Action PU-1.2: Informational signs should continue to be maintained at the parking areas. When informational signs are removed or damaged beyond repair, new signs that are more resistant to vandalism should be installed by UCSB as replacements.

Action PU-1.3: All currently available vehicle access routes for emergency services, maintenance, and other UCSB-authorized purposes should be maintained as necessary for public safety in the lagoon area.

Action PU-1.4: Traditional access routes to beaches and other important destinations through and into the management area should be maintained in a manner that causes the least amount of environmental damage to the area. (See also ES-1.2, ES-1.3, and ES-1.5.)

Action PU-1.5: Two volunteer trails leading into the management area on the steep slope near the San Miguel dormitory could be improved to maintain access and reduce environmental impacts on the rest of the slope, or barriers should be installed to discourage students from using the slope as a shortcut. (See also ES-1.1.)

Action PU-1.6: For new facilities developed in the management area, UCSB should adhere to its existing policy (in accordance with state and federal requirements) to provide full and equal access to all new facilities for people, including those who are physically challenged, where it is feasible and not restricted because of topographical and environmental constraints.

Action PU-1.7: For any educational or other public use facilities (e.g., interpretive trails, exhibits, or overlooks) planned to be constructed on Goleta Point or Lagoon Island, UCSB should carefully consider the environmental impacts and costs of constructing these facilities and work with local interest groups to develop appropriate ways to meet federal and state requirements for providing full access.

Objective PU-2: Control public access in the lagoon area to reduce environmental impacts.

Action PU-2.1: Restrictions on bicycles should continue to be enforced on a regular basis by UCSB police and student workers for all areas where bicycle riding is restricted in the management area (e.g., Lagoon Island and Goleta Point) (see also discussion under "Erosion and Slope Management").

Action PU-2.2: Bicycle riding should continue to be prohibited in the West Lagoon Park management zone except on paved surfaces that are present now or are planned with future development of the park. (See also ES-1.1 and PU-2.5.)

Action PU-2.3: To discourage bicycle access to Goleta Point and Lagoon Island, informational signs and barriers should be installed, and entry points and fences should be improved at the existing bicycle access points to these areas. (See also ES-1.2 and ES-1.3.)

Action PU-2.4: UCSB should implement a variety of techniques and programs to involve and educate people about ways to reduce erosion in the management area (e.g., interpretive exhibits, printed informational materials, involvement by student groups in organized activities to encourage awareness and self-policing). (See also PU-5.1.)

Action PU-2.5: To protect and repair the eroded east-facing slope of the west bluff in the southern portion of the West Lagoon Park management zone, barriers should be

installed at the top of the slope; an informational sign should be installed to help direct people to a boardwalk and stairs ~~the access path~~ to the beach; eroded parts of the slope should be allowed to revegetate; and the existing accessible path down the slope should be improved for easier wheelchair access to the beach and Lagoon. ~~continue to be maintained; and emergency vehicle access should be maintained along the improved, full-access path from the west bluff to the beach area.~~ All improvements should avoid impacts on special-status plants in this area. (See also ES-1.5, VH-2.5, PU-2.2, and ES-2.1.)

Action PU-2.6: In both sand dune areas in the South Beach management zone, barriers and informational signs should be placed to discourage traffic in these sensitive dune areas, essential paths (at least two in each dune area) should be designated for public access, and remaining nonessential trails should be allowed to revegetate naturally. (See also ES-3.2 and VH-2.2.)

~~**Action PU-2.7**: Proposed improvements to the east lagoon barrier should be constructed to maintain and improve public access from the Main Campus to the beach and Goleta Point as part of the proposed seawater system replacement project and subject to review and approval by the Regents and CCC. Proposed access improvements as part of this project include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, and providing stairs to the beach at the pumphouse. (See also ES-3.1 and A-1.2.)~~

Objective PU-3: Maintain and improve public safety and access for emergency service vehicles at the lagoon area.

Action PU-3.1: All existing emergency service vehicle access routes should continue to be maintained in the lagoon area, including all vehicle entry points and paved roads shown in Figure 3-2. (See also PU-2.5 and ES-1.5.)

~~**Action PU-3.2**: Proposed improvements should be made to the east lagoon barrier for emergency vehicle access as part of the seawater system replacement project; these include placing a removable bollard across the access road near the marine laboratory for emergency access, paving the road on top of the barrier, and providing a hammerhead turnaround at the base of the north facing bluff. (See also ES-3.1 and PU-2.7.)~~

Action PU-3.3: The eucalyptus groves in the North Margin management zone should continue to be maintained by gradual thinning and permanent removal of some trees identified in coordination with the campus fire marshal to reduce fire danger and for other purposes. As opportunities become available, native trees, shrubs, and groundcovers should be established to replace and improve the wildlife habitat values lost from the eucalyptus trees but maintain a low fire hazard. Eucalyptus trees identified as important roosting or nesting habitat should be retained until their habitat value is provided by native vegetation, and all eucalyptus trees with 4-inch or less calipers should be removed and controlled regularly. (See also VH-2.4 and VH-3.1.)

Action PU-3.4: Mowing to create firebreaks on Lagoon Island should be coordinated with the campus fire marshal and performed as necessary to protect public safety. (See also VH-
1.3.)

Action PU-3.5: To reduce the danger of people falling or being struck by falling debris, low barriers that would not be visually intrusive should be permanently installed along and near the steep coastal bluff edges at Lagoon Island and Goleta Point. (See also ES-2.1.)

AESTHETIC MANAGEMENT

Management Rationale

The visual character of the Campus Lagoon management area is mostly natural and of high quality. Important views from the management area are of the ocean, coastline, distant hills, the Main Campus area, and most areas visible from within the lagoon area itself. Within the management area, important views include those of the coastal bluffs, areas of vegetation, the beaches, the rocky point, wildlife, and the lagoon itself. Important views of the lagoon area are from areas on the Main Campus where large numbers of people gather, including areas in and around the University Center and Commencement Green. Other important viewing areas are the road along the north lagoon margin, the east bluff near the marine laboratory, the Pearl Chase Memorial Garden, the west bluff, and several residence halls.

Low-quality views within the management area are of eroded slopes and paths; the eroded east face of the east lagoon barrier, including sand bags and plastic pipes; some trash and debris in the lagoon; and small built elements, including the outflow weir and the two discharge pipes near the marine laboratory.

The high visual quality of the management area could be improved and preserved by eliminating or reducing the visual impacts associated with visually intrusive elements. Eroded slopes and paths should be allowed to revegetate as described in the "Erosion and Slope Management" section. ~~The eroded east face of the east lagoon barrier should be improved for aesthetic purposes as part of the seawater system replacement project improvements. Visual quality of the barrier would be improved by replacing the sand bags with a permanent rock revetment that blends with the surrounding rocks and existing revetments, removing the large plastic pipes in the east face, and improving the appearance of the pumphouse.~~ The outflow weir at the south end of the west arm should be replaced, when improvements are made for water quality and circulation, with a structure that is more visually pleasing and less obtrusive~~. The two discharge pipes near the marine laboratory should be improved in appearance or screened as part of the seawater system replacement project.~~ In addition, trash and debris in the lagoon should continue to be cleaned up on a regular basis.

To preserve the high visual quality of the management area, important views and visual features in the area should be maintained and protected. Any new elements that are constructed in or adjacent to the management area (e.g., student housing, paths, and landscaping on the west bluff [Figure 3-10]) should be carefully designed to blend with their surroundings and the visual character of the lagoon area. Features such as fences, barriers, stairs, paths, ramps, and signs should be designed to have a low profile and use earthtone colors. Bright or highly reflective surfaces on structures or signs would generally be inappropriate. Appropriate materials may include wood, stone, and other natural appearing materials. Using native plants to help screen built elements would be generally appropriate. Plantings should be placed carefully to avoid interfering with or screening important views in, of, from, or through the lagoon area.

Management Actions

Management Goal A: Preserve and improve the visual quality of and enhance viewing opportunities in the management area.

Objective A-1: Improve the visual quality of the management area by reducing intrusive visual features.

> **Action A-1.1**: Eroded slopes and paths should be allowed to revegetate as described in the "Erosion and Slope Management" section.
>
> **Action A-1.2**: ~~The eroded east face of the east lagoon barrier should be improved for aesthetic purposes as part of the seawater system replacement project improvements, by replacing the sand bags with a permanent rock revetment that blends with the surrounding rocks and existing revetments, removing the large plastic pipes in the east face, and improving the appearance of the pumphouse.~~
>
> **Action A-1.3**: The outflow weir at the south end of the west arm should be replaced, when improvements are made for water quality and circulation, with a structure that is more visually pleasing and less obtrusive.
>
> **Action A-1.4**: ~~The two discharge pipes near the marine laboratory should be improved in appearance or screened as part of the seawater system replacement project.~~
>
> **Action A-1.5**: Trash and debris in the lagoon should continue to be cleaned up on a regular basis.

Objective A-2: Preserve the visual quality of the management area by maintaining important views and protecting visual features.

> **Action A-2.1**: Any new elements (e.g., fences, barriers, stairs, and signs) that are constructed in or adjacent to the management area should be designed carefully to blend with their surroundings and the visual character of the lagoon area by avoiding use of bright or highly reflective surfaces and inappropriate materials or colors; being of small scale and low profile; and using primarily earthtone colors and natural- appearing materials.
>
> **Action A-2.2**: For all new plantings installed in or adjacent to the lagoon management area, use of native plants should be emphasized and plants should be placed carefully to avoid interfering with or screening important views in, of, from, or through the lagoon area.

restoring the bluffs as an Oak Woodland. The restoration project was consistent with the Long Range Development Plan and Campus Wetlands Plan, so only a working concept or plan was necessary. No specialized consultants were engaged because of the extensive expertise of Museum staff. Students and volunteers reduced labor costs. An extensive amount of informal coordination occurred between academic departments, their students, and Facilities Management staff to make the project work. Maintenance is expected to be minimal once the plants are established. The involvement of so many different people from the campus-community offers a large pool of potential volunteers who can assist Grounds staff in keeping the area well maintained.

In the last two years the UCSB Habitat Restoration Club has taken responsibility for other restoration projects on campus. Most recently the club has adopted the Lagoon bluffs between Ortega Commons and San Nicholas Hall. They are restoring the area with native coastal sage scrub vegetation to stabilize the slope, reduce soil erosion and enhance the area's visual character and ecological value. The improvements to the remnant riparian wetland and drainage channel south of Old Pool are also a Restoration Club project. Student volunteers have cleared and replanted this long overlooked area of the central campus.

Management Actions and Costs

Based on the results of campus consultation and the success of the North Campus Bluffs restoration project, the recommended approach for implementing the Lagoon Management Plan is to designate the Museum of Systematics and Ecology as the responsible unit for implementing the actions of the plan. The Museum requires at least 0.5 FTE for an annual cost of $33,500 to perform the work. The capital cost of improvement projects would be approximately $387,000 to be spread over 5 years based on the priorities discussed below.

The Natural Reserve Committee is also considering the need for a 0.5 FTE for a Coal Oil Point Reserve steward in connection with the North Campus housing program and proposed addition to the Reserve. These separate part-time functions could be combined so that there was one funded position with responsibility for maintaining and improving the environmentally sensitive areas of the campus. Currently, there is no single person or position responsible for improvements to the natural areas of the campus. Improvements are typically made two ways: 1. requirements of regulatory approvals for campus development projects and 2. small *ad hoc* projects as funding and staff time permits.

Extramural Funding

Based on this draft plan, UCSB applied for State Transportation Enhancement Activity (TEA) funding to construct the coastal access improvements in the Lagoon Island area, such as the stairways and bluffs fencing. The application was one of five projects the Santa Barbara County Association of Governments (SBCAG) staff recommended in March 1996 to be forwarded to the State Transportation Commission for funding. Unfortunately, UCSB's application was one of two projects SBCAG dropped in favor of funding the purchase of the Wilcox property. UCSB also ~~has~~ forwarded the proposal for funding from the Petroleum Violation Escrow Account, ~~and expects to be notified by July 1996 if~~ but this application ~~has been~~ was not successful.

UCSB will continue to seek extramural ~~If~~ funding ~~is received from this source it will~~ to reduce the capital costs of the recommended program, however, there is no guarantee of extramural funding.

In terms of implementation, management actions have been organized into three categories:

1. One-time capital improvements for "hardscape" elements such as fences, and stairways and major restoration projects such as in the sand-dunes areas;

2. Continuing vegetation and habitat management activities such as controlling invasive exotic plants, replanting, supervising students and volunteers;

3. Existing operations and maintenance activities.

Category 1

These capital projects would be phased over 5 years, beginning in ~~1997-98~~ 1999-2000 by replacing the outflow weir at the eastern end of the Lagoon. The weir is the first priority because of its poor condition, likelihood of failure, and the basic need to control inflow and outflow of Lagoon water to manage the area. In ~~1988-89~~ ~~2000-2001~~, the focus will be on visitor improvements such as stairs and bicycle barriers. These improvements will enhance the area for pedestrians, concentrate visitors to specific areas, and make it more difficult for bicycles to compact the soil, destroy plant life, and increase erosion. In ~~1999-2000~~, 2001-2002, barriers would be erected to protect special status plants and the circulation system re-worked to confine access to defined trails and repair the road used for emergency access. In ~~2000-01~~, 2002-2003, invasive plants would be removed and some revegetation of the dunes would occur. Interpretive signs would be posted for visitor education and some rehabilitation would occur for the discontinued trails if they had not recovered. Lastly, in anticipation of greater use in part because the area has been improved, selected portions of the bluff would be fenced to discourage erosion and provide an additional measure of public safety.

The total amount of funding needed for these projects would be approximately $378,00.00. The projects will be implemented in order of priority as set out below. The estimate of costs is a general estimate based on the best available information and extensive discussions between the Office of Budget and Planning and Facilities Management staff.

The program would be administered by the Museum of Systematics and Ecology. Museum staff would contract with Facilities Management or outside contractors, as they determined to be necessary.

The Director of the Museum of Systematics and Ecology would prepare an annual report identifying upcoming priorities and funding needs. This report would be submitted to the Office of Budget and Planning and would be the basis for determining the amount of funds released for the following year.

A key component of the Lagoon's preservation is the revetment near the Marine Laboratory. It is not included in this program because it is part of the comprehensive upgrading of the Marine Laboratory and Seawater System Replacement Project currently included for funding in the Five-year State Funded Major Capital Improvement Program.

Year	Item	Estimated Costs
~~1997--98~~	Outflow weir	$95,000
1999-2000		
~~1998--99~~	Campus Point Island north entrance, stairs & bicycle barriers	$40,000
2000-01	Lagoon Island west entrance, stairs & bicycle barriers	$43,000
~~1999--00~~	Protection of special status plants	$7,000
2001-02	Divert paths around highly eroded slopes and install barriers	$40,000
	Patch access road	$15,000
~~2000--01~~	Invasive plant removal and dune revegetation	28,000
2002-03	Interpretive exhibits	$36,000
	Rehabilitation and closure of paths	$43,000
~~2001--02~~	Bluff fencing	$40,000
2003 - 04	**TOTAL**	**$387,000**

Category 2

With annual funding of $33,500 the Museum would be responsible for implementing the vegetation and habitat management work described in the plan. There are a number of reasons to think the Museum is the logical place to coordinate efforts of this sort.

- Successful track record of similar projects,
- Well situated to work with community or UCSB volunteers such as the Habitat Restoration Club,
- Extensive botanical and zoological knowledge required for this type of work, and
- Ability to coordinate restoration work with instructional opportunities.

The instructional aspects of the implementation program is a key component of the recommended approach. The annual funding would go much further if portions of the work is performed by volunteers or as part of class exercises. It is anticipated that Museum staff will use some of the funding to seek grants.

To monitor implementation of the plan, the Director of the Museum of Systematics and Ecology would prepare an annual status report describing management actions accomplished during the preceding year, and submit it to the Office of Budget and Planning, for distribution to members of the Wetlands Committee and Landscape Committee.

Category 3

Existing campus activities that are related to management of the lagoon area include such things as maintenance of the outflow weir, roads, fences, stairways, and parking lots, replacement of signs, and law enforcement. The Management Plan assumes the existing activities and responsibilities of Police, Fire, Environmental Health & Safety and Facilities Management will continue. The current maintenance of the campus physical plant would be supplemented by new habitat management activities under the direction of the Museum. The

Install barriers at the top of the eroded east-facing slope of the west bluff in the southern portion of the West Lagoon Park management zone; install an informational sign to help direct people to a boardwalk and stairs ~~the access path~~ to the beach; allow eroded parts of the slope to revegetate; and ~~continue to~~ maintain and improve the existing accessible path down the slope for easier wheelchair access to the beach and lagoon. ~~and maintain emergency vehicle access along the improved, full access path from the west bluff to the beach area~~. All improvements should avoid impacts on special-status plants in this area. References: Action PU-2.5, ES-1.5, VH-2.5, PU-2.2, and ES-2.1.)

Install structural and vegetative barriers around eroded areas and install informational signs. References: Action ES-1.1, PU-1.5, and PU-2.2.

Install barriers at entries to already eroded areas and nonessential paths. References: Action ES-1.4.

Repair damaged areas (bluff edges and steep slopes) using structural techniques. References: Action ES-2.1, and PU-3.5.

Install barriers and informational signs in both sand dune areas in the South Beach management zone, to discourage traffic in these sensitive dune areas, designate essential paths (at least two in each dune area) for public access, and allow remaining nonessential trails to revegetate naturally. References: Action PU-2.6, ES-3.2, and VH-2.2.

Interpretive Exhibits

Place interpretive exhibits at three important primary, high-priority entry points to sensitive areas of the lagoon and possibly in other secondary areas where interpretive opportunities may exist. Exhibits should be designed to be durable and resist vandalism. Themes will focus on interpreting the unique environmental and cultural aspects of the lagoon area. References: Action PU-5.1 and PU-2.4.

Bluff Fencing

Install low fences and barriers along the south-facing edges of the coastal bluffs in the West Lagoon Park and Lagoon Island management zones, and along the south- and east-facing bluff edges in the Campus Point management zone. References: Action ES-2.1 and PU-3.5.

Permanently install low barriers that would not be visually intrusive along and near the steep coastal bluff edges at Lagoon Island and Campus Point. References: Action PU-3.5 and ES-2.1.

~~**Revetment**~~

~~Improve the east lagoon barrier as part of the comprehensive upgrading of the Marine Laboratory and seawater system replacement project and as approved by the Regents and the CCC. References: Action ES-3.1 and PU-2.7.~~

~~Subject to review and approval by the Regents and CCC, construct proposed improvements to the east lagoon barrier to maintain and improve public access from the Main Campus to the beach and Campus Point as part of the proposed seawater system replacement project. Proposed access improvements as part of this project include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, and providing stairs to the beach at the pumphouse. References: Action PU-2.7, ES-3.1 and A-1.2.~~

~~Proposed improvements to the east lagoon barrier should include provision for emergency vehicle access, including: placing a removable bollard across the access road near the marine laboratory for emergency access; paving the road on top of the barrier; and providing a hammerhead turnaround at the base of the north facing bluff. References: Action PU-3.2, ES-3.1 and PU-2.7.~~

~~Proposed improvements to the east lagoon barrier should include improving the eroded east face for aesthetic purposes, by replacing the sand bags with a permanent rock revetment that blends with the surrounding rocks and existing revetments, removing the large plastic pipes in the east face, and improving the appearance of the pumphouse. References: Action A-1.2:~~

Development Guidelines

Adhere to existing policy (in accordance with state and federal requirements) to provide full and equal access to all new facilities for people, including those who are physically challenged, where it is feasible and not restricted because of topographical and environmental constraints. References: Action PU-1.6

For any educational or other public use facilities (e.g., interpretive trails, exhibits, or overlooks) planned to be constructed on Campus Point or Lagoon Island, UCSB should carefully consider the environmental impacts and costs of constructing these facilities and work with local interest groups to develop appropriate ways to meet federal and state requirements for providing full access. References: Action PU-1.7

Carefully design any new elements (e.g., fences, barriers, stairs, and signs) that are constructed in or adjacent to the management area to blend with their surroundings and the visual character of the lagoon area by avoiding use of bright or highly reflective surfaces and inappropriate materials or colors; being of small scale and low profile; and using primarily earth tones colors and natural- appearing materials. References: Action A-2.1

Replace the outflow weir at the south end of the west arm with a structure that is more visually pleasing and less obtrusive. References: Action A-1.3:

Improve the appearance of or screen the two discharge pipes near the marine laboratory as part of the seawater system replacement project. References: Action A-1.4:

Control invasive exotic plants using appropriate chemical and mechanical methods to reduce their adverse effects on special-status plant species and other native plant habitats in areas (e.g. vernal pools and coastal sand dunes) that may contain special-status plants. Reference: Action VH-1.1:

Monitor and map the populations of special-status plant species. References: Action VH-1.2 and actions under Objective PU-2.

Coordinate with the campus fire marshal to determine whether it is necessary for public safety to continue mowing firebreaks. References: Action VH-1.3 and PU-3.7.

Retain outstanding ornamental plant specimens . References: Action VH-1.4

Protect saltmarsh habitat and, as opportunities become available, enhance saltmarsh habitat along the lagoon margin through revegetation and water management based on evaluation of the existing saltmarsh enhancement efforts in the wetlands management zone. References: Action VH-2.1, H-2.1, WQ-1.1, and WQ-2.1.

Protect coastal dune vegetation and, as opportunities become available, enhance coastal dune vegetation on the bare sand dune areas through revegetation and planting once invasive exotic plants have been controlled. References: Action VH-2.2, VH-1.1, and PU-2.6.

Protect California sagebrush series vegetation and, as opportunities become available, enhance California sagebrush series vegetation along the coastal bluffs, once invasive exotic plants have been controlled, by collecting, growing, and planting native plants or through natural revegetation resulting from other protection efforts. References: Action VH-2.3, ES-1.1, ES-2.1, and PU-2.4.

Control eucalyptus trees in the North Margin management zone and gradually replace with native trees and shrubs. References: Action VH-2.4, VH-3.1, and PU-3.3.

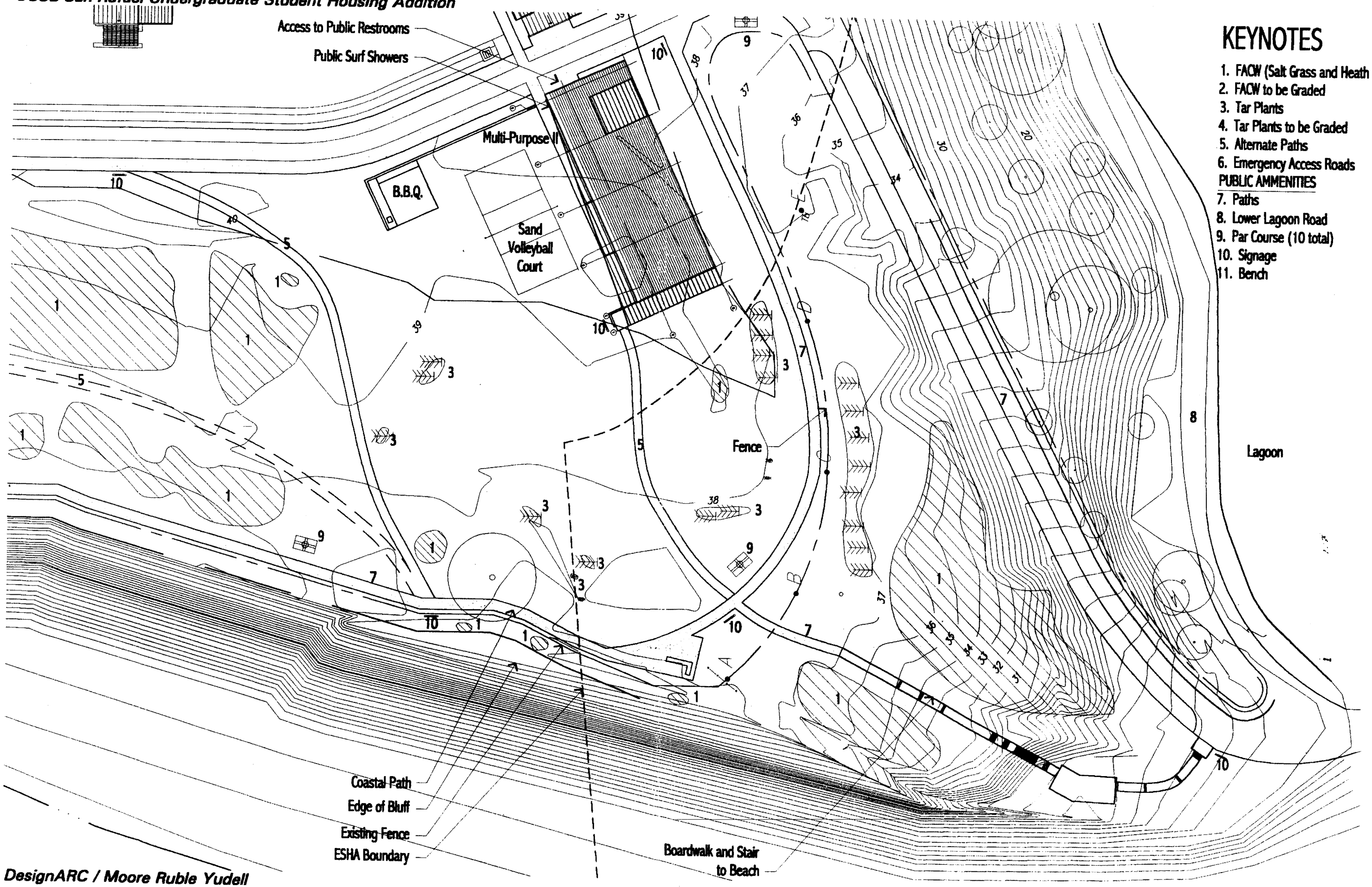
Create and ~~P~~protect new vernal pools or wetlands on Lagoon Island ~~vernal pools and, if possible, restore Vernal pools in the West Lagoon Park management zone~~ by controlling public access; controlling invasive exotic plants; monitoring conditions of the pools; and implementing an enhancement plan to improve the functions and values of the vernal pools, ~~if necessary~~. Action VH-2.5 and PU-2.5.

Temporarily protect some eucalyptus trees in the North Lagoon Margin management zone and retain as habitat for herons and raptors and gradually thin and remove most trees and replace with native plants as opportunities become available. Minimize human disturbance within 300 feet of the known nesting locations for heron, owl, and other raptors in eucalyptus trees during the breeding season (January 1-August 1). References: Action VH-3.1, VH-2.4 and PU-3.3.

Retain snags whenever possible, when they do not create a public safety hazard, to preserve nest and roost cavities and perches for wildlife. References: Action VH-3.2

As opportunities become available, additional roosting and rearing habitat for bats could be created by constructing, placing, and maintaining bat boxes in appropriate locations and monitoring their use. References: Action VH-5.1

UCSB San Rafael Undergraduate Student Housing Addition



KEYNOTES

1. FACW (Salt Grass and Heath Alk
2. FACW to be Graded
3. Tar Plants
4. Tar Plants to be Graded
5. Alternate Paths
6. Emergency Access Roads

PUBLIC AMMENITIES

7. Paths
8. Lower Lagoon Road
9. Par Course (10 total)
10. Signage
11. Bench

DesignARC / Moore Ruble Yudell

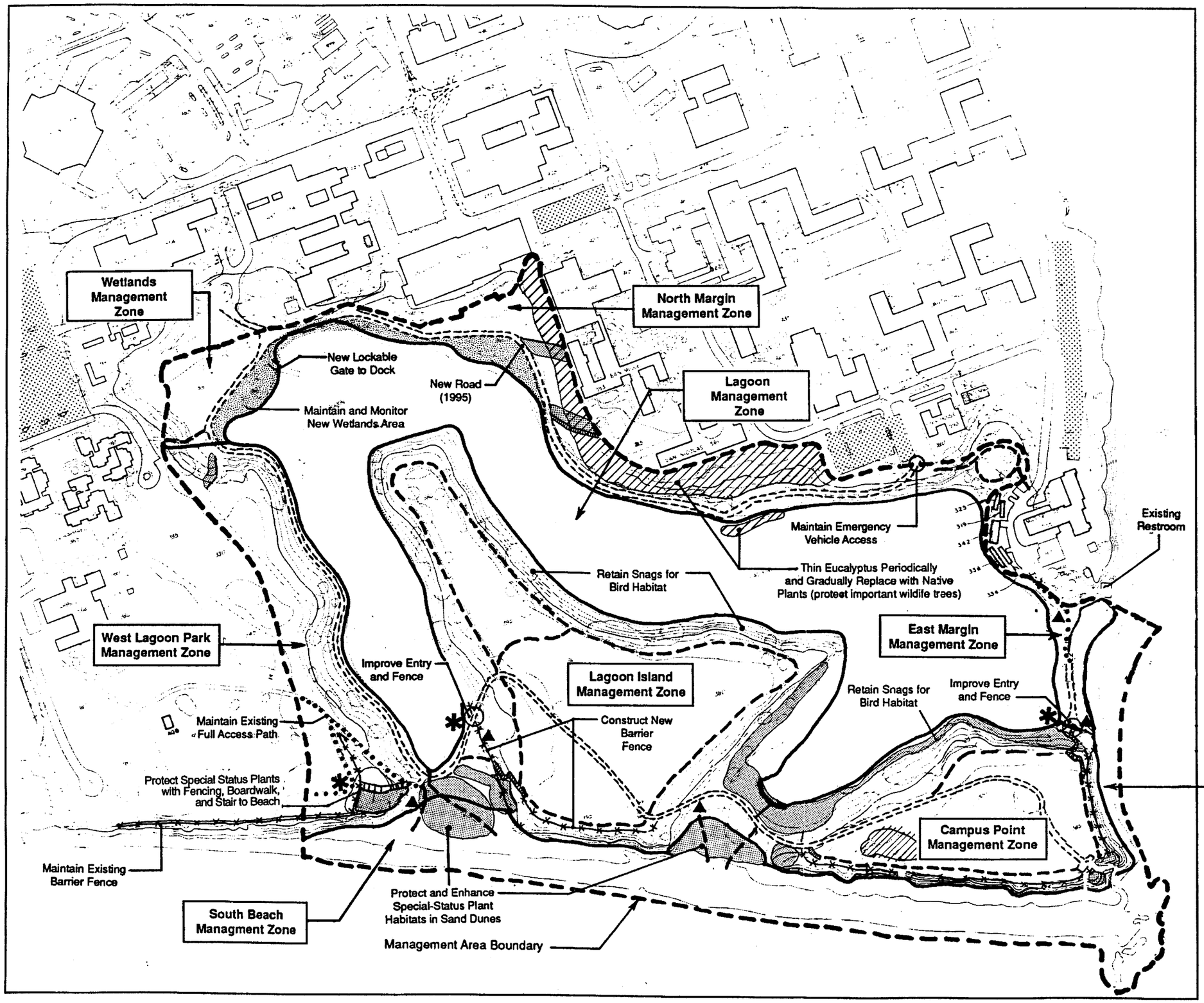
Enlarged Partial Site Plan - East Bluff

Figure 1-5

1"=40'-0"

Figure 3-1.

Campus Lagoon Management Actions Summary Plan



Legend:

- Paved Emergency Access Road to Maintain
- Essential Path to Maintain or Improve
- Full Access Path to Maintain or Improve
- Eroded Areas to Protect and Allow to Revegetate
- Public Parking for Coastal Access
- Low Barrier Fence
- Stairs to Improve or Construct
- Information Sign
- Interpretive Exhibit

Source: Landscape Master Plan, Part III, U. C. Santa Barbara, 1992

Prepared by: Jones & Stokes Associates

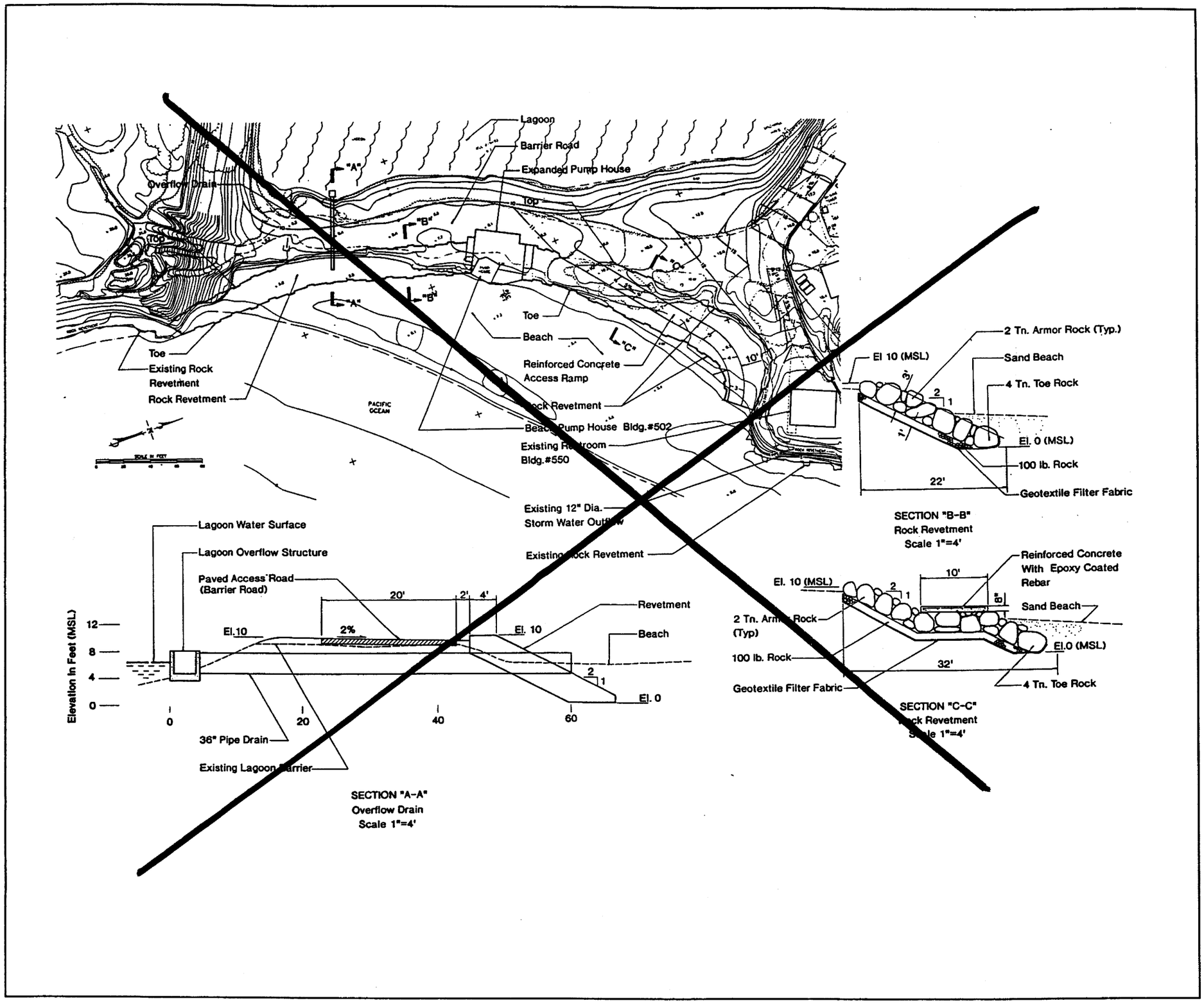


Figure 3-2.
~~Lagoon Barrier Revetment~~ as ~~Part of Seawater System Replacement Project~~

Source: U. C. Santa Barbara, 1994
(drawings prepared by D. W. Thomson Consultants, Ltd. 1994)

EXHIBIT 8c

Lagoon Management Plan

UCSB

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Draft Management Plan for the Campus Lagoon

University of California
Santa Barbara

Draft

Management Plan for the Campus Lagoon at the University of California, Santa Barbara

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Chapter 1. Overview

NEED AND PURPOSE

The Campus Lagoon at the University of California, Santa Barbara (UCSB) is one of the most recognizable features of the picturesque coastal campus. Positioned prominently on the campus at a point jutting into the Pacific Ocean, the lagoon and its surrounding coastal bluffs and beaches contribute vividly to the campus image and sense of place. The lagoon area is a valuable campus resource for people to use and enjoy. It contains a wide array of native and non-native plants and diverse habitat types that are important to wildlife and plants. Several species of special-status plants and wildlife occur in the lagoon area, and much of the area is identified by UCSB as sensitive habitat.

Over the years, the lagoon area has been altered substantially by human activities. The bluffs and beaches have been changed by the introduction of exotic plants, agriculture, development, and recreation. The lagoon itself has evolved from being mostly a barren salt flat with occasional tidal influence to being a large saline pond that is separated from the ocean by revetments and maintained at a nearly constant level by an overflow weir and inflows of seawater discharged from UCSB marine research operations.

Today, although the lagoon area is largely protected from further encroachments, a combination of natural processes and extensive use by people threatens to reduce its aesthetic quality and habitat values. Without informed and comprehensive management of its resources, the lagoon and its environs may deteriorate and its cultural and habitat values may diminish.

The Management Plan for the Campus Lagoon has been developed to ensure that the lagoon and its environs are managed in a manner that protects, enhances, and restores the area and continues to provide public access and education opportunities. This management plan is intended to "contribute to the understanding and wise management" of the area and provide "planning opportunities and guidelines to assist the integration of stewardship, research, education, access, and interpretive responsibilities of the institution" (UCSB 1992).

Preparation of this management plan is required by a 1992 amendment to UCSB's Long Range Development Plan (LRDP) (UCSB 1990). Once approved by UCSB and the California Coastal Commission (CCC), the management plan will become an amendment to the LRDP. To satisfy CCC requirements identified in the 1992 amendment to the LRDP, this plan identifies specific policies to protect, enhance, and restore the lagoon area; maintain and improve public access and education opportunities for the lagoon area; and ensure that activities occurring outside the lagoon area do not create adverse impacts within the lagoon area. This plan supports existing coastal policies in the LRDP and mitigation measures identified in the LRDP EIR and University Center (UCen) EIR. This management plan has been prepared as a comprehensive guide for managing the lagoon area as a unique and valuable resource for the campus and the region. The plan identifies background information and goals, objectives, and actions for seven specific

management elements: erosion and slopes, hydrology, water quality, biotic factors (i.e., vegetation and wildlife), cultural resources, public use, and aesthetics. The plan also identifies priorities and costs for implementing the management actions. Specifically, the plan provides guidance for all aspects of operations, maintenance, protection, improvements, and monitoring for the lagoon management area.

GOAL AND OBJECTIVES

The overall goal for managing the Campus Lagoon is to protect, enhance, and restore the area while maintaining it as a place for people to use and enjoy. The management plan has been developed to support this goal and ensure that the lagoon area will continue to be a viable and valuable campus resource. The plan is intended to guide and direct management decisions and actions that may affect the lagoon area. In addition, it balances the goals of maintaining and improving habitats, public use and safety, water quality, hydrology, and aesthetics. Achieving this balance of purposes will require detailed and ongoing management that is comprehensive and adaptive to changes.

The objectives of this management plan are the following:

- Adhere to all coastal policy requirements pertaining to the Campus Lagoon area that are identified in the UCSB 1990 LRDP as amended.
- Adhere to all mitigation measures pertaining to the Campus Lagoon area that are identified in the LRDP EIR.
- Fulfill the CCC's requirement in the 1992 amendment to the 1990 LRDP for submittal of a "Campus Lagoon Wetland Management Plan as an amendment to the LRDP".
- Fulfill the CCC requirement that the management plan be consistent with the local coastal programs of adjacent communities.
- Adhere to and maintain consistency with all UCSB policies and programs for campus operations, public safety, and access.
- Identify management actions that implement LRDP policies, support the overall goal for the lagoon area, adequately address the issues of concern, are reasonable and feasible to implement, and represent UCSB priorities for balancing protection of the lagoon's ecological functions and its use and enjoyment by people.
- Adhere to all applicable federal and state regulatory compliance procedures and laws.
- Provide a basis for prioritizing funding and budgeting requests for implementing elements of the plan.

- Earn approval and support for the plan from the UCSB community, including the administration, faculty, appropriate committees, staff, and students and the public.

ENVIRONMENTAL SETTING

The Campus Lagoon is located on the UCSB campus in Santa Barbara County on the south-central coast of California. The campus lies just south of the City of Goleta and about 8 miles west of the City of Santa Barbara's central downtown district (Figure 1-1). The UCSB campus is at the south edge of a coastal plain that extends from the base of the Santa Ynez Mountains to the Pacific Ocean.

Most of the UCSB campus is situated on top of a coastal terrace at an elevation of approximately 40 feet above mean sea level (msl). The campus topography also includes adjacent lowlands that contain wetlands, tidal lands, and areas of open water. The Goleta Slough and Santa Barbara Airport border the campus to the northwest (Figure 1-2). The 815-acre campus actually comprises three campuses (Main, Storke, and West) that almost surround the unincorporated community of Isla Vista. The Campus Lagoon area occupies the southernmost portion of the Main Campus, which juts into the Pacific Ocean.

The Campus Lagoon management area encompasses about 94 acres, nearly a quarter of the entire Main Campus of UCSB, and includes coastal bluffs and terraces, ocean beaches, sand dunes, the rocky Goleta Point, wetlands, and the lagoon itself (Figure 1-3). The lagoon has a surface area of about 31 acres and a surface elevation of approximately 6 feet above mean sea level (MSL). The lagoon management area is divided into nine management zones (Figure 1-3), each of which is generally distinguished by a unique signature of topographic, habitat, and cultural characteristics. These management zones help identify the locations of features, activities, and management actions in the lagoon area.

Most of the lagoon management area has been identified as an Environmentally Sensitive Habitat Area (ESHA) in the LRDP (UCSB 1990) (Figure 1-4). The ESHA designation includes the lagoon, Lagoon Island, Goleta Point, and beaches to the east and south. ESHAs are designated to preserve areas with special-status or other sensitive species or that provide unique opportunities for research and instruction (UCSB 1990). The remaining area in the management area, adjacent to the ESHA, is designated in the 1990 LRDP as open space. This area serves as a buffer between the ESHA and the more developed portions of the campus. A small area on the west bluff near the southwest corner of the management area contains special-status plant species and, because of this, is proposed in this plan to be included in the ESHA (Figure 1-4).

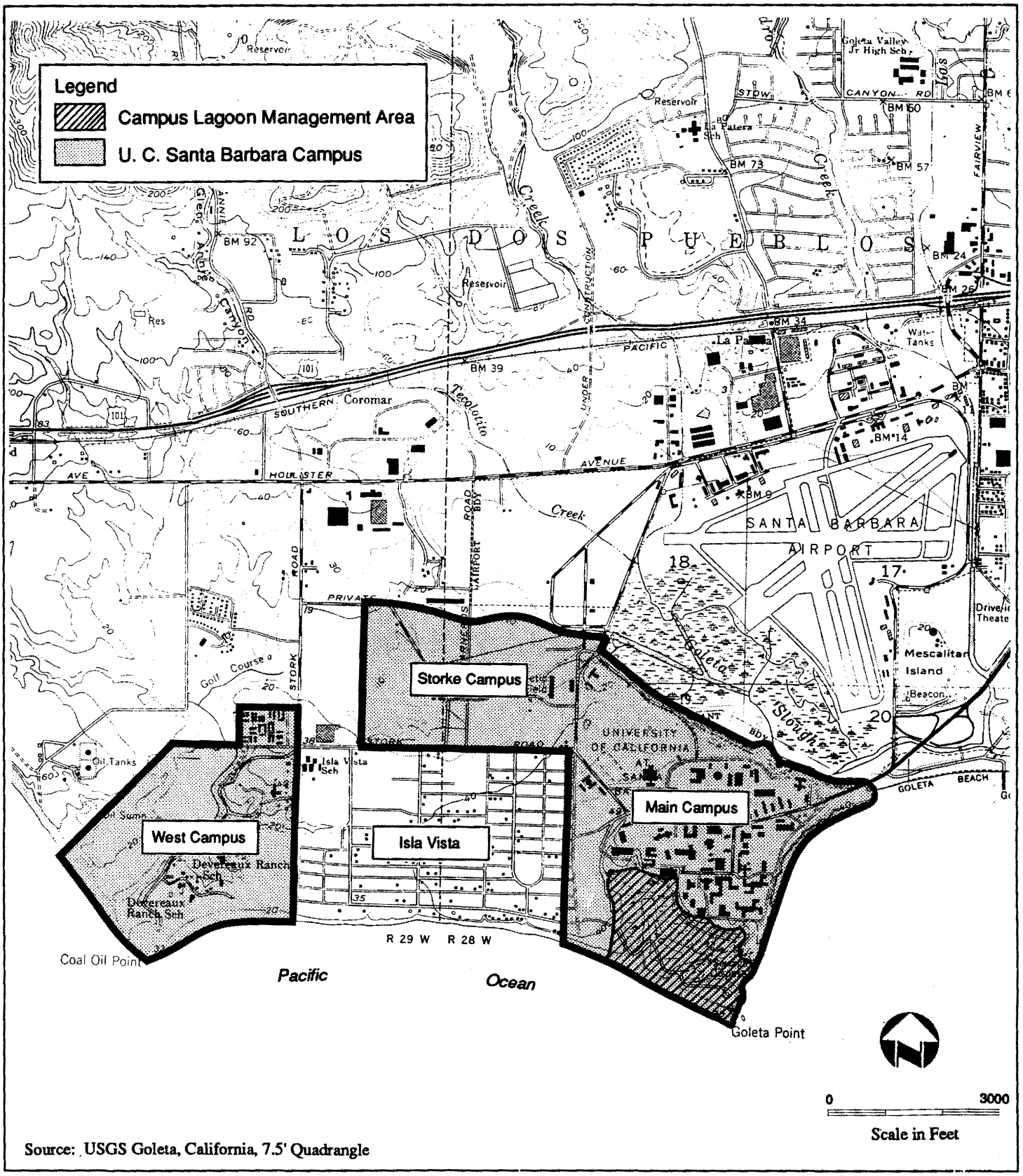
PROJECT BACKGROUND

The Campus Lagoon has been a part of campus planning since at least 1954, when it was included in the University's Master Landscape Plan. The first LRDP was prepared for the campus in 1963. In that plan, the lagoon area was identified as a reserve with recreation and wildlife areas and designated paths (MacKay 1992). In subsequent years, the LRDP was updated several times and various new management policies were identified for the lagoon area. In 1970, the Lagoon

Source: USGS Los Angeles, California 1:250,000 Topo Map

Jones & Stokes Associates, Inc.

Figure 1-1.
Regional Location



Source: USGS Goleta, California, 7.5' Quadrangle

Jones & Stokes Associates, Inc.

Figure 1-2.
Campus Lagoon Vicinity

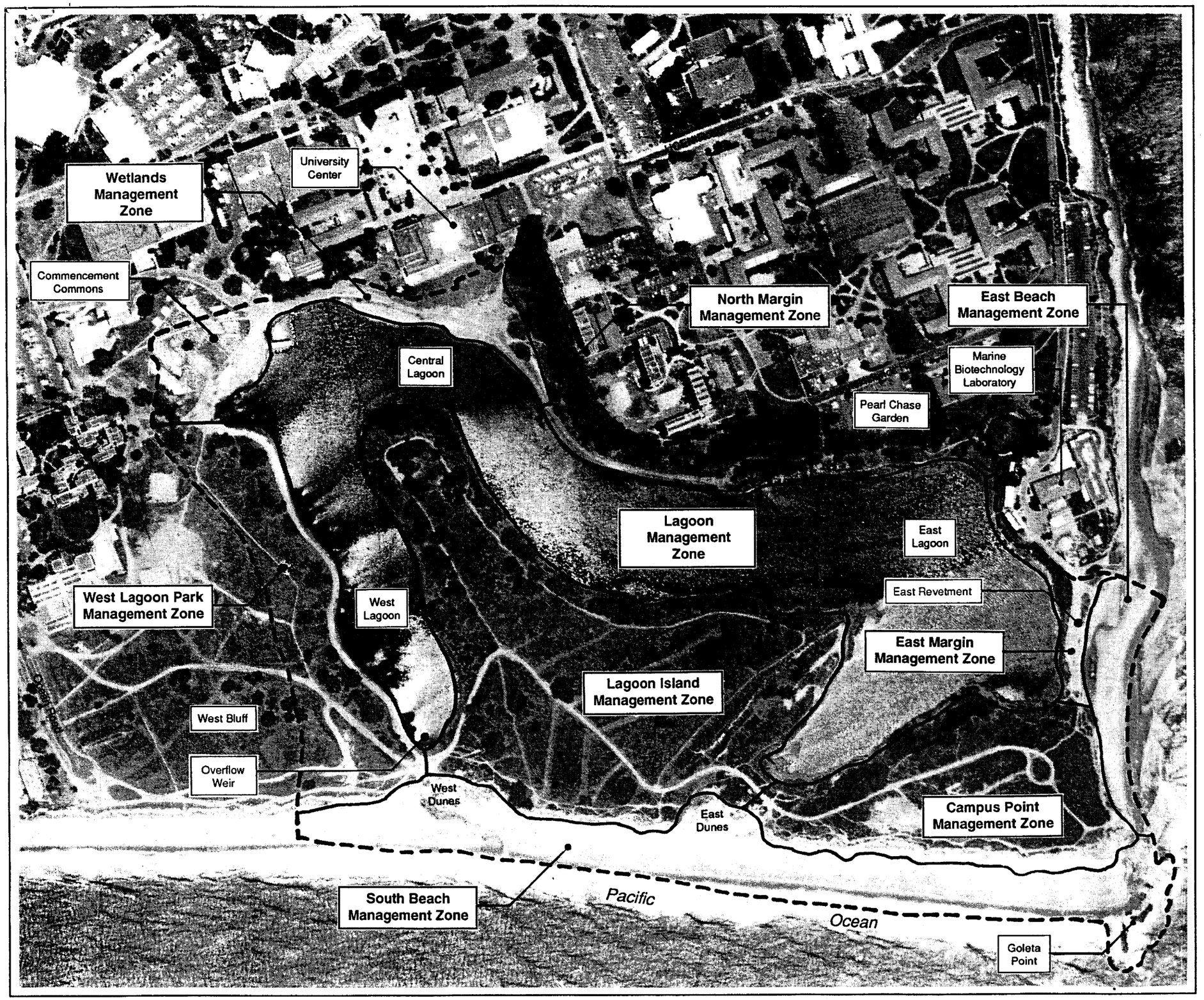


Figure 1-3.

Campus Lagoon Management Area with Management Zones

Legend:

Management Area Boundary

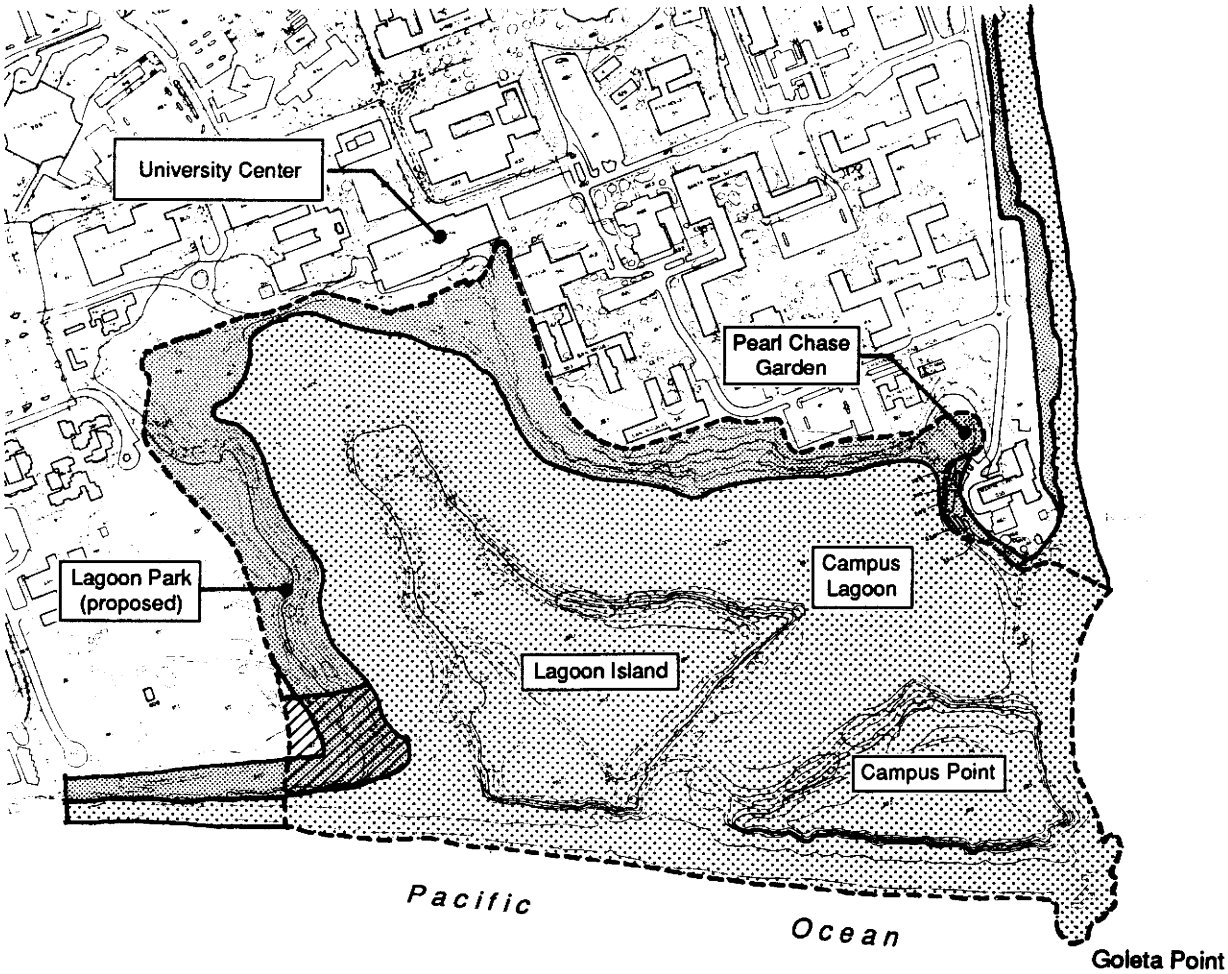
Management Zone Boundary

Source: Jones & Stokes Associates, 1995
Date of photograph: June 14, 1992

0 150 300 600

Approximate Scale in Feet

Jones & Stokes Associates



Legend

- Boundary of the Campus Lagoon Management Area
- Environmentally Sensitive Habitat Area (ESHA) [1]
- Areas Adjacent to ESHA and Open Space [1]
- Area Containing Special-Status Plant Species Proposed to be Included as ESHA [2]

0 300 600
Scale in Feet

[1] Source: 1990 Long Range Development Plan as amended (UCSB 1990)
[2] Source: Ferren 1994

Jones & Stokes Associates, Inc.

Figure 1-4.
Coastal Land Use Designations in the Management Area

Management Committee was formed at UCSB to help oversee management and planning of the lagoon area.

In 1981, the LRDP was certified by the CCC to conform with requirements of the California Coastal Act of 1976 (Coastal Act). The LRDP recognized the environmental sensitivity of the lagoon and established policies to help protect it (e.g., prohibiting swimming and establishing setbacks). In 1990, when the LRDP was again updated, the entire Campus Lagoon and much of the area surrounding it was designated as either ESHA or open space, with requirements that the area be managed to protect important habitat values (UCSB 1990).

In 1992, the LRDP was amended to allow the University Center expansion project to extend into former Parking Lot 8 instead of Storke Plaza. The CCC approval of the amendment carried conditions that required, among other things, landscaping the edge of the lagoon near the University Center to essentially create salt marsh and brackish marsh wetland habitats. The CCC also required UCSB to "submit a Campus Lagoon Wetland Management Plan as an amendment to the LRDP with policies for protection, enhancement, restoration, and public interpretation and access for the Campus Lagoon" (UCSB 1992 LRDP policy 30240.[b]10).

PLAN DEVELOPMENT PROCESS

In August 1994, UCSB hired the environmental planning firm of Jones & Stokes Associates to prepare the Campus Lagoon management plan. Given the amount of existing data readily available from UCSB, an approach was developed that required only a small amount of additional fieldwork and data collection. A 1992 aerial photograph of the lagoon area was obtained from a local aerial survey company and detailed information was compiled on area biology, hydrology, water quality, and several other elements. Much of the background information, particularly information that appears in Chapter 2, was summarized from the Draft Natural Areas Plan (UCSB 1992). Key information is also summarized from Supplement I to the natural areas plan, Draft Management Plan for the Campus Lagoon and Vicinity (MacKay 1992), which was prepared as an undergraduate student senior thesis in the Environmental Studies Program.

The key steps in preparing the draft plan included:

- gathering and reviewing existing information and data for the lagoon;
- conducting an information-gathering meeting at UCSB with individuals who were knowledgeable about the lagoon area and UCSB operations;
- conducting a field visit and site inventory to verify conditions in the lagoon area and identify key issues regarding its management;
- identifying preliminary management issues, goals, and objectives;
- analyzing opportunities and constraints for management;
- identifying management actions and costs; and

- preparing a draft management plan, including general cost estimates, and an implementation strategy for eliciting review and comment from the UCSB campus community, the public and various agencies.

Jones & Stokes Associates prepared an administrative draft management plan, including general cost estimates, and an implementation strategy, for UCSB staff review. UCSB Office of Budget and Planning staff rewrote Chapter 4, the Implementation Plan, which outlines the University's strategy for implementation and identifies costs and scheduling priorities. The final plan will incorporate responses to UCSB, public and agency comments. The final management plan and LRDP amendment will be approved by the Regents and then submitted to the CCC for approval as an amendment to the LRDP.

PLAN APPROVAL PROCESS

As mentioned above, before the plan is approved, it must be determined to be consistent with the Coastal Act, the UCSB LRDP, and all relevant local coastal programs (e.g., local coastal programs for the County of Santa Barbara and the City of Santa Barbara's airport and Goleta Slough). After the plan is approved, some management actions may need to be coordinated with and receive permits or approval from various regulatory agencies before they could be implemented. Other agencies that may have regulatory authority for aspects of the plan are:

- U.S. Environmental Protection Agency for administration of Section 404 of the Clean Water Act;

- U.S. Fish and Wildlife Service (USFWS) for administration of the federal Endangered Species Act;

- California Department of Fish and Game (DFG) for administration of the California Rare and Endangered Species and Wildlife and Marine Refuge Programs, and a wetlands alteration permit under Sections 1601 and 1603 of the California Fish and Game Code; and

- California Office of Permit Assistance in the Governor's Office of Planning and Research for administration of the California Environmental Quality Act (CEQA).

The environmental analysis for the Campus Lagoon Management Plan is tiered from the University of California, Santa Barbara, Long Range Development Plan (LRDP) 1990 Environmental Impact Report (EIR). The 1990 LRDP EIR is a Program EIR, pursuant to Section 15168 of the California Environmental Quality Act (CEQA) Guidelines. The 1990 LRDP is a long-range plan that guides development at UCSB necessary for the University to meet its broad mission of instruction, research, and public service for the period 1990 - 2005/2006.

The CEQA concept of "tiering" refers to the coverage of general environmental matters in broad program; level EIRs, with subsequent focused environmental documents for individual projects that implement the program. The project environmental document incorporates by reference the discussions in the Program EIR and concentrates on project-specific issues. CEQA and the CEQA guidelines encourage the use of tiered environmental documents to reduce delays

and excessive paperwork in the environmental review process. This is accomplished in tiered documents by eliminating repetitive analysis of issues that were adequately addressed in the Program EIR and by incorporating those analyses by reference.

In accordance with CEQA Sections 15152 and 15168(C), this project is tiered to the 1990 LRDP EIR (SCH# 87022516), which is incorporated into the Initial Study by reference and which is available for review during normal operating hours at the UC Santa Barbara Office of Budget and Planning at 1325 Cheadle Hall, University of California, Santa Barbara. The 1990 LRDP EIR evaluated the environmental effects of implementation of the proposed 1990 LRDP and identified measures to mitigate the significant adverse project and cumulative impacts associated with that growth.

The tiering of the environmental analysis for the proposed project allows the Tiered Initial Study to rely on the 1990 LRDP EIR for the following:

- a discussion of general background and setting information for environmental topic areas;
- overall growth-related issues
- issues that were evaluated in sufficient detail in the 1990 LRDP EIR for which there is no significant new information or change in circumstances that would require further analysis; and
- long-term cumulative impacts.

The Initial Study should be viewed in conjunction with the UC Santa Barbara LRDP EIR. The purpose of the Initial Study is to evaluate the potential environmental impacts of the plan with respect to the 1990 LRDP EIR to determine what level of additional environmental review, if any, is appropriate. The plan's relationship to the LRDP and the LRDP EIR is important in a number of respects:

- The Campus Lagoon Management Plan has been prepared to comply with a CCC condition for approval of an amendment to the 1990 LRDP, under provisions of the California Coastal Act.
- The Regents' action to approve the Campus Lagoon Management Plan does not commit UCSB to actions that are inconsistent with the adopted 1990 LRDP.
- The Campus Lagoon Management Plan provides more detail about proposed improvements in the management area that are consistent with the 1990 LRDP.
- Many of the actions to implement the Campus Lagoon Management Plan are ongoing operations and maintenance activities, or landscaping and habitat management activities that UCSB considers "ministerial" in nature and therefore exempt from CEQA (CEQA Guidelines Section 15268).
- The one major project discussed in the plan that would be subject to future discretionary review is the Seawater System Replacement and Lagoon revetment

LRDP MM 4.5-4
LRDP Coastal Policy 30244.3
When development is proposed for areas where archaeological resources are affected, the project will be designed to minimize impacts on such resources (1980, revised).

LRDP MM 4.5-5
LRDP Coastal Policy 30244.4
During any grading and other activities that may result in ground disturbance on archaeological sites, a non-University of California affiliated archaeologist recognized by the State Office of Historic Preservation and a Native American representative shall be present (1980, revised).

LRDP MM 4.5-6
LRDP Coastal Policy 30244.5

project which is still in the planning stage. The 1990 LRDP describes the revetment in some detail (Part 2, Chapter IV, Marine Environment, D. Revetments, Breakwaters, Etc.) and recognizes that it would be subject to further Coastal Commission review under the Notice of Impending Development and CEQA procedures. An EIR will be prepared for the Seawater System Replacement Project.

- Based on the analysis contained in the Initial Study, it has been determined that Plan does not exceed environmental impacts previously identified in the 1990 LRDP EIR, no mitigation measures are required, and preparation of Findings consistent with this determination is appropriate.

- The Campus Lagoon Management Plan describes how UCSB will specifically implement existing LRDP coastal policies and the LRDP EIR mitigation measures to improve the environmental quality of the lagoon area.

- Mitigation measures identified in the 1990 LRDP EIR that are relevant are incorporated into the plan and are identified and discussed in the Tiered Initial Study.

- The following are the program level Mitigation Measures from the 1990 LRDP EIR that are variously: incorporated as Plan policy (during proposed construction projects and management activities); or implemented by the Plan; or support the Plan; or are supported by the Plan. Some of these Mitigation Measures are also LRDP Coastal Policies and are referenced accordingly.

1. LRDP EIR Mitigation Measures and LRDP Policies that are incorporated into construction projects and management activities proposed in the Management Plan.

LRDP MM 4.2-6
LRDP Coastal Policy 30240(a).10
South-facing ocean bluffs on the Main and West Campuses shall be left in their present state (1980).

LRDP MM 4.2-9
LRDP Coastal Policy 30253.3
No development shall be permitted on the bluff face, except for staircases or access ways to provide public beach access and pipelines for instructional or research-

e. Adequate nearby access. (1980 Plan policy).

LRDP MM 4.17-1
Water or dust palliatives shall be applied to exposed earth surfaces as necessary to control dust emissions.

LRDP MM 4.17-2
Revegetation or stabilization of exposed earth surfaces shall take place as soon as possible.

LRDP MM 4.17-3
Proper maintenance of construction equipment and vehicles shall be required as part of the construction contract.

2. LRDP EIR Mitigation Measures and LRDP Policies that are implemented by the Management Plan

LRDP MM 4.2-16
LRDP Coastal Policy 30253.11
Pedestrian use of unimproved paths up and down the bluff shall be discouraged. To this end, a fence shall be constructed on the coastal bluff-top edge, wherever it does not now exist (1990).

LRDP MM 4.3-3
Within 50 feet of the bluff top, vegetation shall be maintained or replanted with drought resistant species should grading be required to establish proper drainage landward of the bluff (1990).

LRDP MM 4.3-5
LRDP Coastal Policy 30231.2
Projects shall be designed to minimize soil erosion and, where possible, to direct surface runoff away from coastal waters, and wetlands, according to the following policies:

e. If storm water can only be feasibly discharged into campus wetlands, it shall comply in all respects to all applicable standards of the Regional Water Quality Control Board (1980, revised).

i. The quality of water entering the Campus Lagoon shall continue to be monitored (1980).

j. Minimize siltation of the Campus Lagoon (1980).

k. Prohibit chemical wastes, sewage effluent, or waste waters from entering the Campus Lagoon (1980).

LRDP MM 4.3-6
LRDP Coastal Policy 30231.3
Drainage and runoff shall not adversely affect campus wetlands (1980, revised).

a. *The near slopes along the edge of campus wetlands shall remain an undisturbed buffer area (1980).*

b. *Pollutants shall not be allowed to enter wetland areas through drainage systems (1980).*

c. *Runoff into the wetlands will not increase sediment from campus property (1980).*

LRDP MM 4.3-7

Proposed parking lots on campus shall be regularly cleaned and, if necessary to prevent significant water quality degradation, equipped with traps, filters, or other equally effective measures to control roadway contaminants (such as oil and grease).

4.4-7

Species used for landscaping in parks, open space areas, and for revegetation in natural areas shall be regionally native, and/or native to the Santa Barbara area, emphasizing those of known value to native insects and wildlife. Species used for landscaping associated with facilities development shall be native and/or drought-tolerant plants. In the case of Main Campus, plants may be selected for their research and instructional value. To protect bluff faces, screen new developments, and reduce water usage associated with irrigation the following practices shall be followed:

(a) *(30253.13) Within 50 feet of the blufftop, vegetation shall be maintained or replanted with drought resistant species should grading be required to establish proper drainage landward of the bluff face (1980).*

(b) *New development shall be landscaped with drought tolerant vegetation and shall not be irrigated in such a manner as to accelerate bluff erosion.*

LRDP MM 4.4-9

LRDP Coastal Policy 30240(a).8

Pedestrians and bicycles shall be encouraged to remain on existing trails (1980, revised). Signs shall be posted.

LRDP MM 4.4-10

LRDP Coastal Policy 30240(a).9

Bicycle access to the lagoon island shall be prohibited. Signs prohibiting unauthorized bicycle traffic shall be posted (1990).

LRDP MM 4.4-11

LRDP Coastal Policy 30240(a).7

Motor vehicles (except for service and emergency vehicles), unleashed dogs, and swimming shall be prohibited in the Campus Lagoon and lagoon island environmentally sensitive habitat area (1980, revised). Signs restricting such access and activities shall be posted.

LRDP MM 4.4-15

In cases where urban runoff from new construction of buildings, parking lots, or other impermeable surfaces on campus will enter any campus or off-campus wetlands, passive best management practices (BMPs) for the treatment of urban runoff shall be implemented to reduce peak storm flows and to remove such urban pollutants as heavy metals and petroleum-based pollutants from the campus input to the wetland water supplies. BMPs to be employed could include detention basins, grassed swales, and other similar measures to be constructed outside the protected wetlands. Parking lots shall be swept/ vacuumed regularly to remove pollutants that might otherwise be carried into sedimentation basins or the wetlands themselves.

LRDP MM 4.4-17

Prohibit chemical wastes, sewage effluent, or wastewater from entering any campus wetlands.

LRDP MM 4.4-20

LRDP Coastal Policy 30240(a).15

Unleashed dogs and motor vehicles, except for service and emergency vehicles, shall be prohibited on campus beaches (1980).

LRDP MM 4.4-21

Trash receptacles shall be placed on campus beaches and the campus shall continue to remove litter, especially plastic materials posing particular dangers to wildlife.

LRDP MM 4.4-22

LRDP Coastal Policy 30210.15

The campus shall continue to maintain and improve bicycle and pedestrian accessways to the beach as necessary to protect sensitive habitat areas and public safety (1980, revised).

LRDP MM 4.4-23

Signs shall be posted requesting the public to minimize disturbance to sensitive habitats that are not or cannot be fenced, such as the tidepools at Goleta Point.

LRDP MM 4.4-34

LRDP Coastal Policy 30231.2(e)

If storm water can only be feasibly discharged into campus wetlands it shall comply in all respects to all applicable standards of the Regional Water Quality Control Board (1980, revised).

LRDP MM 4.4-48

As much of the mesa grasslands on the Main and West Campuses shall be retained as is feasible. Such grassland areas should be maintained as natural communities to preserve suitable wildlife foraging areas.

LRDP MM 4.4-49

Mowing for fire protection shall be avoided in areas other than the Coal Oil Point Reserve prior to the time plants go to seed and restricted to the minimum area necessary for adequate fire protection.

4.6-1 or for safety reasons. Any removal of trees or shrubs shall be timed to avoid the nesting season of local birds (January through June) (1980, revised).

LRDP MM 4.16-36
LRDP Coastal Policy 30210.9
The Campus shall conspicuously post coastal access signs which note the direction of the nearest beach access point at the approximate locations shown in Figure IV-A-2 (Coastal Act Element) and in parking lots 1, 5, 6, 10, 23, and 24. Additionally, signs will also be placed near the top of the bluff indicating paths and stairway locations (1980 Plan policy, as adopted).

LRDP MM 4.16-38
LRDP Coastal Policy 30210.15
The Campus shall continue to maintain and improve bicycle and pedestrian accessways to the beach as necessary to protect sensitive habitat areas and public safety (1980 Plan policy).

3. LRDP EIR Mitigation Measures and LRDP Policies that support the Management Plan

LRDP MM 4.14-7
The University shall continue to provide weekend parking at the prevailing rate for visitors of Goleta Beach Park.

LRDP MM 4.16-21
LRDP Coastal Policy 30210.3
Visitors shall be entitled to use the parking facilities on the campus after payment of the appropriate parking fee and in accordance with campus parking regulations. Visitors shall be entitled to park in lots 23 and 24 on the southwest side of the Main Campus (1980 Plan policy).

LRDP MM 4.16-22
LRDP Coastal Policy 30210.4
The campus shall allow visitors to use, at the prevailing rate, designated parking in campus lots numbers 1 and 10 to accommodate public parking demand during Goleta Beach peak-use periods (1980 Plan policy).

LRDP MM 4.16-23
LRDP Coastal Policy 30210.5
The campus shall also allow coastal access parking in lots 5 and 6 at times when the lots identified in policies 30210.3 and 30210.4 have exceeded their capacity, and such parking would not unduly interfere with the parking needs of the campus.

4. LRDP EIR Mitigation Measures and LRDP Policies that are supported by the Management Plan

LRDP MM 4.14-5
LRDP Coastal Policy 30213.1

Outdoor recreational facilities, including recreation fields, basketball and tennis courts, may be used by the public at no cost, when not occupied by UCSB classes or programs (1990).

LRDP MM 4.16-34
LRDP Coastal Policy 30210.1

The coastal access improvements shown in Figure III-2 (Coastal Act Element) shall be implemented in conjunction with nearby building projects, or independently in advance, if funding permits.

LRDP MM 4.16-35
LRDP Coastal Policy 30210.2

Public access to campus beaches from adjoining beaches and all stairway or pathway access routes mapped in Figure III-2 (Coastal Act Element) will remain open to protect the permanent right of the public for pedestrian access and appropriate recreational uses of the beach at all times, except as provided for in policy number 30210.17 (1980 Plan policy, as adopted).

LRDP MM 4.16-41
LRDP Coastal Policy 30210.18)

The Campus shall cooperate with the County of Santa Barbara and the California Department of Parks and Recreation in the proposed expansion of the California Coastal Trail System so long as it is consistent with the environmental constraints of the Coastal Act.

Chapter 2. Natural and Cultural Factors

This chapter describes the natural and cultural factors that characterize and have influenced the development of the Campus Lagoon management area and its environs. These factors provide a context for the management actions described in Chapter 3. The natural factors described in this chapter are climate and microclimate; geology, soils, and coastal processes; hydrology and water quality; and biotic factors. The cultural factors discussed are cultural resources, public use, aesthetics, and infrastructure. Much of the discussion of historic context and existing conditions for each factor is based on Supplement 1 to the Natural Areas Plan, the Draft Management Plan for the Campus Lagoon and Vicinity (MacKay 1992), prepared as an undergraduate student senior thesis in the Environmental Studies Program.

CLIMATE AND MICROCLIMATE

The Santa Barbara coastal area is characterized as having a maritime Mediterranean climate, with mild, moist winters and moderately warm, dry summers (Smith 1976 cited in MacKay 1992).

High temperatures average 67^0F in August and 53^0F in December. The average annual minimum temperature is 37^0F. Temperatures below freezing and above 100^0F are rare (Ferren et al. 1987 cited in MacKay 1992).

Rainfall averages 17.8 inches in Santa Barbara and occurs throughout the winter months, with 90% of annual rainfall occurring between November and April. During 1973-1983, annual rainfall fluctuated widely, ranging from 7.83 inches to 36.67 inches (Ferren et al. 1987 cited in MacKay 1992).

Winds in the Santa Barbara area are influenced by prevailing westerly air movement along the coast. In the summer, winds are generally calm during morning hours with light offshore winds from the west and northwest developing during the afternoon. In the winter, south to southwest winds move air onshore during the day, whereas cooling continental winds cause an offshore air flow during night and early morning hours (UCSB 1979 cited in MacKay 1992).

During the late spring and early summer, coastal fog commonly forms during night and early morning hours as warm air comes in contact with cooler ocean waters. As ocean surface temperatures increase during the middle and late summer months, the frequency of coastal fog decreases (Ferren et al. 1987 cited in MacKay 1992).

Lagoon Microclimate

Goleta Point and Lagoon Island form low barriers to onshore winds, which affect the microclimate of the lagoon. Cooling summer winds move across the lagoon through low points at either side of Lagoon Island. Winter storm winds enter the lagoon area mostly from the east and southeast. Air temperatures on the lagoon and lagoon margins can be slightly warmer than temperatures on the adjacent beaches. Fog can also be less dense at the lagoon margins than on the beach. Periods of locally heavy rainfall may temporarily affect the salinity and other aspects of lagoon water quality by introducing stormwater runoff (see further discussion in "Water Quality" below).

GEOLOGY, SOILS, AND COASTAL PROCESSES

The physical environment of the Campus Lagoon management area results from the relationship between changing geologic forces and the effects of the ocean and local climate. These forces have interacted to create the present land forms. This summary of the geologic, soils, and coastal processes and identification of resulting land form features is provided as a context for the discussions of hydrologic and biotic resources that follow.

Geology

The UCSB campus, including the Campus Lagoon, lies at the southern edge of the Goleta Plain, a coastal plain between the Santa Barbara Channel and the Santa Ynez Mountains. The Santa Ynez Mountains are part of the Transverse Ranges, which trend east-west in this part of California. These mountains comprise uplifted sandstones and shales of Cretaceous age (approximately 135 million years before present [YBP]). The coastal plain is characterized by much younger, generally horizontal alluvial (stream-deposited) formations of Pliocene age (5.3 million YBP) to recent age (5,000 YBP). Underlying the coastal plain is sedimentary bedrock, primarily composed of sandstone, shales, and mudstone. (Dibblee 1966 cited in MacKay 1992.)

The coastal plain was uplifted and tilted slightly to the southwest during the late Quaternary Period (1.6 million YBP). Parts of the coastal plain (such as the Goleta Valley) either were not uplifted or subsided, however, as indicated by thick accumulations of sediment. (Dibblee 1966 cited in MacKay 1992.)

During the late Pleistocene Epoch (120,000 YBP), further uplifting of land and changing sea levels associated with periodic glaciation created marine terraces on the coastal plain. These terraces show evidence of wave action at various levels, from 35 feet to 100 feet above the present sea level. When the sea level dropped, streams cut through the terraces at steep angles, indicating that the sea was at least 225 feet below its present level (Upson 1949 cited in MacKay 1992). Rising sea levels and the resulting flooding of these stream canyons and basins, combined with continued uplift and deposition of alluvium, have produced estuaries and sloughs (such as Goleta Slough) along the coast (Ferren et al. 1987 cited in MacKay 1992).

The Main Campus is located on a marine terrace 35-40 feet above sea level. Erosion has dissected the surface of this terrace, and alluvial materials have been deposited into these former drainages. Underlying bedrock formations include, in historical sequence, Monterey Shale, Sisquoc Shale, and sandstone of the Santa Barbara Formation (Figure 2-1). These formations are covered in most places by the alluvial terrace deposits of recent age, which are approximately 25 feet thick. Older underlying strata have been folded into two synclines and two anticlines (Hoover & Associates, Inc. 1985 cited in MacKay 1992).

Seismic Activity

The Santa Barbara coastal region is seismically active. Several active faults trend through the region in a generally east-west direction and have been responsible for at least four moderate earthquakes in the last 50 years (UCSB 1990 cited in MacKay 1992).

Several faults have been mapped on the campus mesa and near shore locations in the vicinity of the campus in a number of studies that have been conducted over the last three decades. Faults located in the vicinity of the main campus are reportedly the More Ranch Fault System, the Campus Fault, the Coal Point Fault, and the Goleta Point Fault (alternatively called the Goleta Point Fault) (K-C Geotechnical Engineering 1990).

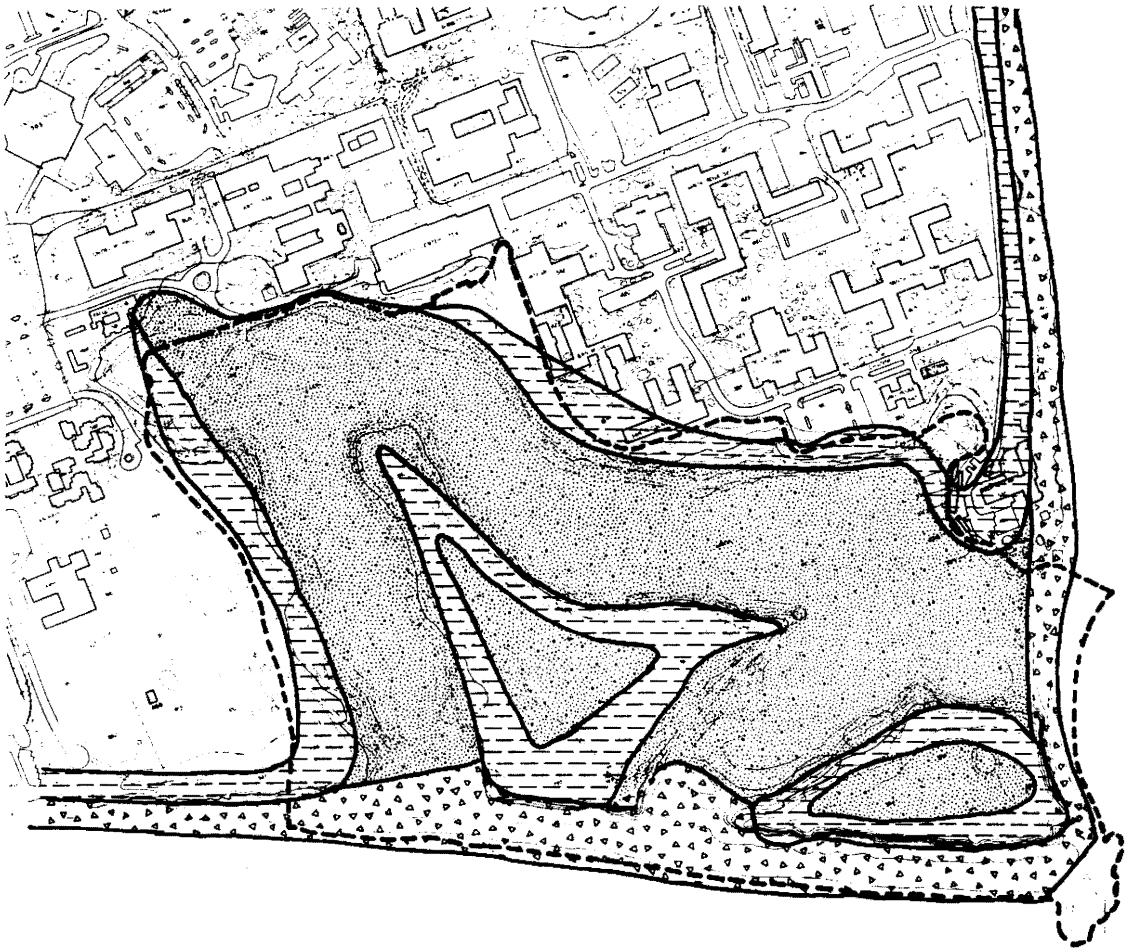
The Goleta Point Fault trends northeast-southwest along the coast just offshore of the campus and crosses the edge of the Campus Lagoon management area at Goleta Point. No direct observation of fault displacement has been confirmed, and no conclusion concerning the fault's activity is reported (Slayman pers. comm.).

The Campus Fault has been reported to trend northeast-southwest under the main campus. No direct surface or subsurface evidence of this fault has been confirmed southeast of the Phelps Hall area on the main campus (Slayman pers. comm.). The location of this fault relative to the Campus Lagoon management area is unknown, but the conclusion of a geotechnical study associated with the University Center expansion project is that it does not pass through that site (K-C Geotechnical Engineering 1990). The activity level of this fault has been variously reported as ranging from inactive to potentially active (Slayman pers. comm.).

Geology and Formation of the Campus Lagoon

The Campus Lagoon is believed to be part of an old stream channel that may represent the historic mouth of the Goleta Slough system (Norris pers. comm. cited in MacKay 1992). The floor of the lagoon is underlain to a depth of 40 feet with unconsolidated sands, silts, clays, and layers of partially decomposed organic matter of Pleistocene to recent age. This material makes the bottom and sides of the lagoon relatively impervious and limits seepage to the ocean during low tides (Goodspeed pers. comm. cited in MacKay 1992).

In historic times, the lagoon was reported to be an evaporative salt flat that was open to occasional tidal action. Topographic maps indicate that by the early part of the 20th century, the two westerly mouths of the lagoon were blocked by stabilized sand dunes and the eastern mouth contained a sand bar that apparently was breached only during highest high tides, when seawater entered the lagoon (Gillard 1969 cited in MacKay 1992).



Legend

- Campus Lagoon Management Area Boundary
- Recent Alluvium
- Older Alluvium
- Beach Sand Deposits
- Sisquoc Shale

0 300 600

Scale in Feet

Source: Modified from Dibblee 1987

Jones & Stokes Associates, Inc.

Figure 2-1.
Geologic Map of the Campus Lagoon Management Area

Soils

Three types of soils have been identified in the Campus Lagoon management area (Figure 2-2). The Conception fine sandy loam (two soils units, mapped as CgA and CgE2) have a high shrink-swell potential and low soil strength. The Baywood loamy sand (BcC) is prone to caving on cut slopes, resulting in unstable bluffs. Beach sands (BE) are highly unstable and present a high erosion hazard. (U.S. Soil Conservation Service 1977 cited in MacKay 1992.)

Coastal Processes

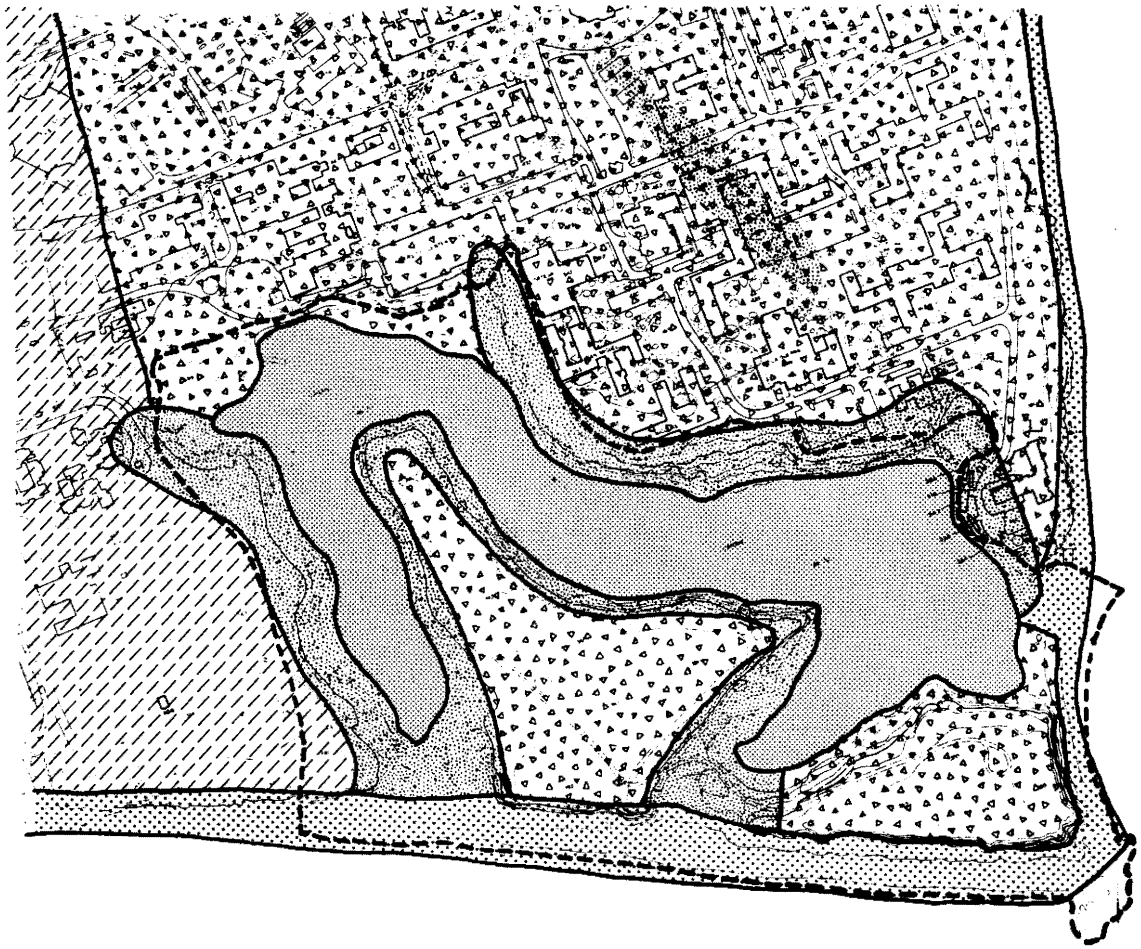
The coast in this area trends east-west and is partially sheltered by Point Conception from the powerful waves and swells generated in the northern Pacific Ocean that generally approach the California coast from the northwest. The Channel Islands provide protection from the less frequent summer storm swells that reach the coast from the south. Strong ocean currents move along the coast from west to east. This results in long shore transport of beach sand down the coast from west to east. In the summer months, however, wave action from the south partially reverses this littoral transport process and moves sand back up the coast and onto the beaches.

Beach Sand Erosion

Beaches along this coast tend to be narrow and backed by cliffs 50-200 feet high. Broader pockets of sandy beach are often associated with stream outlets (Norris 1985a cited in MacKay 1992). Beach sand is created by cliff erosion that occurs from Point Conception to Goleta Point and by sediments washed down from the Santa Ynez Mountains by streams. The long shore current transports this sand down the coast to Mugu Submarine Canyon, where it is discharged deep into the ocean.

Beach erosion occurs seasonally when high-energy waves generated by winter storms strip sand off the beaches and move it offshore. This is usually followed by an erratic recovery during the ensuing summer and fall as sand is gradually moved back onto the beach by lower energy waves. These seasonal cycles vary in duration and magnitude depending on the intensity of winter storms and local conditions associated with sand replenishment. (Norris 1985b cited in MacKay 1992.)

Winter-summer sand movements have contributed to significant beach erosion between Goleta Point and the marine laboratory since the mid-1970s (Hoover & Associates, Inc. 1985 cited in MacKay 1992). Historic photographic evidence indicates that the Campus Lagoon margin was approximately 1,000 feet from the active shoreline and the shoreline faced southeast. Since 1972, the shoreline has been eroded into a concave form facing northeast and has retreated westward approximately 25 feet toward the Campus Lagoon. Wave action has caused damage to the lagoon revetment that was installed in 1942.



Legend

- Campus Lagoon Management Area Boundary
- Baywood Loamy Sand, 2-9% Slopes
- Concepcion Fine Sandy Loam, 0-2% Slopes
- Concepcion Fine Sandy Loam, 15-30% Slopes, Eroded
- Beaches

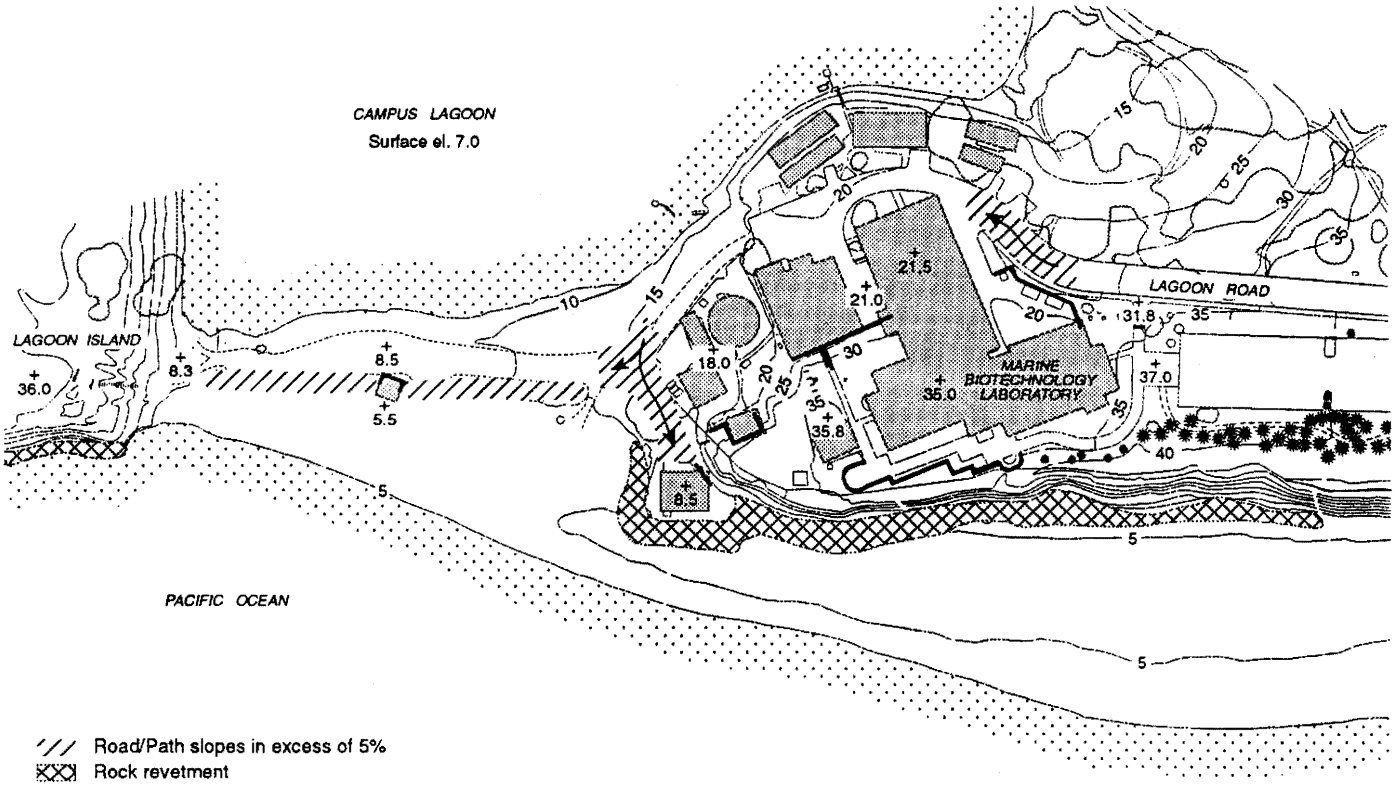
0 300 600

Scale in Feet

Source: U.S. Soil Conservation Service cited in MacKay 1992

Jones & Stokes Associates, Inc.

Figure 2-2.
Soils Map of the Campus Lagoon Management Area



Road/Path slopes in excess of 5%
Rock revetment
Retaining wall

Source: D. W. Thomson Consultants Ltd. 1994

Jones & Stokes Associates, Inc.

Figure 2-3.
Location of East Revetment

Seacliff Erosion

Seacliffs are eroded by high-energy waves, mostly during the winter months, in places where the toe of the cliff is unprotected by sufficient beach width. Characteristics such as the integrity of the rock material and the submarine topography influencing local wave energy determine the natural rate of this process. In addition, stormwater runoff from the cliff top is a factor that contributes to seacliff erosion.

At Goleta Point, the average rate of cliff retreat is 0.25-0.66 foot per year. In 1971, concern about the rate of cliff erosion in this area resulted in construction of rip-rap sea walls along the base of two cliffs: from Goleta Point west to the southerly lagoon entrance and between the Marine Laboratory and the restroom building (Figure 2-3). These sea walls were expected to reduce erosion of the cliff base, but not to provide protection from nonmarine erosion (such as runoff) from the mesa top (Tetra Tech, Inc. 1970 cited in MacKay 1992).

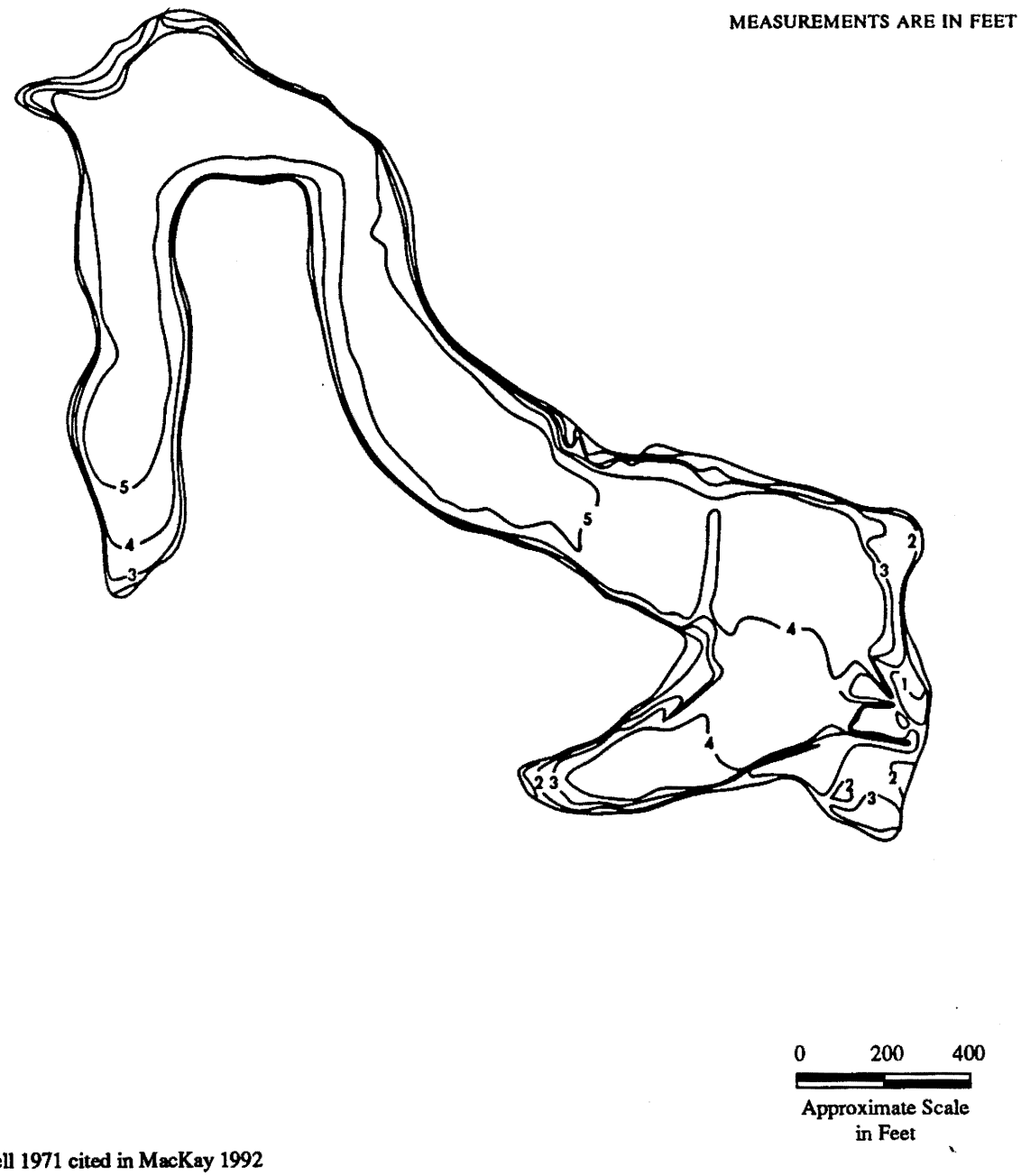
Lagoon Revetment

A revetment of beach sand and cobbles was placed along the upper beach across the former east entrance to the Campus Lagoon during construction of a road to Goleta Point in 1942. Before the 1950s, this revetment was covered by low, partially vegetated sand dunes. In 1952, the revetment was raised and widened by dumping construction debris that included soil, broken concrete, brick, and pieces of asphalt paving to form a more substantial barrier between the Campus Lagoon and the ocean. In 1952, an overflow weir was installed at the western end of the lagoon to control the maximum water level. During the 1960s, barbecue pits were installed along the revetment and seawater discharges into the lagoon associated with operations of the marine laboratory began. The revetment and the seawater discharges stabilized the water level in the lagoon, eliminating large seasonal fluctuations in water level.

A combination of beach sand depletion and severe winter storms in 1982-1983 caused damage to, and a near-breach of, the revetment. Sand bags have been used to reinforce the revetment each winter as UCSB has studied the problem in an effort to identify an acceptable long-term solution. One approach being considered would involve constructing a substantial rip-rap rock revetment structure to replace the existing revetment. An alternative approach that is not presently considered feasible as a long-term solution would involve replacing the eroded revetment and the eroded beach sands on the seaward side of the revetment with sand, gravel, and cobble fill material. (Tomeoni pers. comm. 1994.)

HYDROLOGY

The Campus Lagoon was created in its current form by the construction of a berm at the western terminus of the lagoon in 1942. A sandbar was also present on the east side of the lagoon near the location of the marine laboratory and, together with the berm, it impounded water in the lagoon area. The watershed for the lagoon (Figure 2-4) consists of the open space areas and bluffs around the lagoon margins and the Main Campus, which is connected to the lagoon by the campus stormwater drainage system.



Source: Bothwell 1971 cited in MacKay 1992

Jones & Stokes Associates, Inc.

Figure 2-5.
Bathymetric Map of the Campus Lagoon

Lagoon Outflow System

Two outflow structures are present in the lagoon: the overflow pipes in the eastern levee and the overflow weir in the western arm of the lagoon. Two overflow pipes were placed in the eastern levee in 1991 because high levels of precipitation caused water levels to rise 2 feet above its banks (Anderson pers. comm. cited in MacKay 1992). The two pipes are placed just above the normal water elevation set by the overflow weir, so they operate when the overflow weir capacity is exceeded (Anderson pers. comm.). Both pipes were plugged until heavy storms required them to be cleaned out. One of these pipes, however, is again plugged with sand (Anderson pers. comm.).

The key part of the lagoon outflow system is the overflow weir at the western terminus of the lagoon (Figure 2-4). It was constructed in 1952 to prevent flooding and overflow of the sand bar (original levee) near the present location of the marine laboratory. The overflow weir at the western terminus maintains the lagoon water level at a maximum of 7 feet. The weir overflows during periods of heavy rain and at other times when large quantities of seawater are being discharged. During a site visit on September 14, 1994, the weir was overflowing several inches of water. Seawater discharge from the marine laboratory appeared to be minimal at the time. Water entering the weir flows through a 24-inch-diameter pipe to an outfall box on the beach where it is dispersed across the narrow beach into the surf. The capacity of the overflow weir is limited by either the weir structure or the outfall pipe. Also, the outfall box on the beach requires regular maintenance to clear sand from it that could reduce outflow capacity.

Proposed Marine Biotechnology Laboratory Upgrade and Seawater System Replacement Project

Before discussing the proposed Marine Biotechnology Laboratory Upgrade and Seawater System Replacement Project it should be noted that UCSB does not propose to install a revetment as part of implementing the Lagoon Management Plan. Any references to the revetment within the Lagoon Management Plan are either based on existing LRDP policies, or attempt to provide further detail about what future revetment improvements might look like, by using a description from a project that is still in the planning phase, has not been reviewed pursuant to CEQA, and has not been submitted for approval to the UC Regents or the California Coastal Commission. The 1990 LRDP describes the revetment in some detail (Part 2, Chapter IV, Marine Environment, D. Revetments, Breakwaters, Etc.) and recognizes that it would be subject to further Coastal Commission review under the Notice of Impending Development and CEQA procedures.

The proposed marine laboratory upgrade, which includes substantial improvements to the east levee revetment, would increase the design capacity of the seawater intake system from 800 gpm to 1,200 gpm. The proposed project is currently in the planning phase of the Capital Planning Process, and is still being developed. Consistent with the 1990 LRDP, the need for permanent levee protection from ocean wave action was discussed in a report prepared by UCSB (1994). The improvements would provide much-needed stabilization of the east levee and protection of the lagoon and the marine laboratory facilities. Refer to "Geology, Soils, and Coastal Processes" above for a discussion of levee protection. The proposed plans also include replacement of the two existing pipes in the levee with one 36-inch-diameter pipe to provide additional overflow capability because of the current capacity limitation of the overflow weir.

The existing seawater discharge piping system will not be changed under the proposed plan. The effect or change in circulation patterns in the lagoon as a result of increased seawater discharge is unknown.

WATER QUALITY

Lagoon Water Quality and Algal Growth

Limited data are available on water quality in the lagoon. Studies conducted in 1964-1965 (Kinne 1964) and 1971 (Bothwell 1971) indicated that eutrophication (high or elevated nutrient con centrations and associated algal growth) was already becoming a problem. The shallow depth, lack of circulation, resulting high water temperatures, and nutrient inputs create ideal conditions for excessive growth of algae. These studies indicated that the water quality of the lagoon was highly enriched in nitrates, phosphates, and silicates. Large numbers of fish died periodically because of low dissolved oxygen content and high hydrogen sulfide levels that result from the decomposition process. The studies also showed that the lagoon was characterized by wide fluctuations in salinity (7-26 parts per thousand [ppt]), dissolved oxygen, nutrients, and temperature. The main campus stormwater drainage system carries urban runoff from Main Campus to the lagoon. No detrimental effects other than algal growth have been reported to be associated with either water source, however.

Marine Biotechnology Laboratory Seawater Discharge

In 1976, changes at the marine laboratory increased the ocean water intake capacity from 50 gpm to its current design capacity of 800 gpm. However, actual laboratory use and discharge rates have historically been much lower, averaging 400-500 gpm (DeWitt pers. comm.). This increased volume of seawater discharge consequently increased the lagoon salinity to 33-34 ppt, which is about the same as natural seawater. Current water quality is reportedly similar to conditions described in earlier studies (MacKay 1992). Average water temperatures vary from 12 degrees C during winter months to more than 25 degrees C in summer. Salinity decreases markedly during periods of high precipitation. Current nutrient levels probably exceed those reported in the 1964-1965 and 1971 studies because of the increase in seawater discharge since 1976 (MacKay 1992).

The marine laboratory seawater discharge system is regulated by the Central Coast Regional Water Quality Control Board (RWQCB) under a National Pollutant Discharge Elimination System (NPDES) permit. The design of the intake and filtration system prevents the buildup of toxic substances in pipelines; the water quality is essentially the same as natural seawater but is higher in nutrients. The RWQCB regulates water quality in this region through the water quality control plan or Basin Plan. Aside from this plan, no other regulations apply to lagoon water quality. The RWQCB, which is the primary regulatory authority for water quality issues at UCSB, has no concerns about water quality issues in the lagoon because it is artificial (Nighswonger pers. comm.), but supports any actions that would improve lagoon water quality.

Lagoon Circulation

The discharge of seawater from the marine laboratory provides the main water source for the lagoon and maintains the water quality at its current level. In a technical sense, the lagoon acts as a large detention basin for stormwater runoff and seawater discharges. Because of the small size of the lagoon and therefore the short detention time there, the seawater discharge probably serves to flush the lagoon. Although no prevailing circulation pattern is present in the lagoon, the combination of wind mixing with the seawater input probably keeps water quality from declining notably during summer months.

Other Water Quality Factors

The major water quality problem in the lagoon is the accumulation of nutrients from both inflow sources, which results in algal blooms and eutrophic conditions. Seawater inflows probably provide most of the nutrient input, however. Algae die-offs deplete oxygen through the decay of dead algal cells. Dead algae remain suspended in the water column, thereby increasing turbidity, or settle to the lagoon bottom, increasing bottom sediments. Sediment accumulation is also a concern because it decreases lagoon capacity, resulting in increased water temperatures and reduced habitat quality.

BIOTIC FACTORS

The biotic resources of the Campus Lagoon management area have been investigated to varying degrees by MacKay (1992), Anderson et al. (1989), Page (1979), UCSB (1975, 1979, 1990), Lehman (1991 cited in MacKay 1992), Wenner (1969 cited in MacKay 1992), and Bothwell (1971) and through a reconnaissance-level field visit associated with this project. These investigations are summarized in the following sections; no original investigations of the management area were conducted to prepare the Campus Lagoon management plan.

The biotic resources are a compilation of the area's flora (plant species), fauna (birds, mammals, reptiles and amphibians, fish, and terrestrial and aquatic invertebrates), and the plant communities they inhabit. Habitat is the combination of physical and organic characteristics of a site that are used by plants and wildlife. Particular attention is given to special-status species, including rare and endangered species, as well as other sensitive taxa.

Historical Overview of Flora and Fauna

The history of the flora and fauna of the management area is based on literature, maps, and aerial photographs of the management area. Originally, the Campus Lagoon area consisted of a natural, elevated (35-45 feet msl) marine terrace dominated by southern needlegrass grassland (Magney 1992, MacKay 1992). The slopes away from the ocean were likely dominated by coyote brush scrub. The ocean bluffs were vegetated by coastal bluff scrub and the sand dunes were stabilized by coastal dune scrub. The lagoon was a seasonal brackish marsh that periodically dried out to create salt and mud flats. Seawater occasionally entered from waves overtopping the dunes at the "mouths" of the lagoon during high surf events.

Invertebrates

Invertebrates occurring in the management area consist of many insects, arachnids, isopods, mollusks, brine shrimp, and amphipods; however, no general surveys for invertebrates have been conducted. Page (1979) identified an aquatic snail (*Tyronia imitator*) as increasing in density as seawater input increased, as well as introductions to the lagoon by the leptostracan crustacean (*Nebalia*) and the mud crab (*Hemigrapsus oregonensis*) from the Marine Science aquaria.

Terrestrial Invertebrates. Invertebrates are common in all terrestrial habitats in the management area. Because of the amount of habitat alteration and human disturbance in the management area, many of the invertebrates present there are introduced species.

Aquatic Invertebrates. The lagoon supports many species of aquatic invertebrates. Because the lagoon has been extensively disturbed by human activities, many of the aquatic invertebrates in the lagoon are adapted to or depend on disturbed habitats. Many of these aquatic invertebrates are not native to the lagoon, such as the bubble-shell snail *(Haminoea vivesceus)*, horn snail (*Cerithdea californica*), mud crab *(Henigrapsus oregonensis)*, rock crab *(Pachygrapsis crassipes)*, and bay mussel *(Mytilus edulis)*.

Plant Communities and Wildlife Habitats

The plant communities and wildlife habitats of the management area are listed in Table 2-1 and are illustrated in Figure 2-6 as redrawn from MacKay (1992). Also, Figure 2-6 indicates the vegetation habitat types and locations of rare plant populations. The plant community types generally follow the recently developed California Native Plant Society (CNPS) classification system (Sawyer in press), which has been adopted for use by the DFG (Gibbons pers. comm.), U.S. Forest Service (Shevock pers. comm.), and other state and federal agencies.

Brief descriptions of the plant communities and habitat types present in the management area are provided below, including the characteristic plants and animals that inhabit them.

Coastal Strand

This habitat comprises foredunes and sand accumulations with little or no vegetation. A sparse cover of European sea rocket (*Cakile maritima*) is the only vegetation occurring on this habitat type in the management area. Coastal strand is found along the entire length of the oceanfront in the management area; however, much of the sand migrates offshore during winter and returns each summer, as a result of the seasonal changes in the longshore current.

Coastal strand provides habitat for various wildlife species, primarily invertebrates. The upper intertidal zone at the water's edge contains sand hoppers (*Orchestodea* spp.), sand crab (*Emerita analoga*), bloodworm (*Euzonas mucronata*), purple olive snail (*Olivella biplicata*), Pismo clam (*Tivela stultorum*), and shore flies (*Ephydra regina, E. riparia*). The drier zones harbor tiger beetles, solitary bees and wasps, and spiders.

Many species of shorebirds feed on the invertebrates inhabiting the coastal strand habitat in the management area (MacKay 1992). Shorebirds observed in the management area include the killdeer, semipalmated plover, black-bellied plover, surfbird, black turnstone, whimbrel, western sandpiper, sanderling, and marbled godwit (Appendix B).

Because of the high level of human disturbance along the beach areas, shorebirds are unlikely to nest successfully along the coastal strand. Also, human disturbance disrupts the feeding and roosting activities of shorebirds in the management area, which reduces the value of the area for these animals. The management area probably received higher levels of use (nesting, feeding, and roosting) by shorebirds before the area was developed. The introduction of non-native plants also reduces habitat quality for coastal invertebrates, amphibians and reptiles, and small mammals.

Coastal strand habitats are fairly common along the southern coast of California; however, many sandy beach areas have eroded severely because the sand supply has been largely interrupted by the construction of dams for reservoirs on the larger streams and rivers upcoast, such as the Santa Ynez and Santa Maria Rivers. Human-made obstructions to littoral drift, such as the wharf at Santa Barbara Marina, have caused significant erosion of sandy beaches downcoast of the structures (Penfield 1960 cited in MacKay 1992); however, obstructions do not affect the beach in the management area.

Sand-Verbena - Beach Bursage Series

Sand-verbena - beach bursage series (includes southern foredunes [Holland 1986], coastal dune scrub [MacKay 1992], and ice plant series [Sawyer in press]) in the management area consists of psammophylic (sand-loving) perennial herbs and shrubs growing in eolian (windblown) sand and has a relatively depauperate flora, comprising whiteleaf saltbush (*Atriplex leucophylla*); California sagebrush (*Artemisia californica*); beach bursage (*Ambrosia chamissonis*); European sea rocket; and the invasive exotics Hottentot fig, sea fig, Australian saltbush, giant reed, and New Zealand spinach. Also, this series at the lagoon contains red sand-verbena, a special-status species. Many of these plants stabilize eolian sand and help establish sand dunes by their presence. This plant community is found between the sandy beach of the coastal strand and the coastal bluffs.

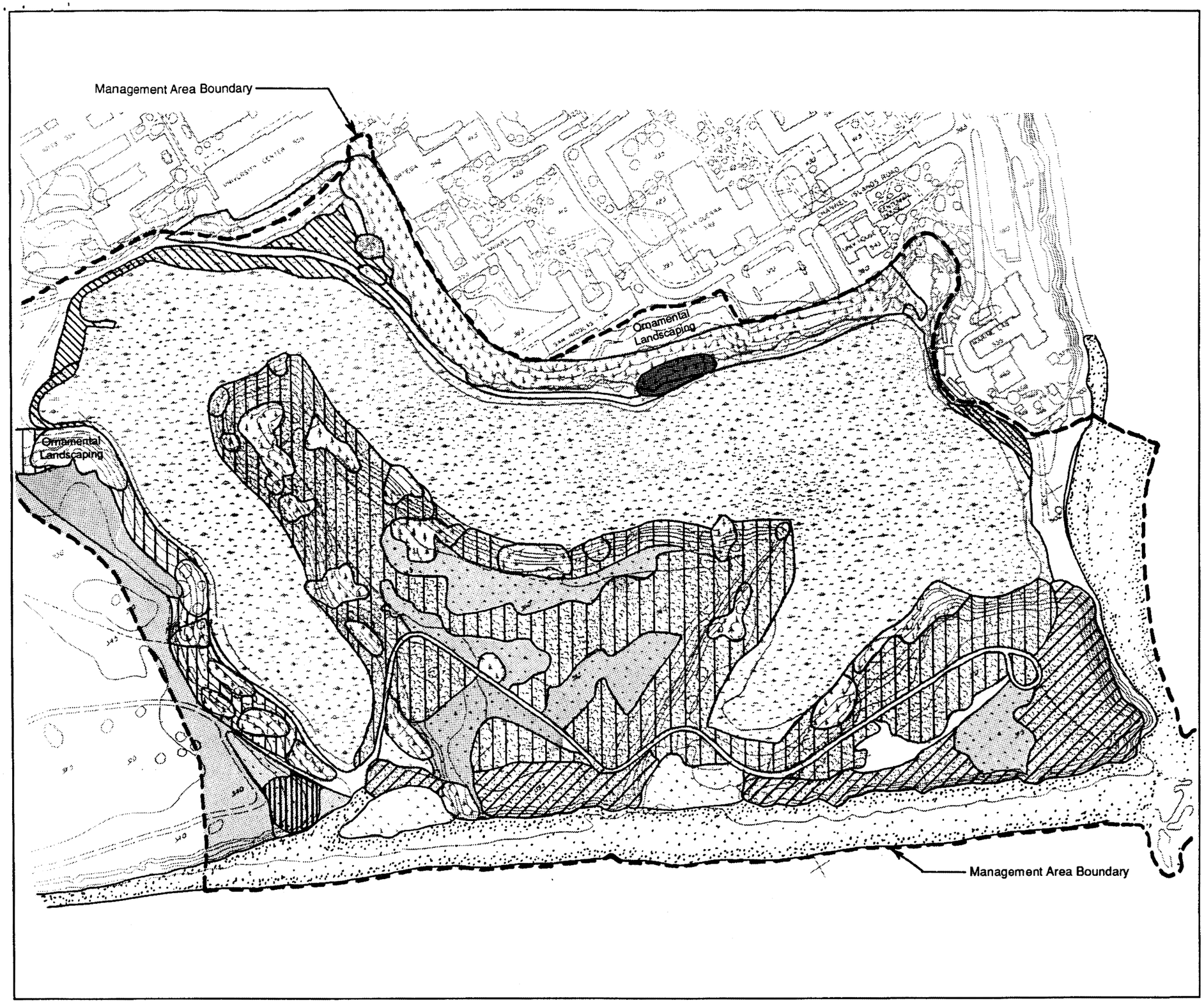
The introduction of non-native vegetation (i.e., Hottentot fig, sea fig, Australian saltbush, and New Zealand spinach) has changed the wildlife species composition and wildlife use of the sand-verbena-beach bursage series.

Human disturbance has changed the character of this sensitive habitat. Foot and vehicle (i.e., bicycle) traffic, as well as road and building construction (mostly during World War II), has fragmented the vegetation, increased the area of habitat edge, compacted the soil, disturbed the native vegetation, and provided pathways and openings for invasive exotic plants to become established.

The sand-verbena - beach bursage series historically provided habitat for the legless lizard, western fence lizard, gopher snake, and southern alligator lizard (UCSB 1979). These species have been extirpated from the area by habitat alteration and human disturbance. Sand-verbena - beach bursage series, however, still provides habitat to the side-blotched lizard, ringneck snake,

Figure 2-6.

Existing Plant Communities and Wildlife Habitats



Legend:

- Ditchgrass Series/Open Water
- California Annual Grassland Series
- Ornamental Landscaping
- Sand-Verbena-Beachbursage Series
- California Sagebrush Series
- Coyote Brush Series
- Pickleweed Series
- Coastal Strand
- Coulter's Saltbush and Southern Tarplant
- Bare Soil/Asphalt
- Bird Roosting Area

Source: Landscape Master Plan, Part III, U. C. Santa Barbara, 1992, and Jones & Stokes Associates, 1995

0 100 200 400

Scale in Feet

Jones & Stokes Associates

savannah sparrow, white-crowned sparrow, house finch, and desert cottontail (Appendix B) and numerous invertebrates.

Sand-verbena - beach bursage series (under the name southern foredunes) is considered a rare plant community throughout the California coast (Natural Diversity Data Base 1987), particularly on the south coast, as a result of substantial urban coastal development. Remaining sand-verbena - beach bursage series vegetation is routinely affected by humans trampling it. Invasive exotic plants have severely altered the flora of this habitat by invading sand dune areas and out competing native species. Hottentot fig and sea fig are the most prevalent exotic plants on the dunes in the lagoon management area.

California Sagebrush Series

California sagebrush series (southern coastal bluff scrub [Holland 1986], coastal bluff scrub [MacKay 1992]) occurs at localized sites along the California coast. This community is dominated by woody and succulent shrubs up to 6 feet (2 meters) tall. In the management area, California sagebrush series comprises California sagebrush, bush lupine (*Lupinus arboreus*), purple-bracted morning-glory (*Calystegia macrostegia* ssp. *cyclostegia*), coyote brush (*Baccharis pilularis*), Brewer's saltbush (*Atriplex lentiformis* var. *breweri*), tiny primrose (*Camissonia micrantha*), California bush sunflower (*Encelia californica*), and non-native wild radish (*Raphanus sativus*) and field mustard (*Brassica rapa*). This plant community occurs along the bluffs and coastal portions of the mesa top of the management area.

The California sagebrush series is severely affected by human activity (e.g., bicycles and pedestrians), which reduces the series' wildlife value, and is considered a sensitive community by the Natural Diversity Data Base (1987) under the name of southern coastal bluff scrub (Holland 1986). Remaining California sagebrush series vegetation is routinely affected by humans trampling it and by mass wasting of the bluffs from pounding surf. Invasive exotic plants have significantly altered the flora of this habitat by invading bluff areas and out competing native species, extirpating some native species from the management area. Hottentot fig, sea fig, and wild radish are the most prevalent exotic plants on the bluffs in the management area.

The top of the bluff on Lagoon Island attracts double-crested cormorant, migrating land birds, and wintering sparrows. California vole, gopher snake, western rattlesnake, western fence lizard, black-tailed hare, numerous insects and arachnids, and Pacific chorus frog also occur on the bluffs.

Coyote Brush Series

Coyote brush series scrub (coyote brush scrub [Holland 1986], coastal sage scrub [Munz and Keck 1973]) habitat consists of schlerophylos (having small, thick, drought-resistant leaves) evergreen and drought-deciduous shrubs and perennial and annual herbs and grasses that occupy loamy to clayey soils of level or moderately sloping terrain. The dominant scrub is coyote brush, which often occurs in areas that have been disturbed in the past. Other plants commonly associated with the coyote brush series in the management area are California sagebrush, bush lupine, wild radish, field mustard, and plants from the grassland community. Coyote brush series

Table 2-1. Plant Communities and Wildlife Habitats of the UCSB Campus Lagoon Management Area

Plant Community or Habitat Type	Management Zone	Total Area (Acres)
Ditchgrass series and open water	Lagoon	30.9
California annual grassland series	Lagoon Island	3.93
	Campus Point	0.72
	West Lagoon Park	3.72
Ornamental landscaping	Lagoon Island	2.67
	Campus Point	0.68
	North Margin	4.99
	Wetlands	2.28
	West Lagoon Park	1.29
Sand verbena - beach bursage series	South Beach	1.16
	Lagoon Island	0.14
	Wetlands	0.41
California sagebrush series	Lagoon Island	11.18
	Campus Point	3.40
Coyote brush series	Lagoon Island	1.48
	Campus Point	3.45
	West Lagoon Park	4.12
Pickleweed series	East Margin	0.22
	Wetlands	1.53
Coastal strand	South Beach	8.63
	East Beach	2.19
Barren habitats	Lagoon Island	0.46
	Campus Point	0.87
	East Margin	0.79
	Wetlands	1.50
	West Lagoon Park	0.78
	South Beach	0.00
	East Beach	0.00
	North Margin	0.61

Note: Only management zones containing the plant community or habitat type are listed for each zone.

is a component of the coastal sage scrub complex and is relatively common in the south coast region. Several ornamental plantings occur in this habitat type in the management area.

Coyote brush series occurs primarily on Lagoon Island and Goleta Point and intergrades with California sagebrush series on the bluffs and steep slopes on the ocean side of the area, as well as with grassland habitats on flatter terrain with deeper soils, such as on the mesa tops of Lagoon Island and Goleta Point. The now-developed portions of the campus were grassland before the 1880s.

The dead Monterey cypress on the east bluff of Lagoon Island in coyote brush series areas is an important roosting site for snowy egrets (MacKay 1992). Black-shouldered kite formerly nested on top of the Lagoon Island mesa. In general, wildlife species composition and wildlife use of coyote brush is similar to that of California sagebrush.

California Annual Grassland Series

Grassland habitats in the management area consist of two types, California annual grassland series (Sawyer in press) and southern coastal needlegrass grassland (Magney 1992), which is included in the purple needlegrass series by Sawyer (in press). California annual grassland series consists of annual and perennial grasses and herbs less than 1 meter high with a continuous to open ground cover dominated by seasonal annual herbs and grasses. In the lagoon management area, California annual grassland series is composed of wild oat (*Avena fatua*), fiddleneck (*Amsinckia spectabilis*), Australian saltbush, field mustard, brome grasses (*Bromus* spp.), tocalote (*Centaurea melitensis*), chenopods (*Chenopodium* spp.), gaura (*Gaura* spp.), bicolored everlasting (*Gnaphalium bicolor*), tarplants (*Hemizonia* spp.), barleys (*Hordeum* spp.), goldfields (*Lasthenia californica*), peppergrasses (*Lepidium* spp.), lupines (*Lupinus* spp.), plantains (*Plantago* spp.), wild radish, and purple vetch (*Vicia benghalensis*) (MacKay 1992). Also, two special-status plant species, Coulter's saltbush and southern tarplant, occur in a portion of this series habitat in the lagoon management area.

California annual grassland series and southern coastal needlegrass grassland occur in patches on the mesa tops of Lagoon Island, Goleta Point (in one area), and the southeastern and central portions of the west bluff area (Figure 2-6).

The southern coastal needlegrass grassland consists of perennial and annual grasses and herbs, dominated by perennial bunchgrasses such as purple needlegrass (*Nassella [Stipa] pulchra*). Other common and characteristic plants of southern coastal needlegrass grassland in the management area include brome grasses, everlastings (*Gnaphalium* spp.), fascicled tarplant (*Hemizonia fasciculata*), and slender fescue (*Vulpia bromoides*). This community occurs as small remnant patches in the grassland areas of the management area and intergrades with California annual grassland series and coyote brush series.

Because of the habitat alteration and human disturbance in the management area, the grass lands provide relatively low-quality wildlife habitat. Common wildlife species tend to occupy grassland habitats in the management area, including the red-tailed hawk, American kestrel, western meadowlark, Botta's pocket gopher, California ground squirrel, California vole, gopher snake, and gray fox.

Pickleweed Series

Pickleweed series (Sawyer in press) marsh (also called southern coastal salt marsh [Holland 1986]) are found in bays, lagoons, and estuaries along the coast and is a type of coastal wetland. The community is dominated by perennial, herbaceous to suffrutescent (shrub-like) plants that are halophytic (salt-tolerant) and hydrophytic (water-loving). Plant species of the pickleweed series in the lagoon area include pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), fleshy jaumea (*Jaumea carnosa*), alkali heath (*Frankenia salina*), fat hen (*Atriplex patula*), marsh spurry (*Spergularia marina*), and horned sea-blite (*Suaeda calceoliformis*). Pickleweed series covers small portions of the management area along the margins of the lagoon, primarily along its north edge. This habitat was likely always a part of the lagoon's ecosystem; however, the discharge of seawater from the marine laboratory caused the extirpation of the bulrushes (as a result of increased salinity) and likely restricted the pickleweed series to its current location (Ferren pers. comm.).

Pickleweed series vegetation is susceptible to damage by human trampling, which has occurred fairly extensively in the area adjacent to the Commencement Green and near the University Center.

Pickleweed habitat is considered important for many wetland-dependent wildlife species. Pickleweed is important foraging habitat for great blue heron, snowy egret, great egret, Virginia rail, sora, and northern harrier. These habitats are also important breeding habitats for the Virginia rail, sora, and harvest mice. Saltgrass, a common native grass in pickleweed series habitat, is the host plant to the wandering (salt marsh) skipper (*Panoquina errans*), a special-status invertebrate that occurs in the Goleta area, such as at Devereux Slough (Isla Vista) and downcoast at Ormond Beach in Ventura County (BioSystems Analysis 1993).

Ditchgrass Series and Open Water

The ditchgrass series community is characterized by an exclusive, sparse cover of ditchgrass (*Ruppia maritima*), a submergent aquatic vascular plant (Sawyer in press). This community occurs in the lagoon, with ditchgrass growing in the muds at the bottom of the lagoon. Open water areas are occupied to varying densities by free-floating aquatic phytoplankton and algae. The lagoon historically was euryhaline (exhibited fluctuating salinity) as a result of seasonal evaporation of the ponded water. This natural phenomenon was altered in 1976 when a relatively stable inflow of seawater to the lagoon began largely for aesthetic reasons. (MacKay 1992.)

These conditions provide habitat for dinoflagellates (*Gyrodinium* spp.), diatoms (*Cyclotella* and *Nitzschia* spp.), a mat-forming green algae (*Enteromorpha intestinalis*), blue-green algae (*Oscillatoria* spp.), as well as ditchgrass.

The lagoon water is habitat to several aquatic invertebrates, including rotifers (*Pedalaria* spp.), hydroids (*Obelia* spp.), medusae (*Goniomnemus* spp.), copepods (*Calanodia* and *Harpactoida*), protozoans (*Zoothamnium* spp.), free-swimming amphipod (*Ansiogammarus confervicolus*), ostricods, brine shrimp, beetles (*Tropisternus salsamentus* and *Hydrobius* spp.), water boatman (*Trichocorixa reticulata*), and shore flies (*Ephydra regina, E. riparia*). The lagoon bottom supports benthic invertebrates such as polychaete worms (*Polydora nuchalis* and

Capitella capitata); tube-building amphipod (*Corophium insidiosum*); and, before 1976, California brackishwater snail (*Mimic tryonia*).

Numerous wading birds and shorebirds, including American avocet, sanderling, gulls, willet, snowy egret, and black-necked stilt, forage in the lagoon and along its margins. Killdeer use the lagoon margins for nesting. Large numbers of wintering waterfowl also use the lagoon as roosting and foraging habitat. Logs from downed trees provide roost sites for pelicans, gulls, terns, cormorants, and herons.

The change from an evaporative salt flat subject to occasional tidal action to a permanent, artificial, seawater lagoon has caused a significant shift in the types of plants and animals that now inhabit or use it. Whereas, historically, the lagoon provided varying seasonal habitats from fresh to hypersaline open water, as well as salt and mud flats when the water evaporated, it now consists of a permanently flooded saltwater lagoon that depends entirely on active human management (i.e., seawater discharge from the marine laboratory).

The southeastern portion of the lagoon's east arm has a sandy and clay shoreline that is used frequently by shorebirds and wading birds and is relatively protected from human disturbance. This area has relatively high value to wildlife.

Ornamental Landscaping

Ornamental landscaping consists of groupings of planted trees, shrubs, and groundcovers and comprises typical and commonly used and unusual ornamental horticulture species. Turfgrass habitat in the management area consists of ornamental lawn grasses (e.g., bluegrass *[Poa]*, ryegrass *[Elymus]*, and bermuda grass *[Cynodon]*) and scattered ornamental trees and shrubs, such as Moreton Bay fig (*Ficus macrophylla*). Native hydrophytes, such as Mexican rush (*Juncus mexicanus*), also occur in the lawn at the Commencement Green, especially toward the lagoon margin.

Ornamental plantings are scattered throughout the management area, forming "unnatural" communities. Many of these plantings occur among natural communities, such as those on Lagoon Island. These plantings include Monterey cypress (*Cyperus macrocarpa*), Torrey pine (*Pinus torreyana*), myoporum (*Myoporum laetum*), melaleucas (*Melaleuca* spp.), hakeas (*Hakea* spp.), Catalina Island cherry (*Prunus lyoni*), paper flower bougainvillea (*Bougainvillea glabra*), Cootamunda wattle (*Acacia longifolia*), figs (*Ficus* spp.), eucalypts (gums, ironbarks, beeches, and mallees) (*Eucalyptus* spp.), and Peruvian pepper tree (*Schinus molle*). Many of the plantings are no longer actively cultivated, such as on Lagoon Island, but have persisted. Many of the ornamental plants are well adapted to the Mediterranean climate of southern California, having originated from similar climates. The many Australian tree and shrub species have high value from a horticultural perspective, as suggested by the long list of eucalypts and other members of the Myrtaceae family in Appendix A.

The eucalyptus forest (eucalyptus series [Sawyer in press]) located in the North Margin management zone was planted during the 1930s as a windbreak to protect agricultural crops from continual onshore sea breezes (MacKay 1992). The dominant tree is the Tasmanian blue gum (*Eucalyptus globulus*), a native of Australia. Understory vegetation is almost entirely lacking as a

result of allelopathic chemicals emitted from the leaves and bark of many species of eucalyptus, such as Tasmanian blue gum.

Currently, the eucalyptus forest is being thinned of dead or unhealthy trees and limbs for safety and aesthetic reasons. These trees also pose a serious fire hazard, especially where they overhang or grow near buildings.

The Monterey cypress trees on Lagoon Island were reported to be planted in the 1920s (MacKay 1992); however, no trees are apparent on the 1928 aerial photograph of the area (Figure 2-7). Nearly all the flat terrain was in agriculture in 1928, with the Tasmanian blue gum windrows planted in the 1930s. By 1954 (Figure 2-8), the eucalyptus grove had matured and additional trees, possibly Monterey cypress, appear to be mature trees on Lagoon Island and Goleta Point; however, no large shrubs or trees are visible on the mesa tops of Lagoon Island, West Lagoon Park, or Goleta Point Management Zones. Most of the other ornamental plantings occurred during 1962-1963 as part of UCSB's planting program (MacKay 1992) and are visible on the 1975 aerial photograph (Figure 2-9).

Overall, eucalyptus groves are considered low-quality wildlife habitats. In California, eucalyptus groves generally support fewer wildlife species than the natural plant communities surrounding them. Despite this, eucalyptus trees have high value for certain wildlife species. Eucalyptus flowers provide nectar during the winter for hummingbirds, migratory monarch butterflies, and other insects. Eucalyptus flowers support insects that are eaten by insectivorous birds, including Anna's hummingbird, yellow-rumped warbler, and ruby-crowned kinglet.

Eucalyptus trees in the management area are important as roosts, perches, and nest sites for various bird species, including great blue heron, great egret, black-crowned night-heron, red-tailed hawk, and great horned owl; however, any tree species would likely be suitable.

Barren Habitats

Barren habitats are generally devoid of vegetation, usually because the area was recently disturbed or is disturbed continually, as along trails. A few weedy plant species may occur sparsely in barren portions of the management area.

Barren areas are considered low-quality wildlife habitats because they lack cover and foraging habitat needed by most wildlife. Barren habitats are used, however, by many common wildlife species, such as the gopher snake, Botta's pocket gopher, black-tailed hare, gray fox, California ground squirrel, red-tailed hawk, and mourning dove.

Sensitive and Special-Status Species

Special-status species are plants and wildlife species that meet the definitions provided below and warrant special management attention in the development of this management plan. Although the management area is potential habitat for a large number of special-status species, many of which have been treated in previous reports (MacKay 1992), only those taxa known to occur at or immediately adjacent to the Campus Lagoon management area are described in the following sections.

Definitions of Special-Status Species

Special-status species are plants and animals that are legally protected under the state and federal Endangered Species Acts or other regulations and species that are considered sufficiently rare by the scientific community to qualify for such listing and protection. Special-status plants are defined, for the purpose of this document, to include species in the following categories:

- plants that are listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.12 [listed plants] and various notices in the Federal Register [proposed species]);
- plants that are Category 1 or 2 candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (58 FR 51144, September 30, 1993);
- plants listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5);
- plants listed under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.);
- plants that meet the definitions of rare or endangered species under the CEQA (State CEQA Guidelines, Section 15380);
- plants that are considered by CNPS to be "rare, threatened, or endangered in California" (Lists 1A, 1B and 2 in Skinner and Pavlik 1994); and
- plants that are listed by CNPS as "plants about which we need more information" and "plants of limited distribution" (Lists 3 and 4 in Skinner and Pavlik 1994), which may be included as special-status species on the basis of local significance or recent biological information.

Special-status animals are defined, for the purpose of this document, to include species in the following categories:

- animals that are listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.11 [listed animals] and various notices in the Federal Register [proposed species]);
- animals that are Category 1 or 2 candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (56 CFR 225, November 21, 1991);
- animals that meet the definitions of rare or endangered species under CEQA (State CEQA Guidelines, Section 15380);
- animals that are listed or proposed for listing by the State of California as threatened and endangered under the California Endangered Species Act (14 CCR 670.5);

- animal species of special concern to DFG (Remsen 1978 [birds] and Williams 1986 [mammals]); and
- animal species fully protected in California (California Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians].

Special-Status Plant Species

Three special-status plant species are known to occur in the management area: red sand-verbena (*Abronia maritima*), Coulter's saltbush (*Atriplex coulteri*), and southern tarplant (*Hemizonia parryi* ssp. *australis*).

Red Sand-Verbena. Red sand-verbena is a prostrate, succulent, sticky-haired, red-flowered perennial herb that grows in beach sand and blooms from February to November. It occurs in sand-verbena - beach bursage series vegetation in the sand dune portions of the South Beach management zone. Red sand-verbena is considered to be a plant of limited distribution (List 4) by CNPS (Skinner and Pavlik 1994) and has been declining in numbers because its habitat has been eliminated or degraded by human activities. It originally ranged along the immediate coast from Baja California to San Luis Obispo County; however, it has been extirpated from most of southern California. Red sand-verbena is reported from Ormond Beach (Jones & Stokes Associates 1994), Emma Wood State Beach (Ferren et al. 1990), and the Channel Islands (Smith 1976).

Coulter's Saltbush. Coulter's saltbush is a small, gray-leafed annual herb that grows in seasonally ponded habitats. It occurs in shallow, poorly defined vernal pools and open sites in alkaline or clay soils, and is associated with California annual grassland series and California sagebrush series vegetation. It occurs in the southern part of the West Lagoon Park management zone on the bluff just above the west arm of the lagoon in an area that receives fairly heavy public use. Coulter's saltbush is considered to be a rare and endangered plant (List 1B) by CNPS (Skinner and Pavlik 1994) and has been declining in numbers because of habitat loss and degradation from human activities. It originally ranged along the immediate coast from Baja California to Santa Barbara County and occurred at some inland sites (i.e., Riverside County) and in the Channel Islands; however, it has been extirpated from most of southern California. Coulter's saltbush is reported from Goleta and Jalama and apparently has been introduced along railroad tracks in Santa Barbara County (Goleta) (Smith 1976).

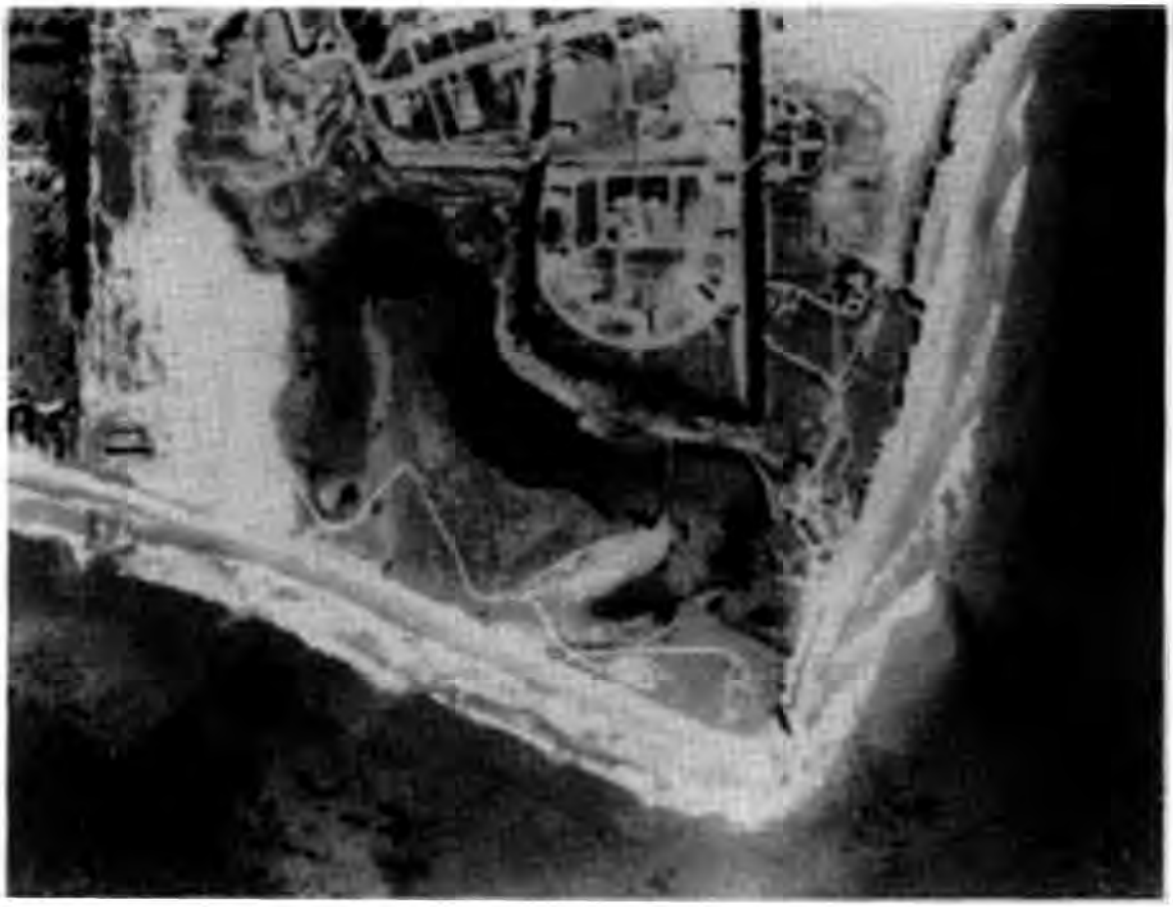
Southern Tarplant. Southern tarplant is an upright, yellow-flowered, annual herb that grows in seasonally ponded and mesic grassland habitats. It occurs in shallow, poorly defined vernal pools and open sites in alkaline or clay soils, as well as loamy soils, and is associated with California annual grassland series and California sagebrush series vegetation. It occurs in the southern part of the West Lagoon Park management zone along with Coulter's saltbush on the west bluff near the lagoon in an area that receives fairly heavy public use. Southern tarplant is a Category 2 candidate for listing as a threatened or endangered species by the USFWS and is considered to be a rare and endangered plant (List 1B) by CNPS (Skinner and Pavlik 1994). It has been declining in numbers because of habitat loss and degradation from human activities. It originally ranged along the immediate coast from Baja California to Santa Barbara County and

This 1928 aerial photograph of the Campus Lagoon area shows that nearly all the flatter land on the bluff tops was in agricultural production and that little native vegetation was present. Two piles of tailings from the Alcatraz asphaltum mine are visible as finger-like projections at the northwest corner of the lagoon, now the site of the Commencement Green. No trees or shrubs are evident near the lagoon, indicating that the existing eucalyptus and Monterey cypress trees were probably planted after 1928. Although it is not known what time of year the photograph was taken, the small amount of water in the lagoon and the predominance of dark-colored soil indicate that the water level in the lagoon fluctuated regularly.

Source: U.C. Santa Barbara Map and Imagery Library

Jones & Stokes Associates, Inc.

Figure 2-7.
Aerial View of the Campus Lagoon, 1928



This 1954 aerial photograph of the Campus Lagoon area shows that substantial land use changes had occurred since 1928. Agricultural crops have been eliminated from the entire management area and replaced by the military installation (constructed during World War II). The eucalyptus grove is visible in the North Margin Management Zone. The West Lagoon Park Management Zone appears to be highly disturbed while the Lagoon Island and Campus Point Management Zones appear to have become revegetated. A few trees, presumably Monterey cypress, are evident on the lagoon margins on Lagoon Island and Campus Point. A clearly defined road has also been constructed between the West Lagoon Park area and Campus Point. A small road had been constructed across the east arm of the lagoon from the North Margin to Lagoon Island. Presumably, this road was used to haul borrow material from excavations at the east edge of Lagoon Island. This road is not present on aerial photographs from the late 1940s or 1960s.

Source: U.C. Santa Barbara Map and Imagery Library

Figure 2-8.
Aerial View of the Campus Lagoon, 1954

This 1975 aerial photograph of the Campus Lagoon area shows again that substantial land use changes had occurred since 1954. The military installation had become part of the university campus during the 1960s. Several of the original military-era buildings were retained and incorporated into the university. The West Lagoon Park, Lagoon Island, and Campus Point Management Zones had become largely revegetated by native and naturalized plants. Many trees and shrubs were introduced during 1962-1968 to the lagoon edge of the West Lagoon Park, Lagoon Island, and Campus Point Management Zones. The road connecting the West Lagoon Park and Campus Point Management Zones is still clearly visible, as are numerous small trails. Present conditions (1994) are similar to what is seen in this 1975 aerial photograph.

Source: U.C. Santa Barbara Map and Imagery Library

Figure 2-9.
Aerial View of the Campus Lagoon, 1975

occurred in the Channel Islands; however, it has been extirpated from most of southern California. Southern tarplant is reported from Isla Vista at the north campus housing project site (Wallace Roberts & Todd 1994a), at the western edge of Goleta Slough at the north edge of UCSB, at Pitas Point, and apparently has been introduced along railroad tracks in Santa Barbara County (Smith 1976).

Special-Status Wildlife Species

Seven special-status wildlife species occur regularly in the management area: California brown pelican (state listed and federally listed as endangered), double-crested cormorant (state species of special concern), great blue heron (DFG special animal), black-crowned night-heron (DFG special animal), western snowy plover (federally listed as threatened), tricolored blackbird (state species of special concern and federal Category 2 candidate), and wandering (salt marsh) skipper (federal Category 2 candidate). The brown pelican and double-crested cormorant do not nest in the management area, but they forage and roost in the lagoon and along the shoreline. The removal of a wooden platform that was placed in the lagoon during the 1970s as a graduate student experiment in cormorant roosting behavior led to a decrease in available habitat for roosting pelicans and cormorants. However, brown pelicans and cormorants continue to use the lagoon and the shoreline on a regular basis.

Several pairs of great blue heron formerly nested in the eucalyptus trees bordering the northwest shore of the lagoon and continuing toward the University Center. This was one of the few nesting locations in the county for the great blue heron. Although the great blue heron has apparently abandoned this grove as a nesting area, the black-crowned night-heron does nest in these trees. These species forage in the wetlands and shallow open water habitats at the lagoon. (MacKay 1992.)

Western snowy plover is not known to nest in the management area, but it rests and feeds on the beaches during migration. Tricolored blackbird has been observed in the lagoon area, but there is no indication that it nests there. Wandering (salt marsh) skipper has not been reported from the management area; however, it could occur in the pickleweed series habitat along the margins of the lagoon.

CULTURAL RESOURCES

The term "cultural resources" refers to the artifacts and sites from either the prehistoric or historic period. The historic period began with the Spanish exploration of California. Successive historic land uses have strongly influenced the lagoon and its environs. Present public uses continue this relationship between cultural factors and the physical conditions of the lagoon. A chronology of important events in the development and management of the Campus Lagoon at UCSB is summarized in Table 2-2.

Prehistoric Context

Evidence of human occupation of the south coast area of Santa Barbara County extends back about 9,000 years (Ferren and Hedges 1992 cited in MacKay 1992). By 1769, at the time of

the Portola expedition, approximately 2,000 native people, generally known as the Chumash, lived in four or five large villages surrounding the Goleta Slough. These people were hunters and gatherers, living close to the rich plant and animal food sources of the slough, foothills, and coastal waters. They used plant and animal materials to make clothing, tools, weapons, and shelters. (Santa Barbara Museum of Natural History 1990 cited in MacKay 1992.)

Of the 10 archeological sites recorded on the UCSB campus, only one is located in the lagoon management area. This site (SBa563) is located on the Goleta Point mesa. It is a dense shell midden approximately 50 feet in diameter and partially covered by asphalt pavement. The shell midden was probably associated with a prehistoric base camp that was used intermittently for shellfish harvesting on the rocky point. Most of the midden was removed in 1948 when the area was paved, but subsurface deposits remain undisturbed and are considered important for scientific research. Another former shell midden was located on the present site of the marine laboratory, but it has been removed. (Glassow 1973 cited in MacKay 1992.)

Historic Context

The earliest exploration of the area by Europeans was in 1542 by Juan Rodriguez Cabrillo. This expedition sailed past Goleta Point to an anchorage several miles up the coast at Dos Pueblos Creek, where two Chumash villages were located. In the next 200 years, several other expeditions sailed along the coast, but colonization of this region did not begin until after the 1769 Portolla expedition. The Goleta Slough area and its villages were described in some detail by a priest traveling with the expedition. In 1782, the slough was surveyed for its potential as a harbor by Pantoja Y. Arriaga of the ship Princesa. He described Goleta Point as a large, treeless bluff (Sahyun 1982 cited in MacKay 1992). With the founding of the Santa Barbara Mission several miles east in 1786, this area was designated as an Indian rancheria, Rancho Los Dos Pueblos, and agriculture was introduced. Less arable lands in the area were used for cattle grazing. (Tompkins 1960 cited in MacKay 1992.)

In 1842, the Mexican governor granted the Rancho Los Dos Pueblos to an Irish immigrant, Nicholas Den, who intensified agricultural development and cattle ranching on the property. When California was granted statehood in 1850, Nicholas Den was required to petition the U.S. Lands Commission for title confirmation, which was granted in 1877. One of the earliest geodetic survey maps of the rancho, prepared in 1860, shows Goleta Point and the surrounding area (Figure 2-10). During the Gold Rush period from about 1849 to the early 1860s, high beef prices led to a substantial increase in the number of cattle raised on the rancho. The increased intensity of cattle grazing had an adverse effect on the vegetation. A severe winter in 1862-1863 and a drought in 1863-1864 reduced the cattle herd on the rancho from approximately 25,000 to only 40 head. (Tompkins 1960 cited in MacKay 1992.)

In 1871, the U.S. Coast Survey mapped the area from Goleta Point (then called Pelican Point) to Dos Pueblos (Figure 2-11). This chart delineated the Campus Lagoon as a pond with sandbars blocking its three entrances. This chart also appears to indicate a seep on the eastern margin of the lagoon in the present location of the Pearl Chase Memorial Garden. In 1876, the Den family leased the present-day Main Campus mesa area to Alexander and Henry More, who logged virtually all the native oaks and sold the wood as firewood for a local whaling camp. (Tompkins 1960 cited in MacKay 1992.)

Table 2-2. Chronology of Important Events in the Development and Management of Campus Lagoon, UCSB

Date	Event
Approximately 5,000 years B.C.	First evidence of human occupation in the region
1542	Cabrillo expedition lands at Dos Pueblos Creek
1769	Portola expedition lands at Goleta Slough
1782	Arriaga expedition describes Campus Point
1786	Founding of Mission Santa Barbara; agriculture introduced on Rancho Los Dos Pueblos
1842	Rancho Los Dos Pueblos granted to Nicholas Den; cattle ranching intensified
1862-1864	Severe flooding and drought devastate cattle herd
1871	U.S. Coastal Survey maps Campus Point
1876	Main Campus mesa oak trees logged for firewood
1890-1898	Alcatraz Asphaltum Company mines asphaltum on Main Campus mesa
1924-1940	Fred Irvine farms Main Campus mesa; eucalyptus and cypress trees planted as windbreaks
1941-1942	Marine Air Corps station built in Goleta Slough and on Main Campus mesa; road across eastern lagoon entrance constructed (episodic tidal flow permanently blocked); sewage treatment plant and sludge ponds built northeast of lagoon; stormwater drainage system outfalls discharge to lagoon; revetments constructed on bluff overlooking western shore of lagoon
1948	Campus awarded to the Regents of the University of California
1950	Campus construction begins; oil derricks erected along south shore of lagoon
1952	Revetment at east lagoon entrance is raised and widened to increase lagoon water level; oil derricks removed
1954	Overflow weir constructed at western entrance of lagoon (seasonal water level stabilized)
1955	Western shoreline of lagoon and bog area filled

Table 2-2. Continued

Date	Event
1960	Lagoon eutrophication is recognized to be a problem
1962	Loop water system extended around lagoon shoreline
1963	Landscaping of lagoon shoreline begun
1964	Eutrophication study initiated; drainage control channel constructed on western lagoon shoreline
1965	Marine laboratory begins discharging seawater into lagoon
1976	Seawater discharge volumes into lagoon are increased
1982-1983	Severe winter storms damage revetment at eastern lagoon entrance

Agricultural uses of the campus area began under a lease to Charles Smith in the late 1880s, and during that time, several buildings were constructed in the Main Campus area. In 1890, the Alcatraz Asphaltum Company developed a mine on the Main Campus mesa to extract asphaltum. The mine was located southwest of the present location of the Speech and Dramatic Arts Building. At the height of production, the mine included several shafts and buildings and employed about 50 men. It was closed in 1898. (Tompkins 1960 cited in MacKay 1992.)

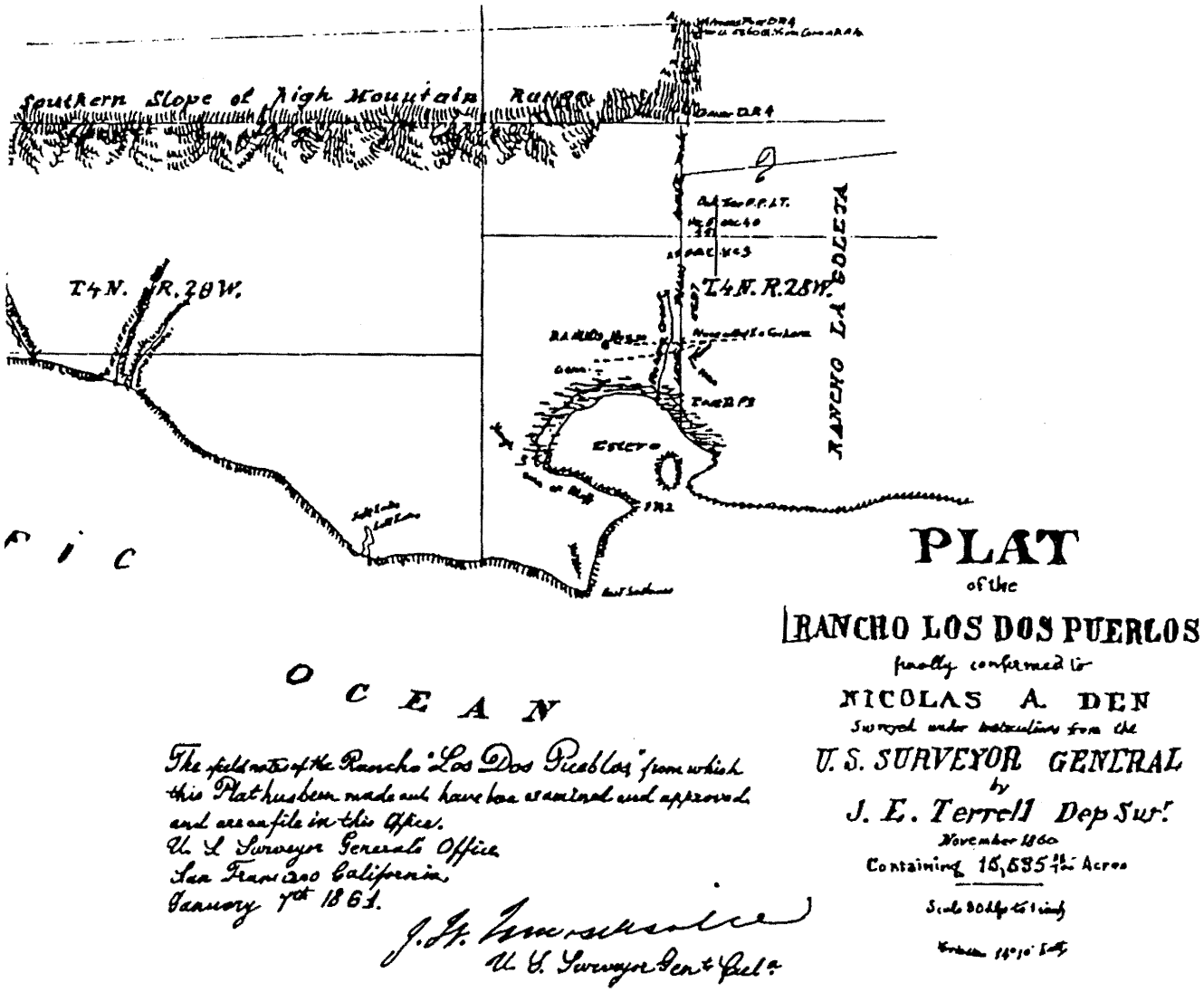
In 1924, the Den family leased the Main Campus mesa area to Fred Irvine. Although ownership passed from the Den family to the Thomas B. Bishop Company in the late 1920s, Irvine continued to farm the land until 1942. During this period, extensive stands of eucalyptus and cypress trees were planted as wind breaks on the Main Campus mesa.

The most significant event to affect the campus lagoon and vicinity began in late 1941, when the U.S. Army Corps of Engineers began construction of the Santa Barbara Municipal Airport on extensive fill in Goleta Slough. In June 1942, the site was converted to a Marine Air Corps station and additional fill was needed to extend the runways for military aircraft. Approximately 8 feet of topsoil was removed from the adjacent mesa bluffs for this purpose. The base itself was established on the Main Campus mesa, where 103 temporary wooden buildings were built, including barracks, mess halls, chapels, post exchange, theaters, administration buildings, and other support structures.

The Campus Lagoon management area was the site of a sewage treatment plant built on the mesa's eastern bluff, at the present site of the marine laboratory, with sludge ponds located on the northeastern shoreline of the lagoon at the present location of the Pearl Chase Memorial Garden. The northern and western shorelines of the lagoon were used as the base trash dump. The base stormwater drainage system outfalls discharged into the lagoon. Earthen revetments were constructed on the bluff overlooking the western shore of the lagoon, and roadways were graded and paved on Goleta Point (disturbing the shell midden discussed above).

After World War II, the Marine Air Corps base was deactivated, and in June 1948 it was awarded to the Regents of the University of California. In 1950, work began to convert the base into a college campus. That same year, oil derricks were erected along the south shore of the lagoon and exploratory oil wells were drilled. These were removed 2 years later when the exploration proved unsuccessful. While the campus was under construction, the trash dumps along the lagoon shoreline were cleaned up and a levee was constructed at the lagoon's eastern entrance to prevent tidal inflows. In 1954, the overflow weir was constructed at the lagoon's western entrance to further control the water level, as discussed above.

As the campus was developed over the next 20 years, several additional changes affected the lagoon. In 1955, the lagoon's western shoreline and a bog area south of the present Faculty Club were filled. In 1962, a loop water system was extended around the lagoon shoreline to provide water for landscaping and fire protection. Extensive landscaping of the lagoon began in 1963 and was followed in 1964 by construction of a drainage control channel on the west bluff to help reduce erosion of the western lagoon shoreline. The marine laboratory began discharging seawater into the lagoon in 1965, and the capacity of this system was increased in 1976. (Brimer 1967 cited in MacKay 1992.)



Source: Ruche 1984 cited in MacKay 1992

Jones & Stokes Associates, Inc.

Figure 2-10.
Rancho Los Dos Pueblos
Geodetic Survey Map - 1860

PUBLIC USE

The Campus Lagoon management area is perhaps the most important area of open space on the Main Campus. It provides an important setting and focus for public use activities that include recreation, nature study and enjoyment, and aesthetic enjoyment of the area. Also, it is occasionally used for university instructional activities and classroom exercises. The lagoon area is the largest area of open space on the Main Campus (UCSB 1990) and receives heavy public use, mostly by students, many of whom live in several dormitories located on the mesa adjacent to the lagoon. For the community of Isla Vista, located adjacent to the west bluff area, the lagoon provides an important natural and open space area within walking or biking distance and attracts substantial public use. In addition, the beaches provide important regional and local recreation opportunities.

Public Access

The Campus Lagoon management area is reached primarily by foot or bicycle. Paved roads are located along the edge of the lagoon on the north and west sides. The lagoon area is easily accessible from several paved parking lots north and west of the lagoon (Figure 2-12). Numbered parking lots in Figure 2-13 identify those designated for public use and coastal access. UCSB does not charge for public parking during weekends and evenings and charges a nominal fee for weekday parking. Coastal access direction and information signs are posted near the parking lots, but these are often vandalized or stolen. (UCSB 1990.) An unpaved, temporary parking lot (Lot 18) was constructed during summer 1994 on the west bluff near the lagoon to provide temporary parking spaces because of construction projects on the campus. The temporary Lot 18 site is designated for student housing in the LRDP.

For the most part, direct access to the lagoon from the main campus mesa is down steep hillsides, pathways, or stairs. However, access is available to the lagoon that can accommodate persons in wheelchairs or with other mobility limitations (e.g., the road entering the lagoon area from the northwest). Unassisted access for people with mobility limitations to Lagoon Island and Goleta Point is very difficult because the slope of the paved road ascending the west side of Lagoon Island exceeds 15% and the slope up the northern escarpment of Goleta Point from the east revetment exceeds 30%. Also, loose sand covers portions of the paved road, make access by wheelchairs difficult. A portion of the road grade leading from the marine laboratory into the East Margin management zone slightly exceeds slopes easily accessible for people with limited mobility (UCSB 1994).

Activities and Facilities

Most public use occurs around the fringes of the lagoon management area. Areas of greatest use are the beaches, the rocky tip of Goleta Point, the blufftop edges that face south and have views of the ocean, and the trails and open lawn areas along the northern edge in the Wetlands and North Margin management zones. Frequently used areas include the area below the University Center, the Commencement Green, and the Pearl Chase Memorial Garden. The

interiors of the Lagoon Island and Goleta Point management zones and the bluff top in the West Lagoon Park management zone are not used as extensively.

Recreation activities that take place within the Campus Lagoon management area are mostly passive. The only developed recreation facilities in the management area are trails, a small boat dock in the lagoon, and three metal fire rings, one at the east beach and one near each sand dune area at the south beach. Recreational uses of the lagoon area include walking, jogging, roller-skating, dog walking, nature study and enjoyment (including bird-watching), picnicking, and crew boating (considered active recreation). UCSB crew teams use the lagoon mostly during morning hours throughout the year for rowing practice. Practices are more frequent during the spring competition season. Boats are carried to and launched from the existing dock at the northwest end of the lagoon in the wetlands management zone. Most rowing activities occur at Lake Cachuma where UCSB has a boathouse.

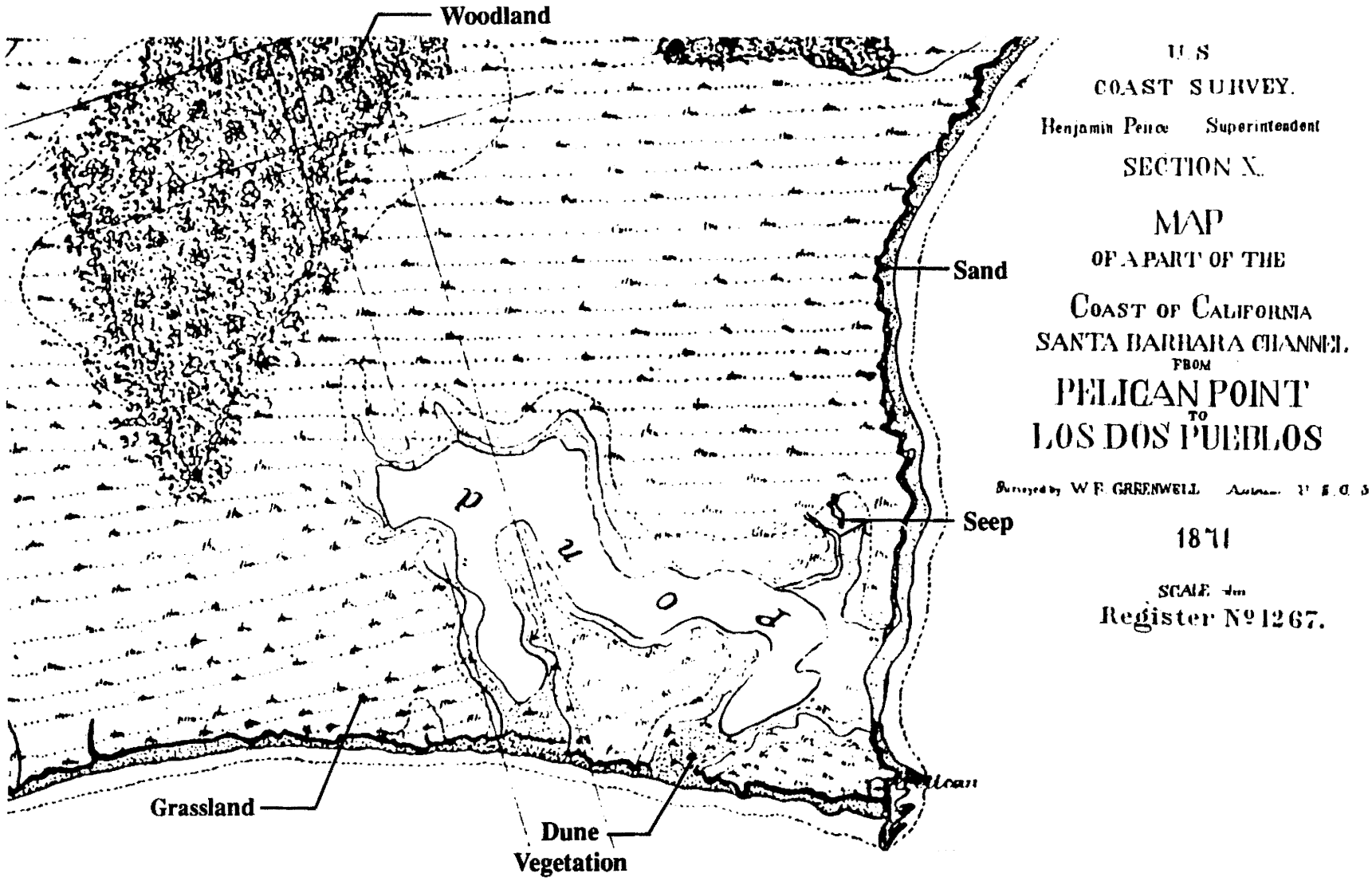
The Commencement Green is used for commencement exercises, as well as a number of other ceremonial gatherings. For the ceremony, folding chairs are set up and hundreds of people use the area. Although the ceremony has a high impact on the lawn area, the impact is temporary and the vegetation generally recovers in a short time. The lagoon provides an important and aesthetically pleasing backdrop for the ceremony.

Some people ride bikes around the periphery of the lagoon, including in areas that are designated off-limits for bike riding (i.e., the Lagoon Island and Goleta Point management zones). Mountain bike use on unpaved paths and in other areas around the lagoon during the past decade has contributed substantially to erosion and damaged vegetation in portions of the lagoon management area (Ferren pers. comm.).

The South Beach and East Beach management zones (Figure 2-12) are important regional recreation resources that are used by the public and by students and employees of the university (UCSB 1990). People use the beaches for a wide range of activities, including walking, jogging, playing volleyball, sunbathing, picnicking, nature study and enjoyment, and access for swimming and surfing. Metal fire rings, two at the south beach and one at the east beach, are used occasionally by university-affiliated groups for fires, mostly at dusk or at night. UCSB requires that a permit be obtained from the Associated Students to use the fire rings (Kargard pers. comm.). The Associated Students require a deposit that is refunded afterward if the area is properly cleaned up. Only unobtrusive uses (e.g., cookouts) are permitted.

A restroom building at the edge of the East Beach management zone is maintained by UCSB for public use. Access to the east beach is by foot, primarily from the north along the base of the bluff, the south beach, or the Main Campus through the lagoon area. A university parking area that is available for public use is located just north of the marine laboratory. Access to the south beach is gained primarily through the lagoon management area or from the west along the base of the bluff.

Other public use facilities in the management area include a remnant paved area in the Goleta Point management zone, two low barrier-type wooden fences, stairs, and coastal access signs. The small paved area is left over from military occupation of the area and has been partially removed. The two low wooden fences are at the base of slopes leading to the Lagoon Island and Goleta Point management zones. Entry gates that were located where the fences crossed paths to those areas are no longer operable. Stairs are located on the slopes just east of the University



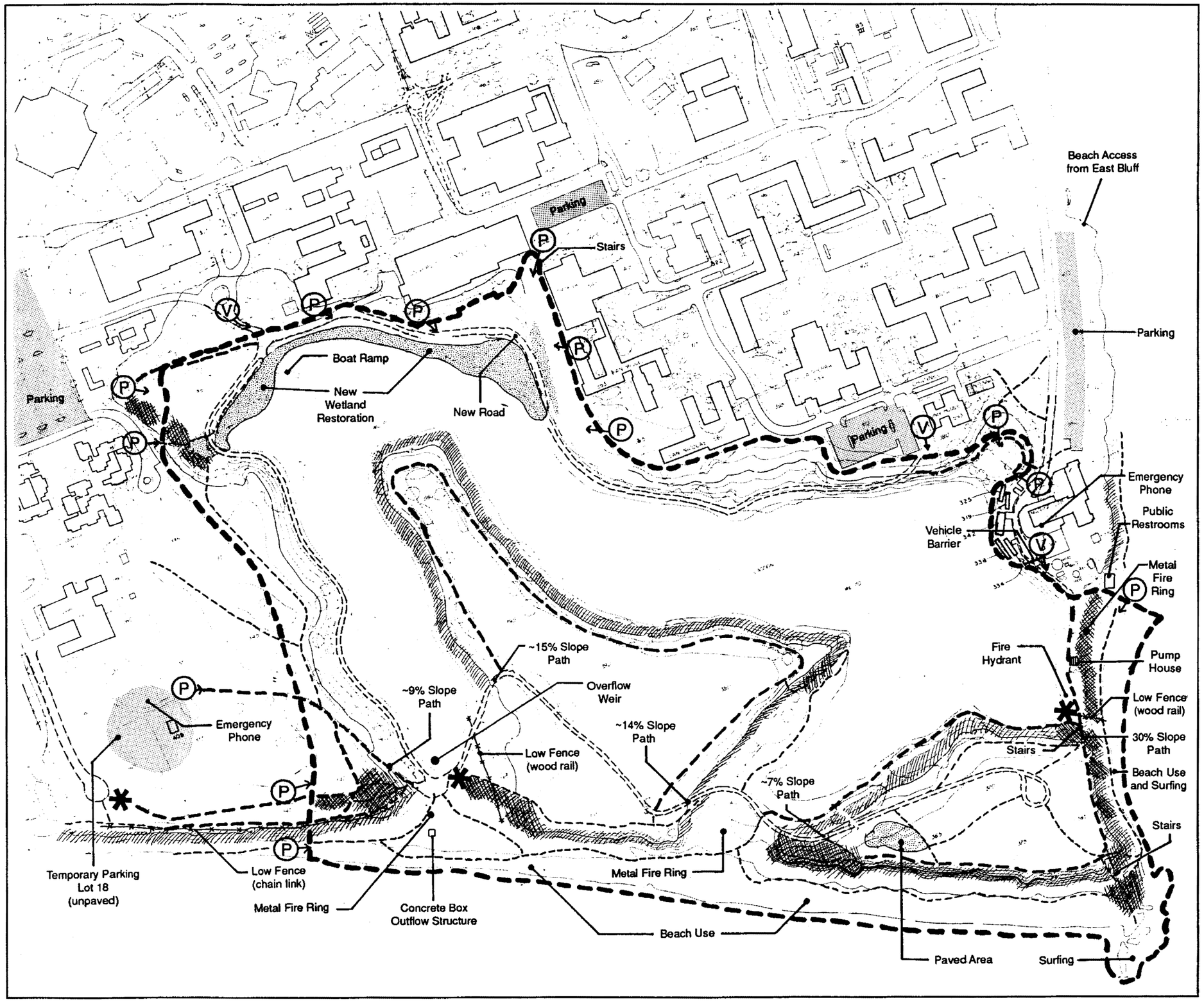
Source: MacKay 1992

Jones & Stokes Associates, Inc.

Figure 2-11.
U. S. Coast Survey Map - 1871

Figure 2-12.

Existing Public Use Features



Legend:

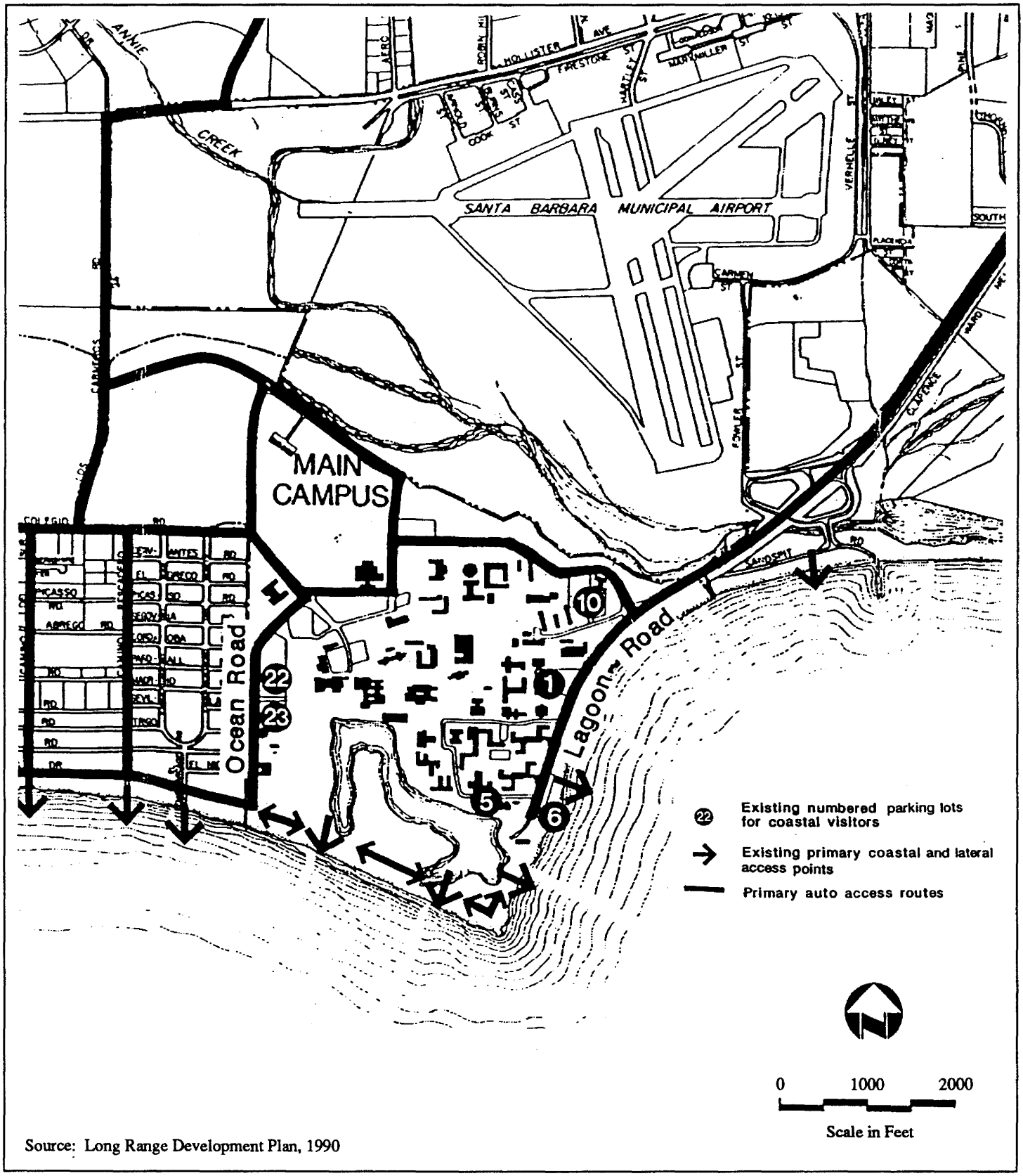
- Management Area Boundary
- Paved or Partially Paved Road
- Primary Pedestrian Path
- Secondary/Informal Pedestrian Path
- Vehicle Entry to Management Area
- Pedestrian Entry to Management Area
- Eroded Slope or Area
- Hazardous Steep Slope or Cliff
- Coastal Access Information Sign

Source: Jones & Stokes Associates, 1994

0 150 300 600

Scale in Feet

Jones & Stokes Associates



Source: Long Range Development Plan, 1990

Jones & Stokes Associates, Inc.

Figure 2-13.
Existing Coastal Access

Center and on the north and south sides of the Goleta Point management zone. Coastal access signs are located in several places around the lagoon area. The text for these signs identifies restrictions on motor vehicles, unleashed dogs, and bicycles in the area and requests that people stay on the existing trails.

Public Safety

Public safety is an important element of public use in the lagoon management area, particularly with regard to safety hazards (e.g., steep bluffs, slopes, and fire potential), emergency service operations, and access needs for emergency service vehicles.

The lagoon management area contains several features that may be hazardous to careless users. The most notable areas are associated with south- and east-facing coastal bluffs in the West Lagoon Park, Lagoon Island, and Goleta Point management zones (Figure 2-12). These bluffs are nearly vertical cliffs, about 25-30 feet high, and consist of extremely erosive materials. These areas may be dangerous for people who choose to walk along the edges of the bluffs because they are unstable, and eroded holes and slide areas exist within and next to some of the bluff-edge paths. Also, people often sunbathe or sit on the beaches near the base of some of the bluffs. Rocks and debris occasionally fall from the bluff face as a result of either natural erosion processes or people dislocating material from the bluff top. A low barrier chain-link fence at the top of the south-facing bluff in the West Lagoon Park management zone helps to keep people away from the steep edge and protects the bluff face from further damage. No fences have been installed along steep bluff edges in the Lagoon Island or Goleta Point zone. Steep slopes in other portions of the lagoon management area also may be hazardous (Figure 2-12) to the careless.

High public use also contributes to high potential for fires, especially during the dry season from about May through October. Because the Lagoon Island and Goleta Point management zones are isolated from the Main Campus, these areas do not represent an important fire danger (Kargard pers. comm.). However, UCSB must maintain emergency vehicle access to these areas to protect public safety. UCSB mows fire breaks in the Lagoon Island management zone, generally during late spring. The grassland in the West Lagoon Park management zone presents a higher fire danger because it is near existing buildings and contains dry, flammable vegetation, especially during summer and fall. In this area, however, fuel loads are not high and access is very good from several directions so that fires could be controlled quickly. The eucalyptus trees in the North Margin management zone pose a more serious fire hazard because they are extremely flammable and overhang or are located near existing buildings, including student residences that are occupied most of the year. However, fire truck access is available and water hydrants are provided nearby. The road along the north margin is essential for maintaining fire and other emergency vehicle access (Gawronik pers. comm.). Locations and numbers of fire hydrants in the lagoon management area are adequate for fire protection (Kargard pers. comm.).

The lagoon itself poses a low safety concern because it is shallow and not attractive for swimming. Shoreline vegetation and mud along the shallow edges, combined with algae during the warmer summer months, produce conditions not generally attractive for swimming or wading.

The number of crime incidents or accidents reported in the lagoon management area have not been high relative to those in other areas of the campus. Reported incidents over the past several years include several rapes and rape attempts; occasional flashing; and a small number of

robberies, robbery attempts, and molestations. Incidents of transients sleeping and camping in remote areas of the Lagoon Island, Goleta Point, and West Lagoon Park management zones occur several times each year. The recent construction of parking lot 18 on the west bluff south of San Rafael dormitory will probably discourage transient use of that area. (Bean pers. comm.)

The UCSB police department daily patrols the lagoon area by car. Officers drive the road along the north margin; next to the marine lab; onto the west bluff from Ocean Drive; and on the road along the west edge of the lagoon, across Lagoon Island, and onto Goleta Point. The road just described is paved, although somewhat deteriorated, and includes a turnaround on Goleta Point. Patrol cars occasionally drive past the turnaround on a narrow dirt path to within about 30 feet of the bluff edge at Goleta Point to gain an overview of the beach areas. The entire road is important for maintaining emergency vehicle access and gaining good vantage points for patrolling the lagoon area, including the beaches. (Bean pers. comm.)

Student workers equipped with radios also periodically patrol the lagoon area by bicycle. For safety purposes, student workers do not go past the west beach area onto Lagoon Island or Goleta Point. They travel along the north margin road more often than the west margin road. For purposes of personal safety, student workers only issue verbal warnings and, in general, focus their patrols on the more populated areas of the campus. (Bean pers. comm.)

The road along the north margin is important for emergency access. In addition to using it for regular patrols, the police use this road as an east-west shortcut across campus; it saves about 5 minutes of drive time and is safer for the public than driving through the more populated sections of the campus. (Bean pers. comm.)

Some lighting is provided along the north margin road, but this is mostly near the University Center. Emergency telephones are located at the marine laboratory and at the recently constructed parking lot 18. No telephones, lights, or electricity lines are present in the south part of the management area, in the Lagoon Island or Goleta Point management zones. (Bean pers. comm.)

Public Use Impacts

The extensive public use in the area, combined with soils that erode easily after vegetation is damaged or removed, has resulted in many eroded areas within the management area. Substantial impacts have occurred in the management area from people creating informal trails, removing vegetation, and causing erosion. Figure 2-12 shows most of the areas of high erosion in the management area.

As described earlier in this section, mountain bikes and heavy pedestrian traffic have caused substantial damage in portions of the management area. Impacts of heavy public use are most apparent on steep slopes and along bluff edges on the south and east sides of the management area, in the northwest corner near the Commencement Green, and in both sand dune areas in the South Beach management zone. Public use of steep slopes on the northeast side of the Goleta Point management zone and at the point itself has caused substantial erosion in these areas. Heavy foot and bike traffic along the edges of bluff tops and on steep slopes near existing paths along the south and east sides of the management area have caused severe erosion problems in these areas. Also, in the southern portion of the West Lagoon Park management zone, heavy use

of the bluff-top and slope down to the lagoon is threatening populations of special-status plants (see the discussion under "Special-Status Plant Species" above).

Education and Research Activities

The lagoon area, and the lagoon in particular, is occasionally used for education and research activities (UCSB 1990). Several research projects have been conducted during approximately the past 30 years (MacKay 1992). Some of these studies are described under "Vegetation Management and Habitat Improvements" above. The lagoon area is used regularly for classroom exercises and projects by undergraduate students in biology and other science courses. It is also used for classes in art and other subjects. Educational use of the lagoon depends on individual professors' interests and course educational objectives.

AESTHETICS

The Campus Lagoon is a unique and important visual resource of the university and perhaps the most recognizable landscape element of the picturesque coastal campus. Occupying a prominent position at the point of the campus jutting into the Pacific Ocean, the lagoon area contributes strongly to the campus image and sense of place. The university's coastal location is recognized as its "most extraordinary natural characteristic" (UCSB 1990). The lagoon management area contains diverse and scenic landscape elements that include the lagoon, its surrounding vegetated margins, coastal bluffs, adjacent beaches, and the rocky Goleta Point. Together these elements constitute a visual resource that is extremely vivid, intact, and unified and is of high scenic quality.

The lagoon area's high visual quality is attributable in large part to its undeveloped character, its diverse topography and vegetation types, its general lack of intrusive elements, and the uniqueness of the large, open water body. In fact, the original motivation for creating and maintaining the lagoon as a year-round open water body was to improve its aesthetic value. Today, maintaining the lagoon as an open water body and maintaining the visual character and quality of the lagoon area continue to be among the primary motives for managing the area. Most current management actions consider, or are strongly based on, preserving the visual quality or views of the lagoon area.

Views of the lagoon area are vivid, intact, and unified from virtually all locations from which it is visible. The most visible and visually important areas are slopes, bluffs, and edges where intersections of visual elements occur, views are focused, and added elements or alterations would be most apparent. Although it is not highly aesthetic, the east revetment is visually important because it is highly visible from important viewing areas in the northern part of the management area, particularly the University Center, and is a focal point for views across the lagoon from the Commencement Green during the annual commencement ceremony and other events.

Views from the lagoon area are mostly of the campus, coastline, and ocean and are highly vivid, intact, and unified. Views from the coastal bluff edges and tops of slopes adjacent to the lagoon are important and generally of high visual quality. Other important views of the lagoon

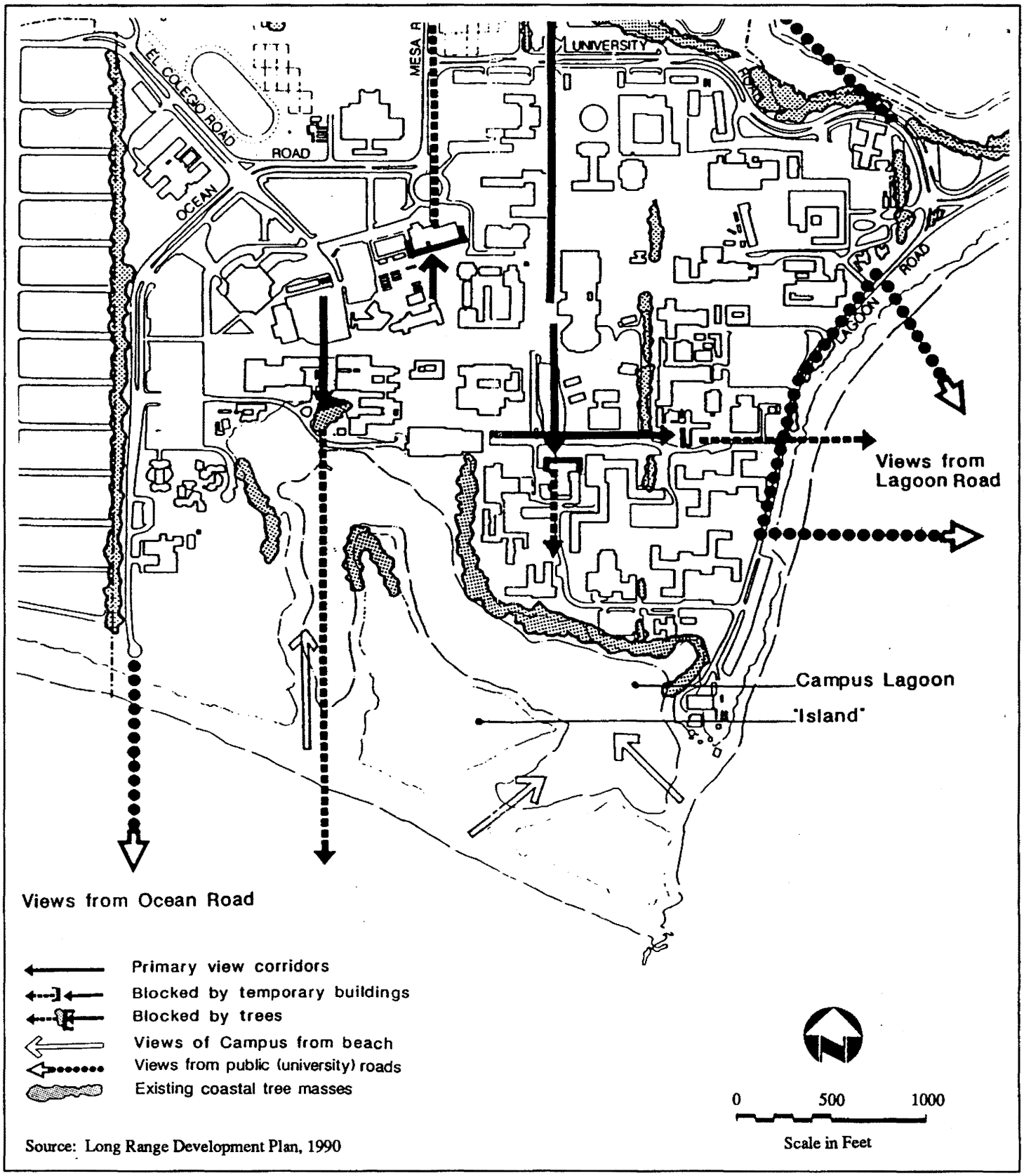
area are from frequently used areas, such as the Commencement Green, the University Center area, and the Pearl Chase Memorial Garden (although views from this location are partially screened by several trees). Important existing coastal view locations and corridors identified in the campus LRDP (UCSB 1990) are shown in Figure 2-14.

Elements that may detract from the high visual quality of the lagoon area are eroded trails, eroded areas other than the coastal bluffs, and some additional built elements. Elements that detract from the visual quality of the lagoon management area are the eroded east face of the east revetment, including the large plastic pipes and sand bags in the East Margin management zone; eroded trails on the north slope of Goleta Point near the east revetment; the eroded portion of the east slope at the south end of the West Lagoon Park management zone; and eroded areas in the Wetlands management zone near the Commencement Green and University Center.

Small built elements that are minor intrusions and reduce the visual intactness of views in the management area include the outflow weir in the west arm of the lagoon, two discharge pipes and associated structures in the East Margin management zone, the metal fire rings at the beaches, the concrete pump house at the east beach, and the deteriorated fence in the East Margin management zone. The concrete outflow structure at the south beach is small in scale and of a color similar to the surrounding sand beach and thus less intrusive than the built elements described above. The deteriorated wood fence on the east side of Lagoon Island is not intrusive because it fits with the form, line, color, and texture of its surroundings. The low chain-link fence along the bluff top in the West Lagoon Park management zone blends in form, color, and line with its setting and is thus not overly intrusive.

The temporary buildings along the lagoon's east bluff edge near the marine laboratory are intrusive and highly visible from many locations in the management area; however, they are not within the management area. The public restroom is fairly low in profile, is adjacent to other built elements, and does not substantially reduce visual intactness in the management area.

Trash and vegetation accumulate along the edges of the lagoon; this is generally an aesthetic concern during the summer and early fall when onshore breezes carry the material to the north edge of the lagoon, which receives the largest amount of public use. Algal blooms and decomposing vegetation along the lagoon margins during middle to late summer are unattractive, and unpleasant odors from algal blooms are often a cause for complaints. The odor may be considered to have an impact on the aesthetics of the lagoon environment because it negatively affects peoples' perceptions of the health of the area and their enjoyment of the lagoon.



Source: Long Range Development Plan, 1990

Jones & Stokes Associates, Inc.

Figure 2-14.
Existing Coastal Views

Chapter 3. Management Elements

Because the various management elements are interrelated, some management actions are repeated under several elements to accomplish different objectives (e.g., placing fencing along the edge of coastal bluffs is intended to protect public safety and protect the bluff from erosion). In general, where actions are interrelated or overlap, references to similar actions in other elements are provided. Figure 3-1, Campus Lagoon Management Actions Summary Plan, identifies the locations of many of the management actions described in this chapter.

Management actions appear in this chapter in the following order (an abbreviation code follows the element title in parentheses):

- **Erosion and Slope Management (ES),**
- **Hydrology Management (H),**
- **Water Quality Management (WQ),**
- **Vegetation Management and Habitat Improvement (VH),**
- **Cultural Resource Management (CR),**
- **Public Use Management (PU), and**
- **Aesthetic Management (A).**

EROSION AND SLOPE MANAGEMENT

Management Rationale

The lagoon management area consists of diverse topographic features that include nearly flat, alluvium-covered coastal terraces; 30-foot high coastal bluffs; steep, vegetated slopes; sand dunes and beaches; nearly flat wetlands and former wetlands; and the open water lagoon. Dynamic geologic, hydrologic, climatic, and coastal processes have combined to shape the landforms of the area over the past several million years. The diverse landforms that we see today have mostly developed over the past several thousand years and are largely the result of natural erosional processes that are continuing today.

Although some erosion processes within the lagoon management area are ongoing and natural, heavy public use has accelerated and exacerbated some of these processes. Several portions of the lagoon management area are of particular concern. In addition, some built and natural landforms that stabilize the lagoon against inundation from the ocean are threatened by natural and human-caused erosional processes. Management objectives and actions identified in this section are intended to reduce the effects of erosion that may affect important habitats and areas around the lagoon. Erosion and slope management is intended to help maintain and improve the lagoon's physical and ecological functions.

Human activities have undoubtedly helped shape the lagoon area's character and appearance since before European settlement in the area. Native Americans created trails, climbed on the steep slopes, burned vegetated areas, collected wood for fuel, and managed and harvested plants for their use. Europeans in the area had more catastrophic effects on vegetation and on the resulting erosion and sediment deposition in the lagoon area. Activities that probably contributed to and accelerated erosion and deposition in the lagoon area included the following:

- introducing large herds of grazing animals in the area that removed vegetation cover and exposed soil;
- clearing vegetation and using farming practices that placed little emphasis on conserving soil;
- cutting most of the oaks on the campus mesa for firewood;
- extracting asphaltum and depositing tailings nearby;
- excavating material to use elsewhere for fill;
- altering drainage patterns;
- constructing dams and other facilities that affect the supply and movement of sand along the coast that may help protect shorelines from storm and wave impacts; and
- constructing ocean barriers, roads, trails, parking lots, buildings, and other structures.

All three soil types found in the area are prone to erosion, especially when vegetation cover is removed.

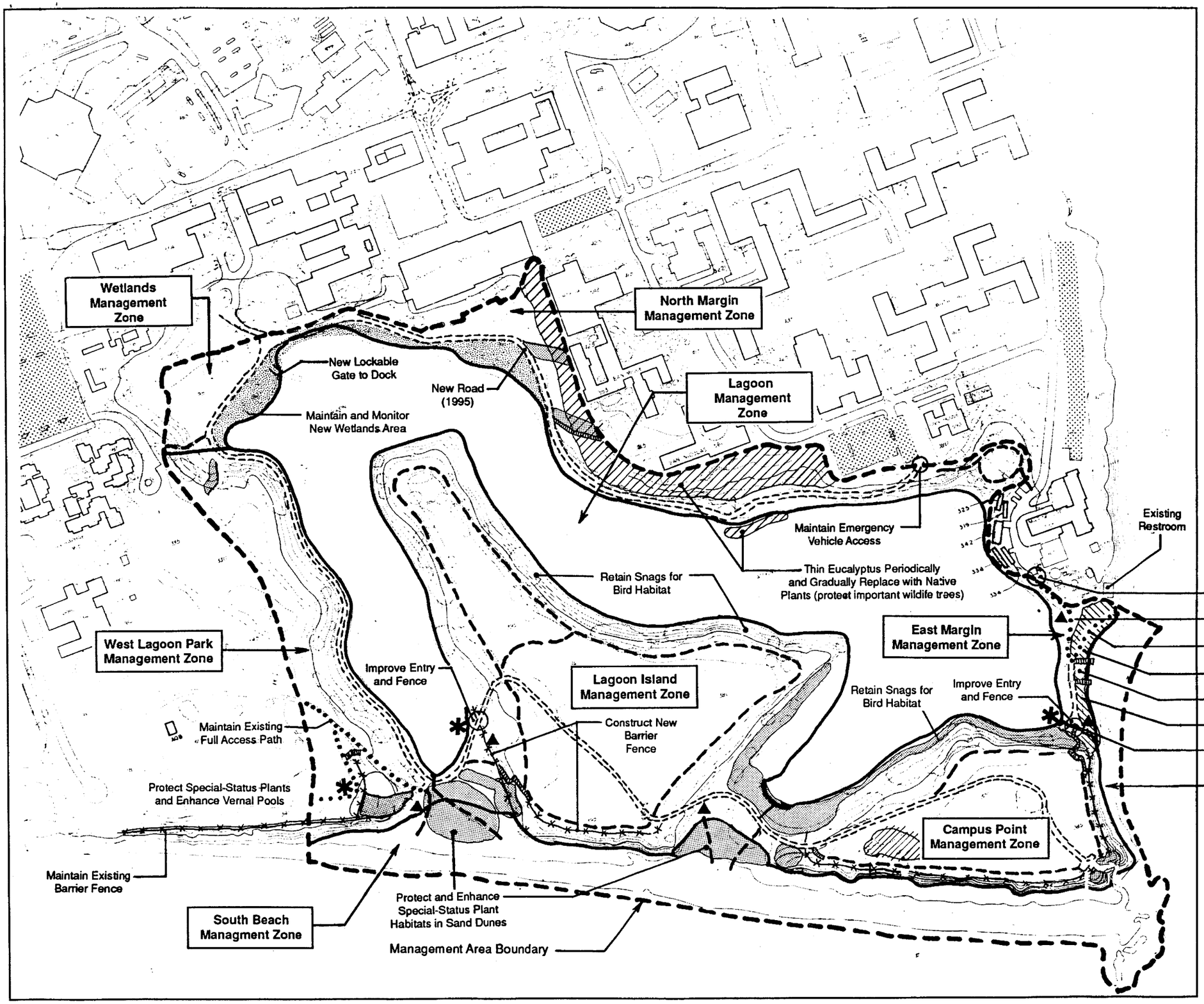
Erosion Reduction

During the past several years, heavy and nearly continual use of the area by people appears to be the greatest contributor to ongoing erosion in the management area. New paths have appeared during the past several years (Ferren pers. comm.). Mountain bike use of trails in the area during the past decade or so has contributed substantially to the increased numbers and widening of trails, the loosening of soil, and the rutting of slopes in some areas (Ferren pers. comm.). The most substantial areas of erosion are located on steep slopes in areas identified in Figure 2-12. Most of the erosion in these areas is the result of impacts from mountain bike use; foot traffic is also a contributing factor.

To help control erosion in the lagoon management area, public access to already eroded areas or areas that may be prone to erosion should be controlled using a combination of barriers and informational signs. Barriers should be mostly structural, although plants could be used in some locations. To be effective, barriers should be designed to discourage access and redirect traffic away from eroded areas rather than to prohibit traffic from affected or sensitive areas. Such barriers could include large boulders, logs, or low rail barriers anchored in the ground or otherwise placed securely so that they cannot be moved easily. Low barrier fences, preferably wooden rail fences less than 4 feet high, could also be used.

Figure 3-1.

Campus Lagoon Management Actions Summary Plan



Legend:

- Paved Emergency Access Road to Maintain
- Essential Path to Maintain or Improve
- Full Access Path to Maintain or Improve
- Eroded Areas to Protect and Allow to Revegetate
- Public Parking for Coastal Access
- Low Barrier Fence
- Stairs to Improve or Construct
- Information Sign
- Interpretive Exhibit

Source: Landscape Master Plan, Part III, U. C. Santa Barbara, 1992

Construct Improvements to East Lagoon Barrier as Part of Seawater System Replacement Project:

- Removable Bollard Emergency Access
- Regraded Path for Full Access to Beach and Restrooms
- Full Access Ramp to Beach
- Rock Revetment
- Expanded Pump House with Beach Access Stairs
- Paved Road for Emergency Vehicle Access
- Fire Truck Turnaround

East Beach Management Zone

0 150 300 600

Scale in Feet

Prepared by: Jones & Stokes Associates

To discourage access by mountain bikes to Lagoon Island from the west, a simple gate structure that allows pedestrians and emergency vehicles to pass should be constructed near the base of the west slope of Lagoon Island. The gate should be incorporated into the existing wooden fence along the base of the slope, and the fence should be improved and extended so that it runs from the lagoon edge to the base of the bluff face. The improved fence should be the same or similar height as the existing fence. The gate should be designed to allow pedestrians and wheelchairs to easily negotiate entry, but make it difficult for people to remain on their bikes while passing through the entry. It could be similar in design to the existing deteriorated entry structure just north of Goleta Point. The gate should be located at one edge of the existing path. A barrier should be constructed across the path that discourages bicycles but is easily accessible to emergency vehicles (e.g., a lock and cable or metal swing gate).

At the south end of the East Margin management zone near the base of the north slope of Goleta Point, the existing wooden entry structure should be improved to discourage bicycle access but allow pedestrians to pass. This entry would not need to accommodate wheelchair passage because the slope is prohibitively steep and, if necessary, wheelchair access to the area could be made available from the direction of Lagoon Island. Emergency vehicle access would not be required at this location. A sturdy wooden rail or similar fence at least 5 feet high should be constructed across the lagoon barrier from its east face to the lagoon edge to discourage all but pedestrian access to the Goleta Point management zone. These entry improvements should be incorporated into the fence design. Although the 5-foot-high fence would not prevent bike access entirely, it would be difficult to lift bikes over and would help deter access.

An informational sign should be placed at each of the two entries described above to inform people of the restrictions in effect for the area and why these restrictions are necessary. Informational signs should be attractive, placed so that they would be difficult to remove, and constructed of materials that are resistant to vandalism. Signs could be fiberglass embedded, metal backed, and mounted in vandal-resistant metal frames.

To help repair already eroded areas, barriers should be placed at entries to nonessential paths and the paths should be allowed to revegetate. Temporary or permanent structural barriers at path entries may be necessary to discourage access. Similar techniques should be used to protect other damaged areas from further erosion in the lagoon management area. Essential paths (those that should remain accessible to the public) are identified in Figure 3-1. These paths should be managed and their surfaces maintained in a manner that is consistent with the natural character of the area. Management of these paths should be focused on erosion control (see "Public Use" below).

Protection of Steep Slopes and Bluffs

In locations where erosion is causing damage to facilities or ESHAs or causing public safety problems, Steep slopes and bluffs should be protected from human-caused erosion by a combination of techniques that would discourage people from getting close to the edge or moving up or down steep slopes. Some techniques that have been described above are construction of fences and other barriers, placement of informational signs, repair of damaged areas using structural and revegetation techniques, and public education and awareness programs.

Low fences and barriers that blend aesthetically with the area should be placed along the south-facing edge of the coastal bluffs in the West Lagoon Park and Lagoon Island management zones and along the south- and east-facing bluff edges in the Goleta Point management zone. An appropriate barrier fence may be wood-rail, eucalyptus pole, or split-rail; 42-48 inches high; and placed in a zig-zag pattern 3-5 feet from the bluff edge. The fence should be designed to discourage people from sitting or walking on it.

Severely eroded areas along the top of the bluffs should be protected from further damage and allowed to revegetate with native plants. Eroded gullies or swales that drain to the bluff edge should be repaired and, where possible without causing greater environmental damage, drainage should be directed away from problem areas, preferably toward the interior of coastal bluff landforms.

Lagoon Barrier Protection

Maintaining the integrity of barriers that protect the lagoon from tidal inundation and wave action is essential to maintain the lagoon as an open water body and protect the management area's ecological, aesthetic, public use, educational, and research values. Three areas around the lagoon's periphery act as barriers to protect the area's important functions and values: the east lagoon barrier in the East Margin management zone and the two low areas at the sand dunes on either side of Lagoon Island.

The east lagoon barrier is essential for protecting the management area's aesthetic, recreational, and ecological values; maintaining its educational, public use, and research functions; and protecting structures and access. Should the barrier be breached, as it nearly was during severe storms in the early 1980s and several times since, much of the lagoon would drain to the ocean, and values and functions described above would be substantially affected.

Since the early 1980s, UCSB has protected the east lagoon barrier using sandbags as a temporary measure. The LRDP (UCSB 1990) identifies the importance of devising a more permanent solution for protecting the barrier by improving it to maintain access and using an "aesthetically pleasing" design solution. The LRDP identifies design criteria for improving the revetment along the east face of the barrier, including protecting habitat, shoreline processes, public safety, and visual quality; maintaining access; and protecting the area from erosion. The revetment is fully discussed in Part 2, Chapter VI, Section D of the 1990 LRDP.

The Seawater System Replacement project (including improvements to the revetment) is still in the planning phase, and UCSB is not seeking approvals for this project in conjunction with the Lagoon Management plan. However, information that has been developed about the revetment, in planning for the Seawater System Replacement project, is included herein to provide further detail about what form future revetment improvements might take. As part of the seawater system replacement project focused on the marine laboratory and its surroundings, UCSB identified detailed design improvements for the barrier that adhere to or surpass the LRDP criteria for environmental protection (UCSB 1994), subject to review and approval by the Regents and the CCC. The present schedule for the start of construction for the seawater system replacement project and the accompanying improvements is 1998. An Environmental Impact Report and Notice of Impending Development will be prepared for the project.

UCSB undertook a pre-design study for the Seawater System Replacement project to determine how to incorporate environmental and Coastal Act considerations in the project. Based on this evaluation it is anticipated that the east lagoon barrier could be improved as described in the report, Detailed Project Program - Seawater Replacement Project (UCSB 1994), and as approved by the Regents and the CCC. Figure 3-2 shows a preliminary design for the lagoon barrier revetment. This design would meet the design criteria identified in the LRDP and exceed those criteria by creating a narrower revetment that would have fewer environmental impacts than the design described in the LRDP (UCSB 1994).

The other two barriers, located on either side of Lagoon Island, are reasonably stable and have not been threatened by wave action recently. In recent years, however, heavy public use has damaged some vegetation in both areas, destabilizing portions of the sand dunes and causing some migration of sand. If the dunes become destabilized further, one or both of these areas could, under certain storm conditions, be breached by wave action. To reduce the likelihood of this occurring, actions should be taken to monitor and stabilize the dunes, primarily through revegetation and control of public access (see "Vegetation Management and Habitat Improvements" and "Public Use" below).

Management Actions

Management Goal ES: Reduce erosion and protect slopes, bluffs, and ocean barriers.

Objective ES-1: Reduce erosion associated with public use activities and features, such as paths and trails.

Action ES-1.1: Public access to existing eroded areas or areas that may be prone to erosion impacts should be controlled using a combination of structural and vegetative barriers and informational signs. (See also PU-1.5, PU-2.2).

Action ES-1.2: A simple gate structure should be constructed, an informational sign should be placed, and the existing fence near the base of the west slope of Lagoon Island should be improved to discourage bicycle access but allow entry by pedestrians, people with wheelchairs, and emergency vehicles. (See also PU 1.4, 1.6 and 2.3.)

Action ES-1.3: The existing wooden entry structure should be improved, an informational sign placed, and the existing fence improved to discourage bicycle access but allow pedestrian entry at the south end of the East Margin management zone near the base of the north slope of Goleta Point. (See also PU 2.3.)

Action ES-1.4: Already eroded areas and nonessential paths should be protected by using barriers at entries where appropriate and allowed to revegetate with native plants.
Action ES-1.5: For well-established paths that are determined to be essential, the existing natural surface should be maintained in a manner that is appropriate to the natural character of the area.

Also, see Action PU-2.4 concerning programs to help educate the public about trail use to reduce erosion.

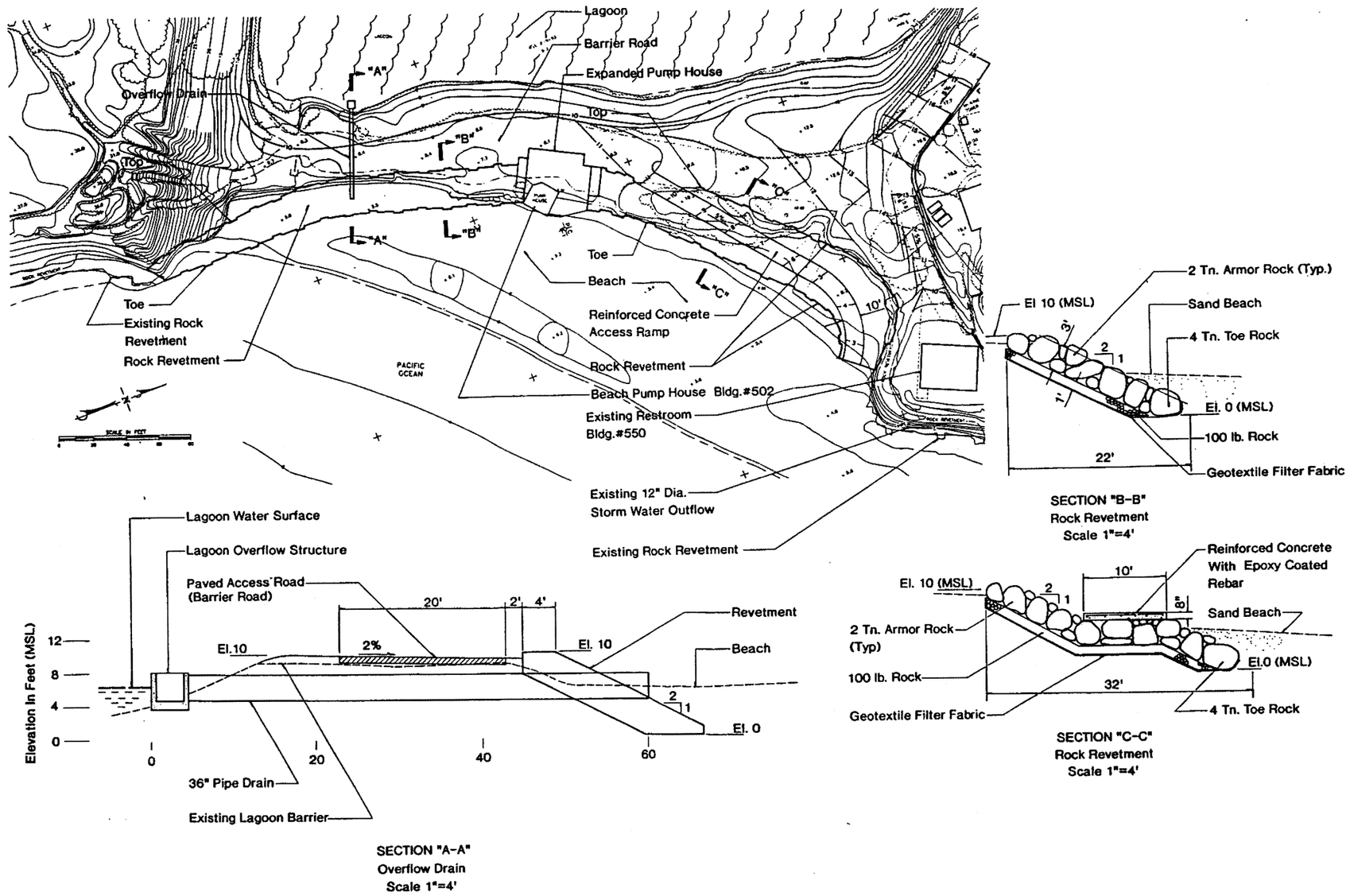


Figure 3-2.

Lagoon Barrier Revetment as Part of Seawater System Replacement Project

Source: U. C. Santa Barbara, 1994 (drawings prepared by D. W. Thomson Consultants, Ltd. 1994)

Objective ES-2: Protect steep slopes and bluffs from human-induced erosion in ESHAs or other areas where special-status species or public safety considerations are present.

Action ES-2.1: A combination of techniques should be used to discourage people from damaging the bluff edges or steep slopes where ESHAs, special-status species, or public safety would be affected (e.g., fences and other barriers, informational signs, repair of damaged areas using structural and revegetation techniques, and public education and awareness programs). Low fences and barriers that blend aesthetically with the area should be placed along the south-facing edges of the coastal bluffs in the West Lagoon Park and Lagoon Island management zones, and along the south- and east-facing bluff edges in the Goleta Point management zone. (See also PU-3.8.)

Action ES-2.2: Severely eroded areas along the top of the bluffs should be allowed to revegetate with native plants, and, where possible, drainage should be directed away from problem areas and eroded drainages should be repaired or allowed to revegetate. (See also PU-2.5.)

Objective ES-3: Protect barriers that prevent ocean inundation and draining of the lagoon.

Action ES-3.1: The east lagoon barrier should be improved as part of the comprehensive upgrading of the marine Laboratory and seawater system replacement project and as approved by the Regents and the CCC. (See also PU-2.7.)

Action ES-3.2: The two lagoon barriers located on either side of Lagoon Island should be monitored and stabilized if necessary, primarily through revegetation and control of public access. (See also PU-2.6.)

HYDROLOGY MANAGEMENT

Hydrology management at the lagoon will focus on the need to accommodate the proposed increased seawater discharge from the marine laboratory, protect surrounding areas from flooding, maintain and improve lagoon aesthetics, improve water quality, and maintain and improve vegetation and wildlife habitats.

Management Rationale

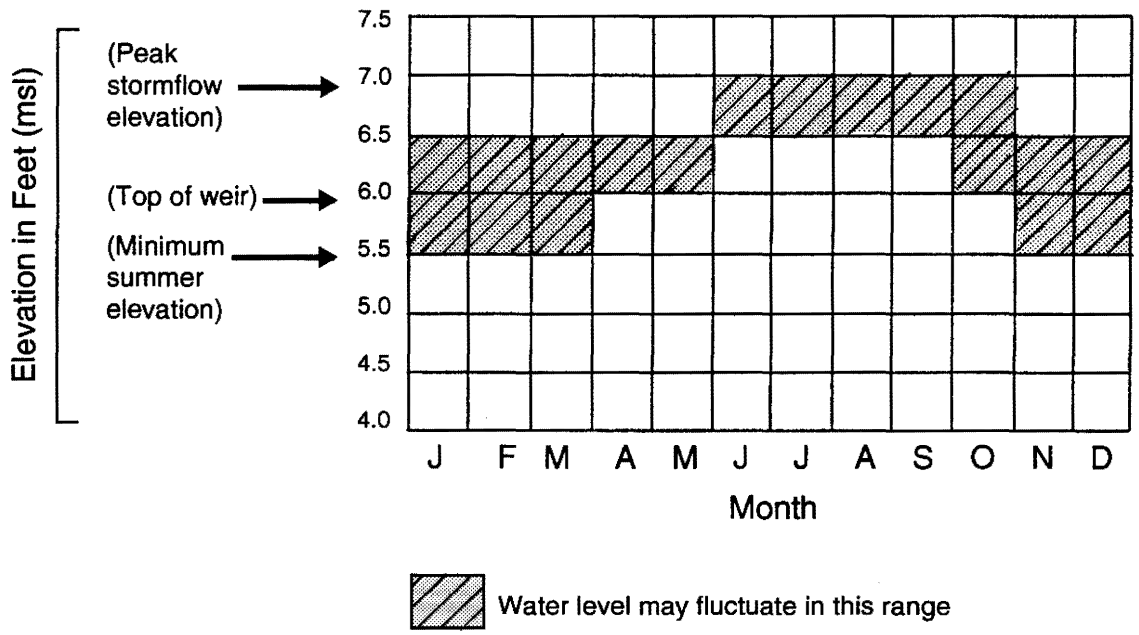
Water Level Management

Water levels in the lagoon fluctuate within a narrow range of about 4-6 feet msl, with a maximum of 7 feet msl during winter storms. Therefore, water level management should accommodate highly variable and uncontrolled inflows of both seawater and stormwater runoff while maintaining a relatively constant water level by controlling lagoon outflow. The primary method by which water levels would be controlled is the western terminus overflow weir.

Lagoon Outflows

To provide improved control and flexibility to manage lagoon outflows, a new overflow weir should be designed and constructed to replace the current structure. Controlling outflows at this location would be the primary mechanism to manage the hydrology of the lagoon. The new overflow weir should be adjustable so that water levels could either remain relatively constant, with adequate overflow capacity provided during storm events, or vary seasonally as desired. The overflow weir should have increased capacity so that all seawater discharged by the marine laboratory could go to the lagoon to increase circulation during summer. This would allow greater flexibility in lagoon water management. The Museum of Systematics and Ecology would be responsible for monitoring the overflow weir and lagoon water levels and Facilities Management will continue to maintain it.

With regard to managing water levels in the lagoon, higher water levels (at or above 6 feet MSL) may be desirable during summer to maintain water quality, and lower water levels during winter would provide runoff capacity and stimulate flushing of the lagoon. A conceptual design for operational settings and seasonal variations is presented in Figure 3-3 Water levels should also



Source: Jones & Stokes Associates 1995

Jones & Stokes Associates, Inc.

Figure 3-3.
Conceptual Water Level Management Goals by Month for the Campus Lagoon

be managed to maintain wetland areas along the margins of the lagoon. Water levels and their importance to water quality are discussed in more detail below under "Water Quality Management".

The 36-inch pipe proposed for placement in the east levee as part of the improvements and revetment should be used to provide additional outflow capacity and water level control during winter storms when the overflow weir is near capacity. This approach would maintain maximum lagoon circulation and flushing, especially during summer.

A preliminary cost estimate for designing and constructing the new overflow weir and outflow system at the west terminus of the lagoon is up to $100,000 (Watson pers. comm.).

Another option for improving circulation would be to extend one of the seawater discharge pipes northward and westward into the lagoon to provide for flow directly into those parts of the lagoon. This option would likely be very expensive. If this option is considered by UCSB, it should be evaluated as part of the overall marine laboratory expansion project.

Lagoon Capacity

Over the long term, sediments entering the lagoon could reduce lagoon capacity and depth, decreasing both circulation and water quality. Dredging could increase water depths, thus reducing water temperatures and increasing capacity. Dredging could also increase circulation if a small channel were dredged to enhance flows to the northwestern and western portions of the lagoon. Dredging would be very expensive, however, and studies should be conducted before dredging begins to evaluate sediment quality and disposal requirements.

Water Level Monitoring

Lagoon water levels normally have not fluctuated substantially and therefore should continue to be managed at levels that fluctuate between 5.5 feet and 7 feet msl. To monitor lagoon water levels, a staff gauge should be installed at the overflow weir. Another staff gauge could be placed near the two marine laboratory outfalls to facilitate quick access by campus personnel. The gauges should be monitored periodically during peak dry-season months (July-October) to help maintain an adequate water level, as well as during significant storm events. Monitoring during summer months should coincide with monitoring of water temperature and nutrient levels described in "Water Quality Management".

Lagoon Protection

Lagoon and beach protection mechanisms are addressed in the "Erosion and Slope Management" section earlier in this chapter. Construction of the proposed improvements to the east levee would protect adequately against lagoon erosion. No improvements are proposed for the berm at the western terminus other than revegetation to help stabilize the dune area from erosion (see "Vegetation and Habitat Improvement").

Management Actions

Management Goal H: Manage the lagoon hydrology for seawater discharge; flood protection; aesthetics; and enhancement of water quality, wildlife, and vegetation.

Objective H-1: Manage lagoon water levels to accommodate seawater discharge and protect from flooding.

> **Action H-1.1**: A new overflow weir and outflow structure should be constructed to replace the existing weir and outflow at the western terminus. The overflow weir should be the primary control mechanism for lagoon water levels and would provide greatly improved outflow capacity and control. (See also SQ-1 and A-1.3.)

Objective H-2: Manage lagoon water levels to enhance aesthetics of the lagoon area and wildlife and vegetation habitat.

> **Action H-2.1:** The new overflow weir described in Action H-1.1 would also support this objective. The new weir should be operated to maintain water levels to support wetland vegetation along the lagoon margins and should be based on monitoring described in Action H-3.1 below.

Objective H-3: Monitor lagoon water levels regularly to support other management plan objectives.

> **Action H-3.1:** A staff gauge should be installed at the overflow weir and lagoon water levels monitored periodically from July to October and during significant storm events year round. Another staff gauge could be placed near the marine laboratory outfalls to facilitate quick access by maintenance personnel. Staff gauges should be installed as part of new overflow weir construction and Museum of Systematics and Ecology personnel should be responsible for monitoring water level settings and changing set points, if necessary. (See also H-1.1 and H-2.1.)

WATER QUALITY MANAGEMENT

The goals of water quality management at the lagoon is to improve water quality in the lagoon by increasing water level control and circulation and improving watershed management practices for areas that drain to the lagoon. Monitoring of water quality is recommended to determine the current status of the lagoon, the efficacy of implemented actions, and the need for additional actions.

Management Rationale

Increasing Water Level Control and Circulation

Objectives and actions described for hydrology management would also apply to improving water quality. The overflow weir should be the primary mechanism by which water levels should be managed, as discussed in the "Hydrology" section. The new structure should also have improved outflow capacity so that increased seawater inflows can be accommodated to improve circulation, especially during summer months. The lagoon should be managed primarily as a saltwater habitat because of the dominance of seawater in the lagoon's current condition, the increased volume of seawater proposed to be discharged to the lagoon, and the need to improve circulation using the seawater discharge. Therefore, salinity should be stabilized as much as possible throughout the year except during storms. During storms, freshwater inflows would flush the lagoon and temporarily decrease salinity, especially in and near the wetlands management zone. The 36-inch pipe to be placed in the east levee should be opened only during emergencies and large storms. The predominance of saltwater should not be incompatible with the recently developed small brackish marsh in the wetlands management zone where several stormwater outfalls are located.

The critical period for maintenance of water quality is during the summer because of the stimulation of algal growth. Objectives and actions to improve water quality should focus on improving these conditions, thereby greatly reducing algal growth. Although the seawater discharge has high nutrient levels relative to the intake, the increase in seawater discharge to the lagoon is expected to improve water quality by increasing circulation and flushing.

Reducing Algal Growth

Operational changes should focus on reducing water temperatures and nutrient levels by increasing circulation and reducing detention time in the lagoon. Lowering the overflow weir and flushing the lagoon with stormwater during winter storms would help reduce nutrient accumulation in the lagoon. The actions to improve water quality would require monitoring to evaluate and verify results. The recommended monitoring program is discussed below.

Dredging is another possible action that could reduce algal growth potential in the lagoon. Dredging could reduce algal growth by reducing water temperatures (as a result of increased water depth) and increasing circulation. These benefits are described above under "Hydrology". However, because of the typically high costs associated with testing, permitting, excavation, and disposal of dredged material, this action should be evaluated carefully to determine its feasibility. Additionally, some of the dredged material could be used to create shallow wetland and shorebird habitats in portions of the lagoon.

Improving Watershed Management

Improving watershed management for areas draining to the lagoon should focus on continuing best management practices (BMPs) already being used by UCSB and improving

Table 3-1. List of References for the Development of Best Management Practices for Watershed Stormwater Management

California Storm Water Best Management Practice Handbooks - Municipal BMP Handbook. 1993. March. Stormwater Quality Task Force. Chicago, IL.

Northern Virginia Soil and Water Conservation District. 1994. Developing successful runoff control programs for urbanized areas. July. Fairfax, VA.

Schueler, T. R., P. A. Kumble, and M. A. Heraty. 1992. A current assessment of urban best management practices: techniques for reducing non-point source pollution in the coastal zone. March. Metropolitan Washington Council of Governments. Washington, DC. Prepared for U.S. Environmental Protection Agency, Office of Wetlands, Oceans, and Watersheds, Washington, DC.

Sonnen, M. B. 1983. Guidelines for the monitoring of urban runoff quality. The M. D. Sonnen Co., Inc. Walnut Creek, CA. Prepared for U.S. Environmental Protection Agency, Office of Research and Development, Cincinnati, OH.

Urban Storm Drainage Criteria Manual Volume 3 - Best Management Practices, Stormwater Quality. 1992. September. Urban Drainage and Flood Control District. Denver, CO.

U.S. Environmental Protection Agency. 1976. Methodology for the study of urban storm-generated pollution and control. (EPA-600/2-76-145.) August. Municipal Engineering Research Laboratory. Edison, NJ.

_____. 1991. Guidance manual for the preparation of Part 1 of the NPDES permit applications for discharges from municipal separate storm sewer systems. (EPA-505/8-91-003A.) April. Permits Division. Washington, DC.

_____. 1992. NPDES storm water sampling guidance document. (EPA-833-B-92-001.) Office of Water. Washington, DC.

_____. 1993a. Guidance specifying management measures for sources of nonpoint pollution in coastal waters. (EPA 840-B-92-002.) Office of Water. Washington, DC.

_____. 1993b. Handbook for urban runoff pollution prevention and control planning. (EPA/625/R-93/004.) September. Office of Research and Development. Washington, DC.

implementation of additional BMPs to reduce pollutants in the lagoon watershed and in stormwater entering specific areas of the lagoon. BMPs include both structural measures, involving treatment methods, and nonstructural measures, such as educational and regulatory actions. BMPs are usually applied as a system of practices and are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility. UCSB already uses several BMPs in accordance with policies and local conditions described in the LRDP. Parking lots on campus are probably the main source of pollutants in stormwater, and these areas are the focus of existing BMPs. Additional BMPs to consider for implementation are presented below. Some of the BMPs are likely to be very expensive to implement; others may require additional expenditures by UCSB for maintenance or monitoring or both.

Sources of information about available BMPs were evaluated for applicability to the lagoon and its watershed. The sources of information consulted are presented in Table 3-1.

Lagoon BMPs. The feasibility of implementing available BMPs at the lagoon is limited by the elevation and location of stormwater outfalls and by cost. Consideration of BMPs to improve stormwater quality entering the lagoon should be concentrated in the wetlands management zone because of constraints elsewhere of slope, water depth, and accessibility to stormwater outfalls.

As part of the conditions for approval of the University Center LRDP Amendment, the University installed a new brackish marsh and saltmarsh habitats in the Wetlands management zone (Figure 3-4). The design includes a brackish marsh area located near a stormwater outfall in the lower elevation habitat. The design also includes a saltmarsh habitat located at the elevation immediately below the brackish marsh. This wetlands design may not continue to function as intended if the amount of seawater discharged to the lagoon increases as proposed for the seawater system replacement project. However, this issue would be addressed in the EIR for the seawater expansion project because that project would have to consider the existing wetlands habitat in the analysis of impacts. As an alternative, actions (such as the development of a seasonal stormwater wetland) could be considered that would use or treat stormwater before it reaches the lagoon. There are two BMPs that could be implemented in this area of the lagoon if an adequate area were available. These are vegetated filter strips (VFSs) and either constructed or stormwater wetlands. A conceptual design for stormwater wetlands is presented in Figure 3-5. A combination of both BMPs could also be implemented. A VFS could replace or be added to the buffer shown in Figure 3-6. One of the main limitations of creating a brackish stormwater wetland at this location is the lack of a summertime source of fresh water. Reclaimed wastewater should probably not be used as a supplemental freshwater source because of its high nutrient levels. The wetland could be designed as a seasonal wetland using drought-tolerant species.

After evaluating various factors UCSB has determined that these BMPs are not feasible because of site conditions, costs and the importance of the existing land uses to the University. The stormwater wetland does not appear to be viable because there is no available land to construct it adjacent to the Lagoon. The lawn area between the UCen and the Lagoon has a steep slope, and is used by students for passive recreation and as a free speech area, and the lawn area between the Faculty Club and the Lagoon is used for Commencement ceremonies. UCSB does not propose to convert these existing land uses to a seasonal stormwater wetland

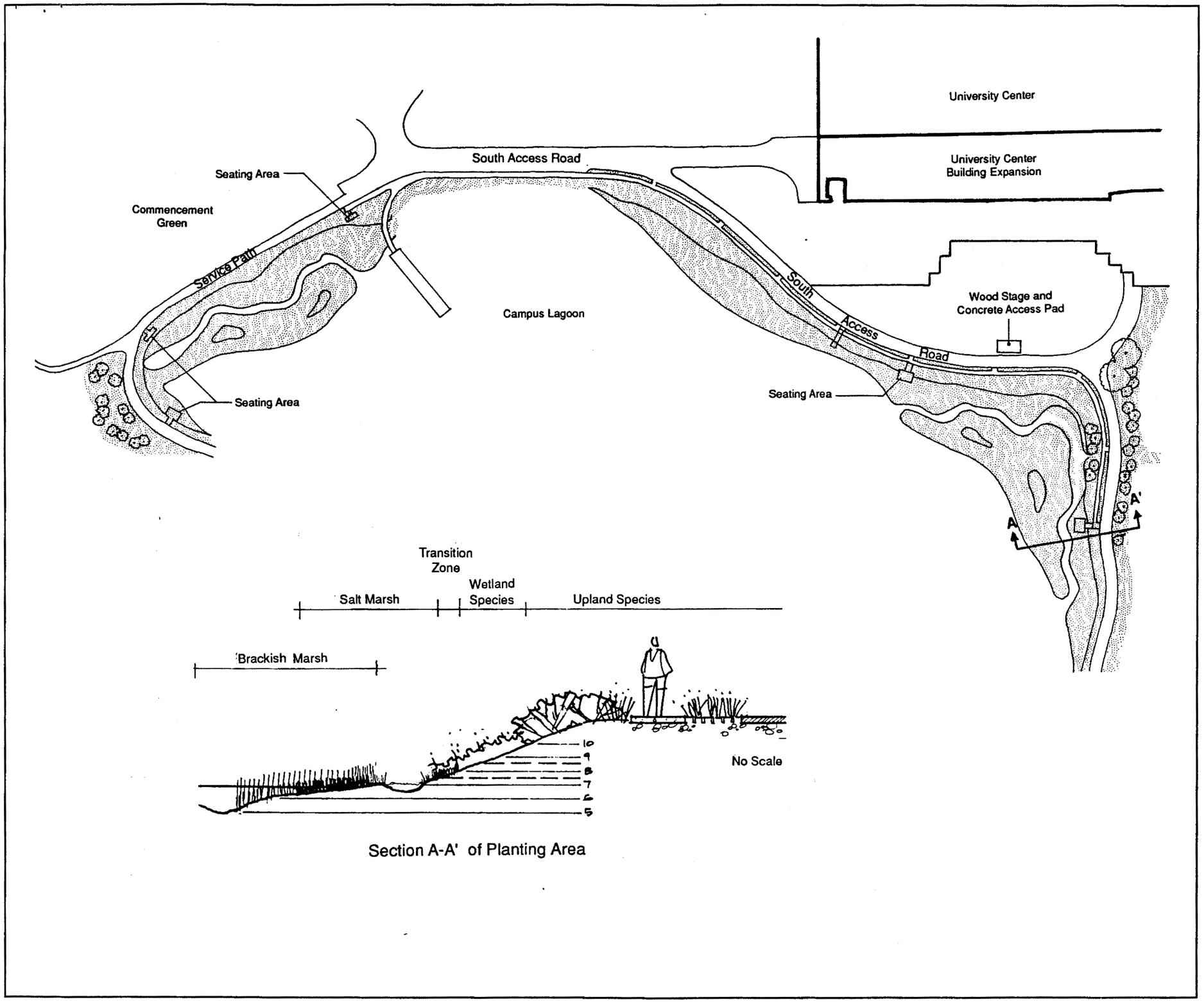


Figure 3-4.

Lagoon Wetlands Landscape Project Planting Area and Section

Legend:

Planting Area for Marsh and Scrub Vegetation

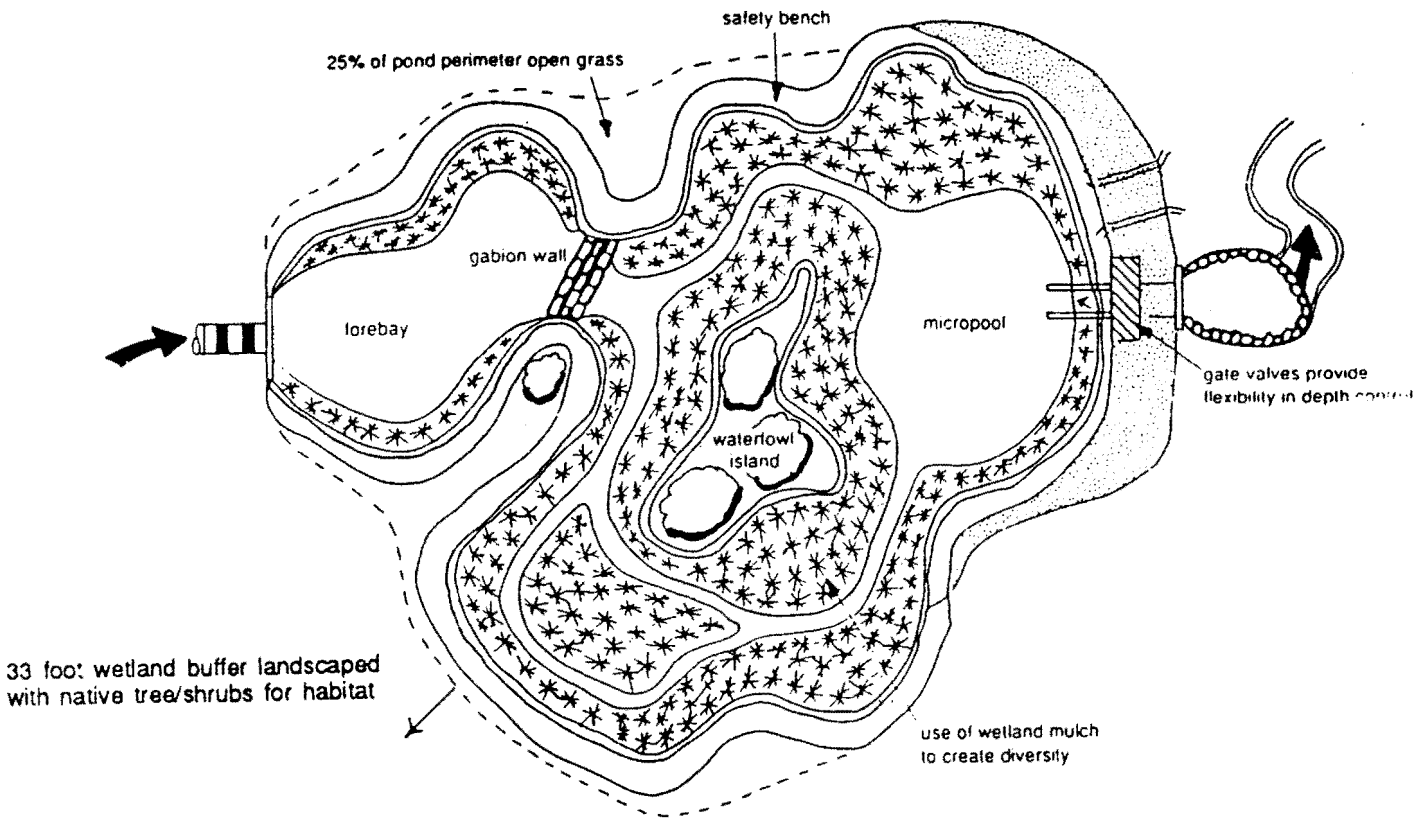
New Riparian Trees

Source: University Center Lagoon Landscape Plan, U.C. Santa Barbara, 1994

0 50 100 200

Scale in Feet

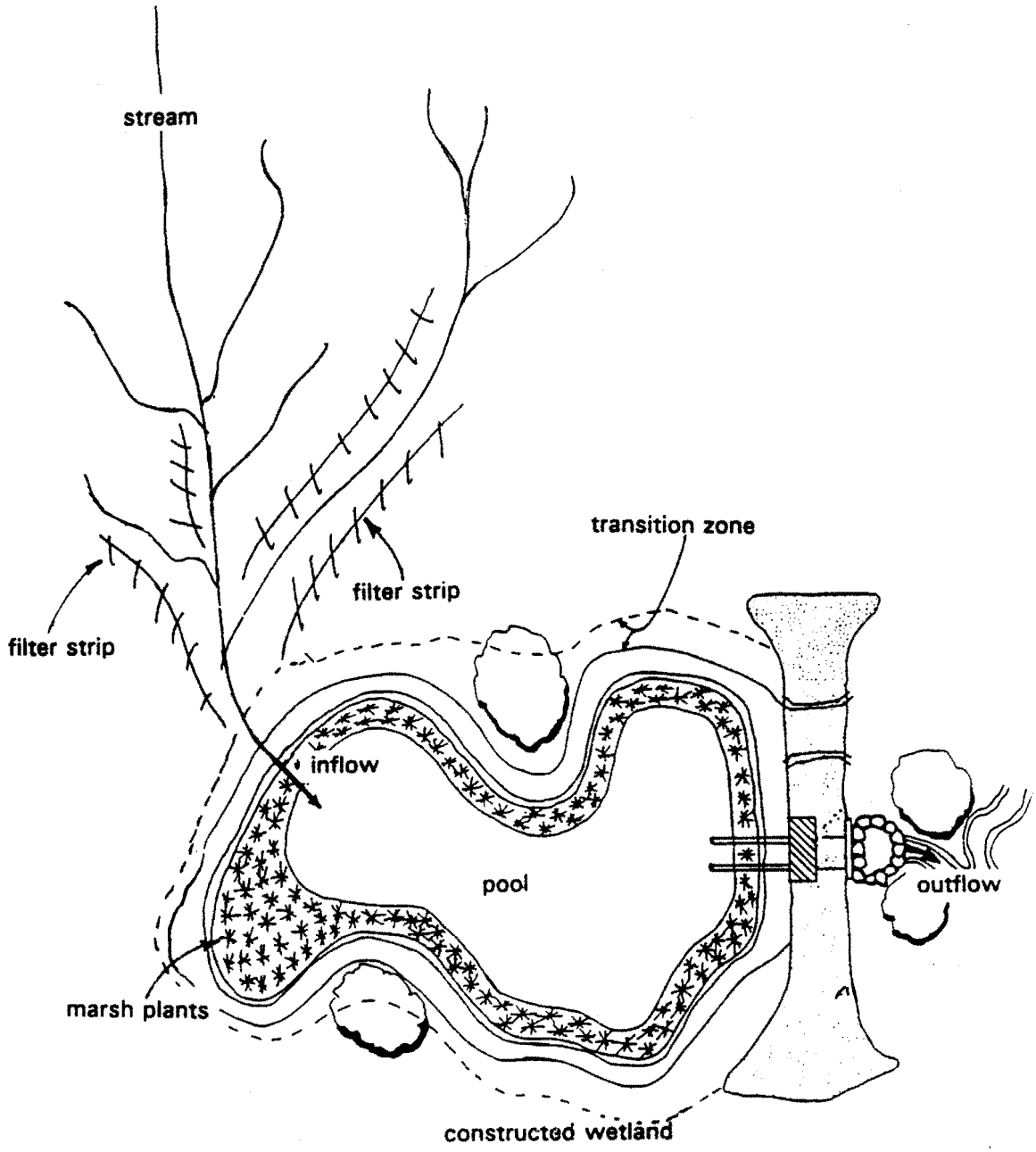
Prepared by: Jones & Stokes Associates



Source: Schueler 1992

Jones & Stokes Associates, Inc.

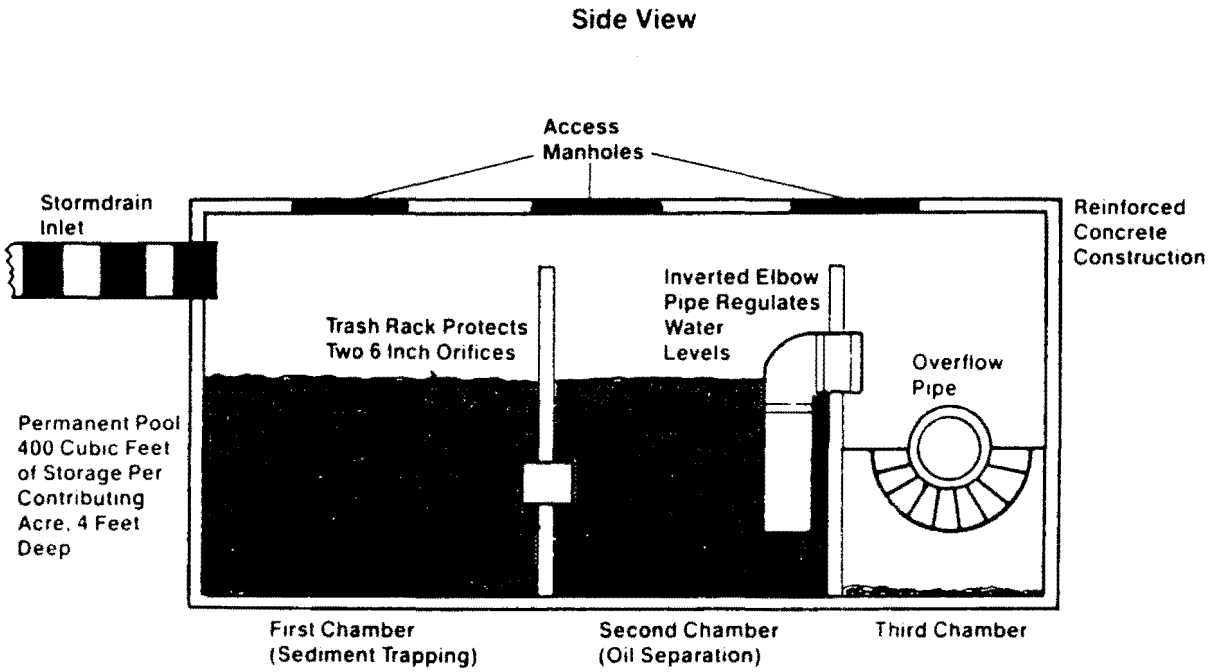
Figure 3-5.
Conceptual Design for Stormwater Wetlands



Source: U. S Environmental Protection Agency 1993

Jones & Stokes Associates, Inc.

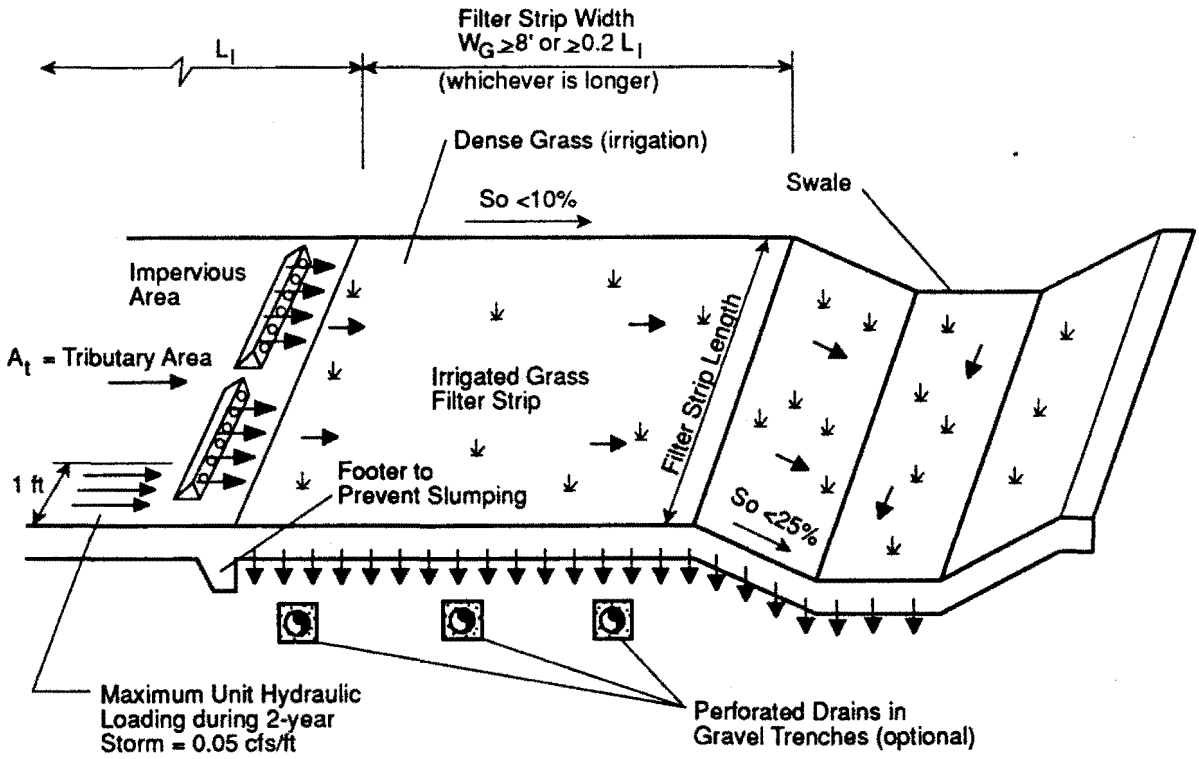
Figure 3-6.
Conceptual Design Incorporating Stormwater Wetland and Vegetated Filter Strip



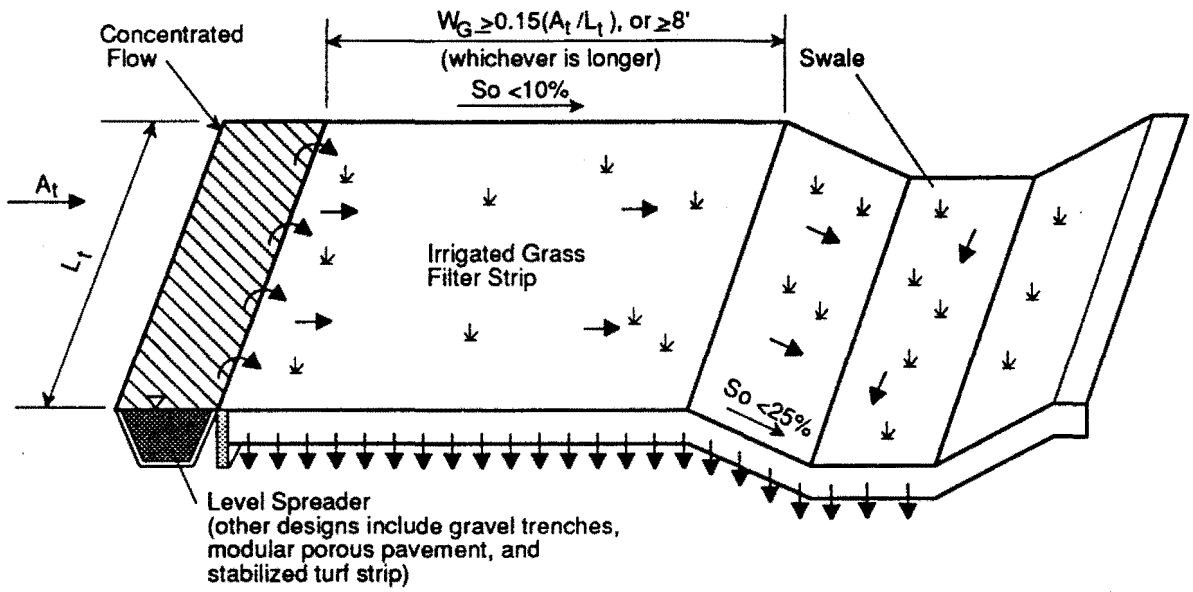
Source: Schueler 1992

Jones & Stokes Associates, Inc.

Figure 3-7.
Conceptual Design of a Water Quality Inlet



ONSITE FLOW CONTROL



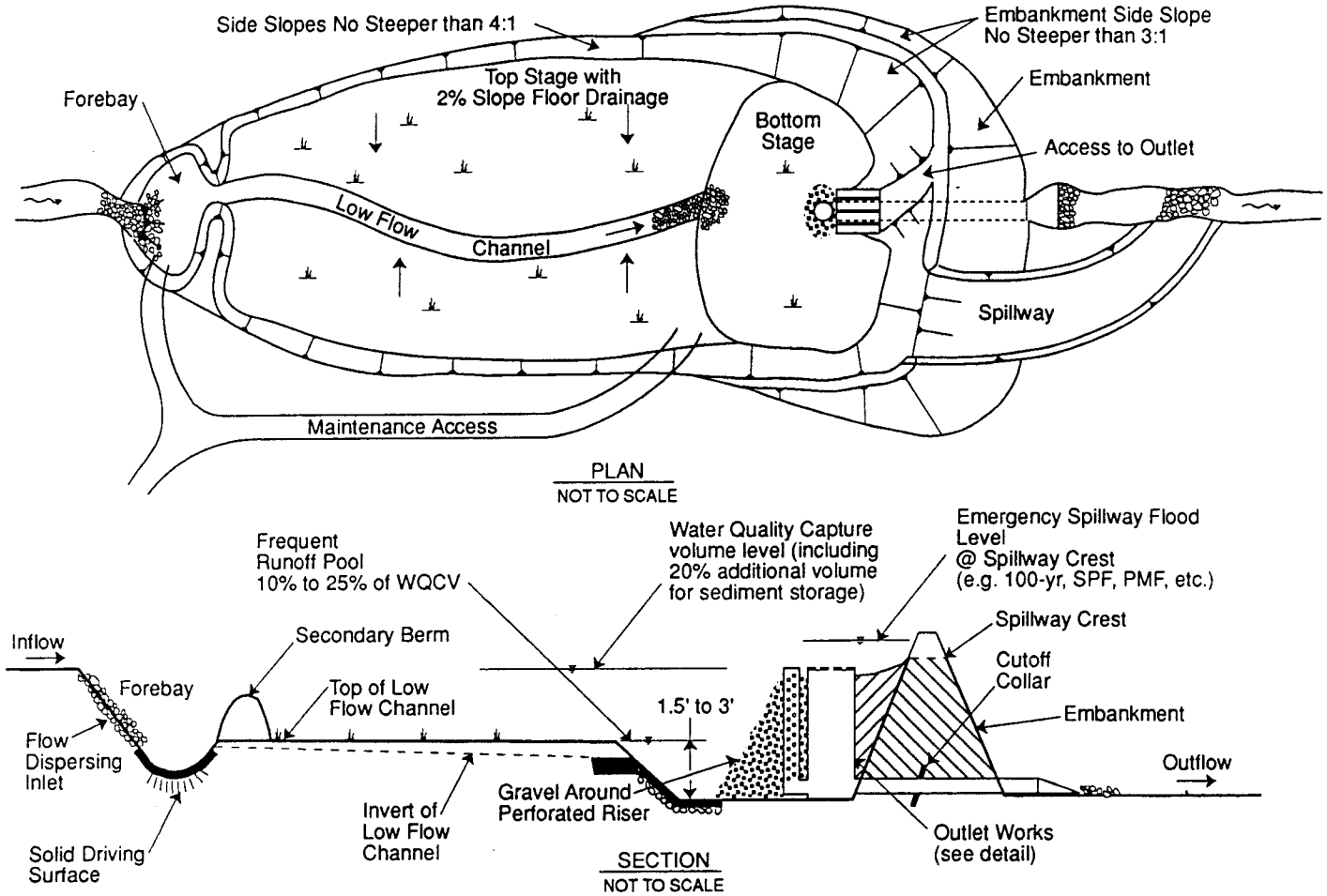
CONCENTRATED FLOW CONTROL

Note: Not to Scale

Source: Urban Drainage and Flood Control District 1992

Jones & Stokes Associates, Inc.

Figure 3-8.
Vegetated Filter Strip Conceptual Design



Source: Urban Drainage and Flood Control District 1992

Jones & Stokes Associates, Inc.

Figure 3-9.
Detention Basin Conceptual Design

Watershed BMPs. The feasibility of implementing additional BMPs in the lagoon watershed is limited primarily by cost. Consideration of BMPs to improve stormwater quality entering the lagoon should focus primarily on nonstructural measures to reduce pollutant sources in the lagoon watershed. Existing measures focus on eliminating or treating runoff from parking lots and other large, impervious areas.

Nonstructural BMPs for reducing watershed pollutant sources should focus on improving the quality while maintaining the quantity of the stormwater inflow by reducing pollutant levels. The existing and recommended BMPs are presented below in Action WQ-2.1.

Structural BMPs would focus on areas of new development and construction, including parking lots and other large, impervious surface areas. Parking lots would be targeted because they are a potential source of substantial pollutant loads. These BMPs include use of water quality inlets, VFSs, and small detention basins. Conceptual designs for these BMPs are shown in Figures 3-7 through 3-9. This approach was used by the engineering firm of Penfield & Smith for constructing a temporary parking lot associated with the new San Rafael housing project.

Although no adverse effects on aquatic biota from pollutants in the lagoon have been observed or reported, implementing a combination of BMPs would reduce pollutant levels in stormwater inflow and improve water quality. The listed BMPs must first be evaluated for applicability and efficiency and then be integrated into an overall program with the lagoon BMPs.

Monitoring Water Quality

A modest water quality monitoring program for the lagoon should be developed by and implemented under the direction of the Museum of Systematics and Ecology, together with consultation as needed with members of the Wetlands Committee. The focus of the monitoring program should be primarily on nutrient levels and responses of algae growth to nutrients. The RWQCB has informed UCSB that it would not require further monitoring unless conditions changed (i.e., seawater discharge increases).

The monitoring program would be implemented to evaluate the effects of the recommended management actions by:

- documenting existing water quality,
- providing data for feedback about circulation and water level controls, and
- verifying the efficacy of BMPs.

The monitoring program should include periodic monitoring of inorganic parameters such as nitrate, phosphate, suspended solids, and total dissolved solids. These parameters should be analyzed every month from May through October. It is recommended that temperature, pH, specific conductance, and dissolved oxygen content be monitored at three points in the lagoon: near the seawater outfall, at west end, and at the dock at the northwest end of the lagoon. Monitoring would not be required during the wet season (November-April) but could be continued as an option for the first 1-2 years of the program. These parameters can be easily and inexpensively analyzed in the field by marine laboratory maintenance staff. The Museum of Systematics and Ecology should draw on the expertise of Wetland Committee members who are

knowledgeable and experienced in collecting and analyzing these data in developing the monitoring program.

Management Actions

Management Goal WQ: Improve water quality at the lagoon.

Objective WQ-1: Increase water level control and circulation.

Action WQ-1.1: A new overflow weir should be constructed and operated to increase lagoon circulation and stabilize salinity as much as possible and be coordinated with monitoring actions described below. (See also H-1.1, H-2.1, and H-3.1.)

Objective WQ-2: Improve watershed management.

Action WQ-2.1: Existing nonstructural BMPs being implemented as required in the LRDP should continue to be implemented and should focus on reducing pollutants in stormwater while maintaining flows. Detailed information about these and other BMPs can be found in the source documents listed in Table 3-1. BMPs that will either be continued or evaluated for implementation in this program are as follows:

- Regularly inspect and clean out culverts and storm drains draining to the lagoon.
- Identify disturbed, erodible, or bare soils in the watershed and cover or revegetate important areas to reduce erosion and sedimentation.
- Develop and conduct a public education/participation program to inform UCSB staff, students, and faculty about ways to improve lagoon water quality. The program should explain the lagoon ecosystem, the stormwater drainage system, the potential sources of pollutants entering the lagoon, and the need for BMPs to reduce pollutant levels.
- Continue the program of good housekeeping practices focusing on spill prevention and cleanup, use of products that have reduced pollutant levels, and material storage controls.
- Continue to avoid the use of toxic chemicals in areas draining to the stormwater system or replace with nontoxic products.
- Continue to sweep large parking lots and roadway areas in mid-fall before the start of the rainy season.
- Continue to implement a program of vehicle leak and spill control for the UCSB vehicle fleet.

- Continue the recycling program for oil, solvents, and other hazardous materials commonly used at UCSB.

Action WQ-2.2: Structural BMPs should be implemented in association with new projects for parking lots and other large, impervious areas to control sediment, oil and grease, and other pollutants. The BMPs to evaluate for these areas are water quality inlets, VFSs, and small detention basins.

Objective WQ-3: Monitor water quality.

Action WQ-3.1: A monitoring program should be implemented that includes inorganic parameters such as nitrate, phosphate, suspended solids, and total dissolved solids every month from May through October at three points in the lagoon: near the seawater discharge, near the overflow weir, and at the dock at the northwest end of the lagoon. Temperature, pH, specific conductance, and dissolved oxygen content also should be monitored.

VEGETATION MANAGEMENT AND HABITAT IMPROVEMENTS

Managing vegetation and improving habitats at the Campus Lagoon are intended to protect, restore, and enhance natural vegetation and habitat types so that they are largely self-sustaining and can support common and sensitive plant and wildlife species. In addition, outstanding or significant ornamental plantings should be protected because they provide opportunities for research and education, consistent with UCSB policy. Vegetation management and habitat improvements would also support goals for erosion control, slope stabilization, water quality improvement, public use, and visual quality in the lagoon area.

Vegetation management in the lagoon area should vary depending on the vegetation type and location and the proximity to developed sites such as the University Center. Existing maintenance practices and other activities should only be changed to improve habitats for the benefit of plants and wildlife that currently use or are expected to use the area. The following objectives should be accomplished to achieve this purpose and accomplish the goals of improved vegetation management and habitat improvement:

- control invasive exotic plants in areas where sensitive native species or habitats are being adversely affected by encroachment from exotic species;
- protect and promote natural revegetation and improvement of important natural terrestrial and wetland habitats (e.g., grassland, scrub, dunes, and vernal pools);
- continue to remove debris and trash that may be damaging to vegetation and wildlife;
- reduce impacts on native vegetation and sensitive habitats from human activities;
- control public access in areas containing sensitive biological resources;
- maintain and promote improvement of existing wetland habitats;

- improve water quality and reduce erosion to benefit native plants and wildlife; and
- protect and maintain ornamental plants that provide values for horticulture, research, wildlife, aesthetics, and erosion control.

Management Rationale

The rationale for vegetation management and habitat improvements is described below. Details for each enhancement activity or program are described, as well as recommendations for monitoring existing conditions and habitat improvements. Additional information will be needed to determine appropriateness or potential for success and actual benefit before certain elements of this management plan can be implemented. Actions for gathering information are described as part of this management plan.

Vegetation Management

The management area consists of two basic habitat types, natural and artificial. The natural habitats should require little, if any, additional maintenance to sustain them after restoration activities have been performed. The artificial habitats consist of ornamental landscaping and will likely need regular ongoing maintenance. Generally, the aim of this management plan is to minimize maintenance requirements for vegetation management.

Some ornamental plantings are inappropriate in their present location because they reduce habitat quality for native plants and wildlife and may be difficult to manage (e.g., from fire danger). For example, activities in certain portions of the management area may adversely affect sensitive or natural habitats or species, such as on the sand dunes or coastal bluffs. Some ornamental plantings do provide values for wildlife, such as by providing structure for roosting and nesting, cover from predators, and sources of food.

The following sections describe the rationale for implementing specific management actions to maintain and enhance the biotic and natural resources in the management area.

Protect Special-Status Species. To effectively protect individuals, populations, and habitats of special-status species, field surveys for particular species should be conducted to map them accurately. This could be accomplished by students as part of a class or individual project, as part of a research project, or as a UCSB Museum of Systemics and Ecology supervised research project.

All special-status species populations should be managed to protect them from harm as a result of human activity or management. Passive barriers (e.g., logs, low rail fences, or telephone poles) and interpretive signs should be installed at sites where impacts on special-status species from humans have occurred or could occur, such as along trails. For example, two rare annual plant species, Coulter's saltbush and southern tarplant, occur in dried-out, shallow vernal pools and flats at the southwestern corner of the West Lagoon Park management zone, which is currently receiving considerable foot and bicycle traffic. Controlling human access by encouraging people to

Table 3-2. Management Prescriptions for Invasive Exotic Plants in the Campus Lagoon Management Area

Invasive Exotics to Control or Remove	Preferred Control Method	Priority
Arundo donax	Glyphosate (2 treatments); dig up rhizomes	1
Atriplex semibaccata	Hand; put in plastic bags for disposal	1
Avena fatua	Glyphosate	3
Bassia hyssopifolia	Glyphosate	2
Brassica rapa	Triclopyr (early season foliar)	2
Bromus diandrus	Glyphosate	3
Bromus hordeaceus	Glyphosate	3
Carpobrotus spp.	Glyphosate; leave in place	1
Centaurea melitensis	Triclopyr; hand pulling	2
Chenopodium spp.	Triclopyr; hand pulling	2
Cortedaria spp.	Glyphosate (2 treatments); dig up rhizomes	1
Cynodon dactylon	Glyphosate	2
Eucalyptus globulus	Hand; pruning saws, Triclopyr on stump	3
Hirschfeldia incana	Glyphosate	2
Myoporum laetum	Hand; pruning saws	1
Pennisetum clandestinum	Glyphosate early season/hand pull	1
Raphanus sativus	Triclopyr; glyphosate	2
Salsola tragus	Triclopyr/glyphosate combination	2
Tetragonia tetragonoides	Hand; put in plastic bags for disposal	2

Notes: Triclopyr application method will vary with species and location.
Glyphosate/triclopyr combination offers greater efficacy at lower rates than either one alone at higher rates.

Priorities:

1 = high priority; implement immediately, within 1 year of plan approval, or if urgency warrants for health or safety purposes.

2 = medium priority; implement within 3 years of plan approval.

3 = low priority; implement within 5 years of plan approval or as funding and staff time permits.

stay on designated trails (e.g., placing interpretive signs and access barriers along the trail) would help sustain and protect these rare plants.

Control Invasive Exotic Plants. Removing and controlling invasive exotic plants is an important component of managing sensitive species and habitats in the management area. In areas where sensitive species or habitats are being adversely affected by encroachment from exotic species, a program to control invasive exotic plants should be undertaken by UCSB. Before vegetation control treatments are begun, a qualified botanist should flag populations that need to be treated. Treatments could include hand removal or herbicide application or a combination of both.

Table 3-2 lists each invasive species and suggested control methods. Removal and control of these plants would probably require both chemical and mechanical treatment. If properly implemented, the initial removal of the invasive exotic plants would greatly reduce or possibly eliminate subsequent control measures. Glyphosate (e.g., Roundup or Rodeo) and triclopyr are two herbicides that have been used successfully to safely control most of the invasive exotic plants listed below. The use of herbicides must be supervised by a California licensed pest control applicator. Some invasive exotic plants, such as myoporum, can be eradicated by cutting them down and removing their roots. Others, such as pampas grass, giant reed, and Kikuyu grass, will likely require several herbicide treatments and removal of the plants to control them effectively. The hottentot and sea figs have been controlled successfully by applying glyphosate and leaving the dead plants in place. This discourages the seeds to germinate because they are not exposed to direct sunlight, which is a germination stimulator for these plants (Ferren pers. comm.). The best time to apply herbicides is when the plants are actively growing, such as in the spring. Care must be taken, when controlling invasive exotic plants with herbicide, that sensitive plant and wildlife species in the vicinity will not be adversely affected by the herbicide or the humans applying it.

An important goal of vegetation management in the lagoon area is to control invasive exotic plants to minimize their impacts on special-status plants and important habitats; however, eradication of invasive exotic plants from the management area is not considered a reasonable goal because some species of naturalized plants are extremely widespread and control measures may adversely affect desirable plants. General control measures for most of the naturalized plants are provided in Table 3-2. Detailed control measures are provided below for the most problematic plants.

Myoporum. Myoporum (*Myoporum laetum*) is an evergreen shrub from Australia. It invades coastal wetland areas from seeds deposited by birds who eat the plant's purple fruits. Because myoporum is not widespread in the management area, hand control techniques are suggested. Each shrub should be cut down with a hand saw or chainsaw, and the cuttings should be carried off the site. The root crown should be dug up with a hand shovel and the roots removed from the site to prevent resprouting.

Carpobrotus. The sea fig (*Carpobrotus chilense*) and hottentot fig (*Carpobrotus edulis*) are succulent perennial herbs or shrubs that create dense mats in sandy habitats. Often, the mats are so dense that native vegetation is crowded out and usually eliminated from large areas of sand dune habitats.

Viable seeds are present in the sand beneath the living plants and germination is stimulated by exposure to sunlight. Therefore, the recommended removal procedure is to kill the plants with herbicide and leave the dead plants in place. Removing the dead plants would allow sunlight to

stimulate the seed bank, and germination would begin. Native dune plants should be planted by hand between the dead fig plants. Glyphosate has been successful in killing sea fig and Hottentot fig.

Pampas Grass. Pampas grass (*Cortedaria atacamensis*) is a large, tuft-forming grass with feathery, cream-colored flower plumes. Pampas grass often invades coastal uplands and upper edges of wetland habitats and outcompetes native plants. Several of these plants occur throughout the site.

Pampas grass has been successfully controlled by applying glyphosate in two treatments, about 2 weeks apart, to growing plants. A licensed pest control advisor should be consulted for the most appropriate control method, and a licensed applicator should be retained to treat the plants with the recommended herbicide.

Giant Reed. Giant reed (*Arundo donax*) is a large, cane-forming, bamboolike grass. Giant reed often invades coastal and inland wetland habitats and outcompetes native plants. Only a few plants occur in the management area.

Giant reed has been successfully controlled by applying glyphosate in two treatments, about 2 weeks apart, to growing plants after cutting the canes near the base of the plant. A licensed pest control advisor should be consulted for the most appropriate control method, and a licensed applicator should be retained to treat the plants with the recommended herbicide.

Fire Management. Currently, several firebreaks are maintained regularly on top of the mesa at Lagoon Island. Ten-foot-wide strips are mowed each spring before fire danger becomes high in the dry season. Mowing the firebreaks continually disturbs the native vegetation, which encourages non-native species to grow. Because of low threats to humans and structures from fires on Lagoon Island, continually disturbing the native vegetation is probably unwarranted. Furthermore, the firebreaks are probably not particularly effective in controlling the spread of a fire on Lagoon Island. The lagoon itself provides a good firebreak between Lagoon Island and the campus buildings with their concentrations of people.

On the other hand, fire is a natural component of grassland and scrub vegetation types in California, and the native plants have adapted to periodic wildfires. In fact, if properly applied, fire could be an effective vegetation management tool (i.e., to control some invasive exotic plants, such as annual grasses and herbs).

UCSB should coordinate with the campus fire marshal to determine the effectiveness of mowing the firebreaks only as necessary for public safety or altogether discontinuing the practice of mowing firebreaks on Lagoon Island.

Retain Outstanding Ornamental Plant Specimens. The management area contains numerous unusual, unique, or uncommon planted shrubs and trees that should be retained because they can provide horticultural knowledge or research opportunities to staff researchers, students, and the community at large. Of the 40 ornamental tree and shrub species identified in the management area, 19 are rarely used in the southern California area in horticultural landscaping. Many of these specimens may have beneficial uses in the horticulture field if they are retained for viewing and study.

Habitat Enhancement

Some disturbed areas (e.g., some trails and portions of vehicle roads) should be protected and allowed to revegetate with native plants. Other important habitats in the management area should be protected, and as feasible opportunities arise enhancement or restoration activities should be undertaken. Opportunities for enhancement or restoration may include the availability of outside funding, organized student or volunteer community group efforts, or university educational or research activities. The following is a general description of the types of habitat enhancement and restoration efforts that could be conducted as opportunities and funding or resources become available. This description should not preclude or limit possibilities for other similar habitat enhancement or restoration efforts in the management area, providing those efforts support the goals of this plan and would not adversely affect special-status plants, ESHAs, or public safety.

Saltmarsh Enhancement. Many portions of the lagoon margin have been degraded in the past. Although some natural recovery has occurred since installation of the lagoon road, several areas are largely devoid of vegetation because the soils are compacted or salinity may be high. For degraded margin areas of the lagoon, enhancement of saltmarsh habitat could be conducted.

A restoration plan for saltmarsh habitat (pickleweed series) enhancement has been implemented in the North Lagoon management zone. That project includes establishment of native plants of saltmarsh and riparian scrub habitat types, including pickleweed, saltgrass, fleshy jaumea, arroyo willow, and other native coastal wetland species (Wallace, Roberts & Todd 1994). A monitoring and maintenance plan (Habitat Restoration 1994) has also been prepared and a streambed alteration agreement obtained for the University Center expansion project (Ferren pers. comm.). Based on the success and lessons learned from this project, additional areas of the lagoon margin could be similarly enhanced. Areas to consider may include the southernmost ends of the west and east arms of the lagoon, and possibly an area near the east revetment. Efforts at saltmarsh enhancement should be coordinated with management of lagoon water levels and quality (see discussions in "Hydrology Management" and "Water Quality Management" sections).

Coastal Dune Enhancement. Enhancement of the sand dunes in the South Beach management zone should be conducted in areas where invasive exotic plants have been removed or killed, or where human-caused disturbance to the natural vegetation has caused blowouts in the dunes that are allowing eolian sand to encroach on wetland areas. Seeds or cuttings of beach bursage (*Ambrosia chamissonis*), sand-verbenas (*Abronia umbellata* and *A. maritima*), and beach primrose (*Camissonia cheiranthifolia* ssp. *suffruticosa*) should be collected in the summer from the site and from nearby areas, such as the Coal Oil Point Preserve. These could be germinated or sprouted in greenhouses for planting in the late autumn or early winter.

Planting should occur on approximately 3-foot centers, as appropriate, in bare areas that need sand stabilization or where hottentot fig or sea fig plants have been eradicated. Propagule collection and growing should be conducted by a contractor experienced with growing California native coastal dune plants or as a class or service group project under the direction of the Museum of Systematics and Ecology. The plantings may need to be watered during the first season to improve establishment success. They could be irrigated from the existing road using a watering truck and hose or by establishing a hose connection to an existing irrigation system, either on Lagoon Island or in the West Lagoon Park management zone.

California Sagebrush Series Vegetation Enhancement. Enhancement of the coastal bluff vegetation in areas of the Goleta Point and Lagoon Island management zones would improve native plant and wildlife habitats in the management area. Enhancement efforts may not be necessary if natural revegetation occurs sufficiently as a result of actions to protect these areas from bicycle and foot traffic. If enhancement efforts are necessary, efforts should be restricted to areas where invasive exotic plants have been removed or killed or where human-caused disturbance to the natural vegetation has damaged or eliminated native plants, such as in the barren areas of Goleta Point.

To accomplish enhancement of California sagebrush series vegetation, seeds or cuttings of California sagebrush, coastal goldenbush (*Isocoma menziesii* var. *vernonioides*), and coyote brush should be collected in the summer from the enhancement sites and nearby areas, such as the Coal Oil Point Preserve. These could be germinated or sprouted in greenhouses for planting in the late autumn or early winter. Planting should occur on approximately 3-foot centers, as appropriate, in bare areas. Propagule collection and growing should be conducted by a contractor experienced with growing California native coastal plants as a class or service group project under the direction of the Museum of Systematics and Ecology. The plantings may need to be watered during the first season to improve establishment success. They can be irrigated from the existing road by using a watering truck and hose or by establishing a hose connection to the irrigation system present on Lagoon Island.

Control Eucalyptus Trees and Improve Habitat for Native Plant Species. Because the eucalyptus trees in the North Margin Management Zone have low habitat value for native plants and most species of native wildlife, many of the trees should be gradually removed and replaced with native trees and shrubs. Damaged or dying trees should be removed over a 10-year period to minimize adverse effects on wildlife species that do use the eucalyptus grove. Young trees with 4-inch or less calipers should be removed whenever opportunities are available and all new growth of eucalyptus trees should be removed as early as possible. Some larger, healthy trees that are identified as having important values for wildlife (e.g., raptor or heron nesting or roosting values) should be retained until native vegetation around the lagoon provides similar or suitable habitat values. Native trees and shrubs, such as coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), Brewer saltbush, California sycamore (*Platanus racemosa*), mule fat (*Baccharis salicifolia*), and arroyo willow (*Salix lasiolepis*), should be planted in the areas where the eucalyptus trees are removed. The goal would be to eventually replace all or most of the eucalyptus trees in the management area with native vegetation with a higher overall habitat value.

Vernal Pool Restoration. Several shallow and degraded vernal pools are present in the west bluff area of the West Lagoon Park management zone. Two special-status plant species also occur there; therefore, this unique and valuable habitat should be protected and, if possible, restored. Under the direction of the Museum of Systematics and Ecology and in consultation with members of the Wetlands Committee, a delineation of the exact locations of the vernal pools and special-status plants in the management zone should be prepared to implement the following measures:

- Redirect trails and roads away from the pools and rare plants and prevent public access to the vernal pools.

- Remove invasive exotic plants from the area.

- Determine the actual watershed for each pool.

- Determine the soil profile for each vernal pool.

- Monitor the vernal pools for 3 years to determine the species richness, dominance, and distribution of the plants and aquatic invertebrates in each pool. Monitoring for invertebrates should occur when the pools are inundated and monitoring for plants should be conducted during spring after much of the water in the pools has evaporated. After 3 years, the monitoring data would be available for further study and action by interested departments and research units at UCSB.

Wildlife Management

Wildlife and wildlife habitats at the Campus Lagoon management area would be managed to protect and improve opportunities for native wildlife. This could be accomplished by:

- enhancing wildlife habitats and habitat features (e.g., snags, roosts, cavities, and nesting and roosting structures),

- protecting existing habitats and selected habitat features, and

- minimizing disturbance by humans and domestic animals.

Protect Some Eucalyptus Trees and Improve Habitat for Native Species. Eucalyptus trees provide winter nectar sources for several species of hummingbirds, the monarch butterfly, and some insects. Some eucalyptus trees also provide roost and nest sites for hawks, owls, and herons. Great horned owl and black-crowned night-heron are reported to nest in the eucalyptus grove at the north lagoon margin. Removal of eucalyptus from the North Lagoon management zone would help improve habitat for native vegetation and many wildlife species; however, some trees should be retained for heron and raptor nesting and winter foraging habitat until native vegetation around the lagoon provides similar or suitable habitat. To protect nesting birds, human disturbance should be minimized within 300 feet of any known heron, owl, or other raptor nesting areas during the breeding season (January 1-August 1). By minimizing human access near active nest locations, the chances of nesting success would be improved. (See earlier discussion under "Control Eucalyptus Trees and Improve Habitat for Native Species"). With the possible exception of important habitat trees, eucalyptus trees should be thinned and removed whenever opportunities are available and the campus fire marshal identifies that there is a public safety hazard. For the eucalyptus grove between the existing road and the lagoon in the North Margin management zone, trees with 4-inch or less calipers should be removed whenever opportunities are available. All new growth of eucalyptus trees should be controlled as early as possible. Some larger healthy trees that are identified as having important wildlife values should be retained until similar or suitable habitat values for native vegetation exist in the management area. As eucalyptus trees are removed, they should be replaced with native trees and shrubs.

Minimize Wildlife Disturbance by Domestic Dogs. Although domestic animals probably cause little direct mortality to wildlife, they have been observed harassing wildlife near shorelines. Domestic animals can significantly stress and disturb wildlife, causing the wildlife to

be more vulnerable to disease and predation. Effective methods of reducing impacts from domestic animals on wildlife in the management area are probably limited to continuing to enforce existing regulations that require all dogs entering the area to be leashed and maintaining and replacing as necessary informational signs posted at entrances to the management area indicating this requirement. Also, informational signs suggesting that dogs, whether leashed or not, should not be taken onto Lagoon Island or Goleta Point should also be placed at entrances to those areas.

Preserve Snags in Natural Areas. Snags (standing dead trees) provide nesting and roosting cavities and perches for wildlife such as bats, swallows, cormorants, and herons. Although often removed for reasons including aesthetics, fire prevention, and public safety, snags should be retained wherever possible when they do not create a public safety hazard (e.g., near the lagoon edge on Lagoon Island or in the water along the north lagoon margin).

Remove Debris. Trash and debris (e.g., concrete, asphalt, bottles, and paper) have been dumped at several locations in the management area. Removing this debris would substantially improve the habitat quality of the management area. Volunteer workers, contract workers, or maintenance staff could traverse the entire site and carry debris to the paved road, where a pickup truck could be loaded and the debris disposed of properly. A skiploader may be needed to remove large or heavy pieces of debris. Damage to natural vegetation should be avoided if heavy equipment is operated beyond the existing roads. Debris and trash should be removed annually or as opportunities of funding, volunteers, or other resources become available.

Additional Optional Habitat Improvements. A variety of additional nonessential habitat improvements could be made at the lagoon as opportunities for funding, volunteer involvement, and other resources become available. A sample of additional habitat improvements are described below. Although nonessential, these improvements would help increase the diversity and quality of wildlife habitat at the lagoon and should be implemented only as outside resources become available and when they are determined not to adversely affect public safety, special-status species, or ESHAs or other goals identified in this management plan. These potential actions are identified here so that they are not precluded from future consideration.

Construct Habitat Island. A small habitat island for roosting and nesting birds could be constructed in the southwestern portion of the lagoon's eastern arm. The island could be built with excavated soil, if the lagoon were dredged, or obtained from other sites on the UCSB campus. The top 6 inches of soil on the island should consist of clean sand or small gravel to create habitat suitable for nesting by shorebirds, such as western snowy plover and killdeer. Providing nesting habitat on an island may reduce or prevent nest predation by mammals and snakes, as well as disturbance by humans. The floating dock platform recently removed from this location was used frequently by shorebirds for roosting. Protrusions and floating objects in the lagoon (including the existing boat dock) are often used by birds for roosting. For these reasons, a habitat island may be a valuable addition to the habitat quality of the lagoon. A habitat island could be constructed as opportunities of funding, volunteers, or other resources become available.

Create Additional Water Bird Roosts. Roosting habitat for water birds, including brown pelican, double-crested cormorant, herons, egrets, gulls, and waterfowl, is limited in the lagoon area (see discussion above). Installing structures similar to the cormorant platform that was recently removed would create additional roost sites for these birds. Methods to install, maintain, and monitor roosting structures should be developed and implemented as opportunities of funding, volunteers, or other resources become available.

Enhance Bat Roosting and Rearing Habitat. Cavities suitable for bat roosting and rearing are limited in the region. Bat roosting and rearing habitat could be enhanced by developing and implementing a bat box program. To create additional roosting and rearing habitat for bats, UCSB could construct and place bat boxes in eucalyptus groves and in other woodland areas. Bat box designs are available from Bat Conservation International. A bat box maintenance and monitoring program should be developed to keep boxes in good condition and monitor their use. Students and volunteers could develop, implement, and monitor the program. Bat roosting and rearing habitat could be enhanced as opportunities of funding, volunteers, or other resources become available.

Monitoring

To help identify potential problems and improve and maintain habitat in the management area, monitoring of important habitat areas should be conducted on a regular basis for areas (e.g., sand dunes and vernal pools) where special-status or other sensitive species are present. Habitat monitoring and reporting should be the responsibility of the UCSB Museum of Systematics and Ecology. With the exception of monitoring described above for hydrology and water quality, all other monitoring programs should be conducted only as can be accomplished within the Museum's budget for Lagoon management, or as opportunities (e.g., grant funding, volunteers, or other resources) become available. Some special-status species of wildlife (e.g., snowy plover) and plants (e.g., Coulter's saltbush) should be monitored. A detailed program for habitat monitoring that should be implemented is identified below for special-status plant populations. Also, an existing approved monitoring program is being implemented for the wetlands enhancement project recently constructed along the north lagoon margin in the Wetlands management zone. The monitoring and maintenance plan for this project is described in detail in a report by Habitat Restoration (1994).

Other optional habitat monitoring programs that may be conducted in the management area as opportunities become available would include special-status wildlife populations, invasive exotic plant populations, revegetation sites, and other existing vegetation. These potential actions are identified here so that they are not precluded from future consideration.

Special-Status Plant Population Monitoring Program. To ensure survival and propagation of special-status plant populations, a monitoring program for each special-status plant species should be developed and permanent monitoring stations should be established at each population. A permanent marker should be provided, transects should be established, and each population should be monitored annually. The number and vigor of individuals should be recorded and each population photographed. Monitoring for Coulter's saltbush, southern tarplant, and red sand-verbena should take place when they are blooming.

Monitoring should be performed by qualified individuals (i.e., knowledgeable consultants, UCSB botanists, botany students, or trained volunteers such as members of California Native Plant Society [CNPS]) or UCSB's Habitat Restoration Club. An annual report that contains the results of monitoring surveys should be prepared under the direction of the Museum of Systematics and Ecology and distributed to the Wetlands Committee.

Additional Optional Habitat Monitoring. A variety of additional, nonessential habitat monitoring programs could be conducted in the lagoon management area that would provide improved information about habitat conditions in the management area. Some additional, nonessential monitoring programs are described below that could be implemented as opportunities for funding, volunteer involvement, or other resources become available. These optional programs are described generally here so that they are not precluded from future consideration.

Special-Status Wildlife Population Monitoring Program. To improve information about survival and propagation of special-status wildlife species, permanent monitoring stations and transects could be established in each management zone that may support special-status wildlife species. A permanent marker could be provided, transects established, and each site monitored quarterly (in mid-winter, mid-spring, mid-summer, and mid-fall). The number of individuals by species observed could be recorded, as well as current weather conditions (i.e., cloud cover, temperature, wind conditions). Monitoring for the western snowy plover, if the species is present, could be done during the nesting season (generally during the spring). Monitors should be careful not to inadvertently harass listed species that may be present. Monitoring should be performed by qualified individuals (i.e., knowledgeable consultants, UCSB faculty or student ornithologists, or trained volunteers such as members of the Audubon Society).

Invasive Exotic Plant Monitoring Program. Monitoring of invasive exotic plants could be conducted with a focus on areas (e.g., vernal pools and dunes) containing special-status plants. Monitoring could consist of annual spring surveys of the management area by a qualified botanist able to identify those particular species. New or reoccurring stands of invasive exotic plant species could be flagged and mapped for eradication. The annual surveys could be continued until no new occurrences are found for 2 consecutive years, at which time the monitoring could be reduced to once every 5 years. The Museum of Systematics and Ecology would be responsible for ensuring that the monitoring and eradication program is implemented.

Revegetation Monitoring Program. A revegetation monitoring program could be developed that would consist of monitoring planted sites for a minimum of 5 consecutive years and every other year afterward until the plantings have been determined to be at least 80% successful. Success could be defined as the area of planted vegetation achieving 75% total cover by the desired species.

Monitoring could be performed by qualified individuals (i.e., knowledgeable consultants, UCSB faculty or student botanists, or trained volunteers such as members of CNPS). An annual report of the monitoring results should be prepared to determine what remedial measures might be taken.

Vegetation Monitoring Program. The natural extant vegetation could be monitored once every 5 years along predetermined transects established by the Museum of Systematics and Ecology to measure species composition and total cover changes. At least one transect could be established within each habitat type in the management area. Transects of 100 meters could be used. Fifty 0.1-square-meter plots could be sampled randomly along each transect. Total cover, relative cover, height, and species dominance could be recorded for each plot. These data could then be analyzed by the Museum of Systematics and Ecology.

Significant changes to the vegetation could be determined by comparing annual monitoring data to those collected previously. The first year's data could serve as the baseline. Species

composition changes toward more natural vegetation would be desired. Increases in numbers, types, or dominance of naturalized non-native plant species would be undesirable, and corrective action could be implemented to reverse such changes toward dominance by native plants. Weed control measures could be implemented as well.

Wildlife Monitoring Program. To improve knowledge about the success of nonessential habitat improvement measures (e.g., proposed nesting island, bat boxes, and water bird roosts), wildlife use of the structures could be evaluated seasonally. A maintenance and monitoring program could also be developed to keep the wildlife structures in good condition. An annual report of monitoring results could be prepared to determine what additional measures might be implemented.

Management Actions

Management Goal VH: Protect and improve opportunities for maintaining and increasing populations of native plants and wildlife and outstanding horticultural specimens in the Campus Lagoon management area.

Objective VH-1: Maintain and enhance existing vegetation resources.

Action VH-1.1: Invasive exotic plants should be controlled using appropriate chemical and mechanical methods to reduce their adverse effects on special-status plant species and other native plant habitats in areas (e.g. vernal pools and coastal sand dunes) that may contain special-status plants.

Action VH-1.2: Special-status plant species should be protected by controlling public access, constructing physical barriers around them, installing informational signs to educate people about the special-status species, and monitoring and mapping the populations. (See also actions under Objective PU-2.)

Action VH-1.3: UCSB should coordinate with the campus fire marshal to determine the effectiveness of mowing firebreaks on Lagoon Island only as necessary to protect public safety of altogether discontinuing mowing of the firebreaks. (See also PU-3.7.)

Action VH-1.4: Outstanding ornamental plant specimens should be retained.

Objective VH-2: Protect and, where possible, enhance native vegetation habitats.

Action VH-2.1: Saltmarsh habitat should be protected and, as opportunities become available, enhanced along the lagoon margin through revegetation and water management based on evaluation of the existing saltmarsh enhancement efforts in the wetlands management zone. (See also H-2.1, WQ-1.1, and WQ-2.1.)

Action VH-2.2: Coastal dune vegetation should be protected and, as opportunities become available, enhanced on the bare sand dune areas through revegetation and planting once invasive exotic plants have been controlled. (See also VH-1.1, and PU-2.6.)

Action VH-2.3: California sagebrush series vegetation should be protected and, as opportunities become available, enhanced along the coastal bluffs, once invasive exotic plants have been controlled, by collecting, growing, and planting native plants or through natural revegetation resulting from other protection efforts. (See also ES-1.1, ES-2.1, and PU-2.4.)

Action VH-2.4: Eucalyptus trees in the North Margin management zone should be controlled and gradually replaced with native trees and shrubs. (See also VH-3.1 and PU-3.3.)

Action VH-2.5: Vernal pools should be protected and, if possible, restored in the West Lagoon Park management zone by controlling public access; controlling invasive exotic plants; monitoring conditions of the pools; and implementing an enhancement plan to improve the functions and values of the vernal pools, if necessary. (See also PU-2.5.)

Objective VH-3: Maintain perch and nest sites and nectar sources for important bird species.

Action VH-3.1: Some eucalyptus trees in the North Lagoon Margin management zone should be temporarily protected and retained as habitat for herons and raptors and most trees should be gradually thinned and removed and replaced with native plants as opportunities become available. Human disturbance within 300 feet of the known nesting locations for heron, owl, and other raptors in eucalyptus trees should be minimized during the breeding season (January 1-August 1). (See also VH-2.4 and PU-3.3.)

Action VH-3.2: Snags should be retained whenever possible, when they do not create a public safety hazard, to preserve nest and roost cavities and perches for wildlife.

Objective VH-4: Control domestic dogs in the management area to minimize adverse effects on wildlife.

Action VH-4.1: UCSB should continue to enforce existing regulations that require all dogs entering the management area to be leashed and should and, as necessary, replace signs indicating this requirement.

Objective VH-5: As opportunities become available, encourage enhancement of roosting and rearing habitat for bats and water birds.

Action VH-5.1: As opportunities become available, additional roosting and rearing habitat for bats could be created by constructing, placing, and maintaining bat boxes in appropriate locations and monitoring their use.

Action VH-5.2: As opportunities become available, habitat islands and water bird roosts could be constructed in the lagoon.

PUBLIC USE

The Campus Lagoon management area is an important area of open space and ESHA for the university, and it provides numerous opportunities for public use that are oriented primarily toward passive recreation and enjoyment of the outdoor setting. The area is easily accessible to and is used extensively by the UCSB community, particularly students; however, it is also an important regional recreation and open space resource that is used by the general public. The area's diverse landforms and natural features, aesthetic quality, and accessibility are several reasons why people are attracted to and use the area. To achieve a balance of public use and ecological function and to preserve the elements that people enjoy and are attracted to in the lagoon area, public use should be managed carefully and with full consideration of the short- and long-term effects it may have on the area's resources.

Management Rationale

Public Access Provision and Control

To a large degree, public access to the state-owned UCSB campus is unrestricted and uncontrolled. The campus in general, and the lagoon area in particular, serves the important function of providing the public with access to diverse and scenic coastal resources and passive recreation opportunities.

UCSB must adhere to the requirements of the Coastal Act to manage the campus for public access. To accomplish this, UCSB has designated several parking lots and beach access routes near the management area that the public can use to reach coastal resources. The ocean is easily visible from most parking areas designated for visitor use, and the quantity and distribution of beach access routes from the Main Campus is adequate (UCSB 1990). Signs, which are often vandalized, are posted at the parking areas to provide information and identify beach access routes. Information regarding visitor facilities, parking, and access is available at the east entrance gate to the campus. These parking areas and access routes should continue to be maintained in accordance with UCSB and CCC policy. Access routes through the management area should continue to be available and managed for public use. Informational signs should continue to be maintained at the parking areas. When informational signs are removed or damaged beyond repair, new signs that are more resistant to vandalism should be installed by UCSB as replacements. New informational signs should meet standards identified under "Erosion and Slope Management" in this chapter.

The only vehicle access routes to the management area are for emergency services, maintenance, and other authorized purposes. All currently available vehicle access in the lagoon area should be maintained for these purposes. Access improvements for emergency access and public safety are discussed in more detail below under "Public Safety".

The management area is used extensively by students because of its attractive recreational qualities and location close to several residence halls, the community of Isla Vista, and well-used parts of the campus. Most access to and through the management area is on foot. The South Beach management zone is used extensively by students and others traveling from Isla Vista and the residence halls. Traditional access routes to beaches and other important destinations from

these areas through and into the management area should continue to be maintained in a manner that minimizes environmental damage to the area. Any access improvements that are constructed should meet standards for ADA compliance. Two unplanned volunteer trails, apparently created by students as shortcuts between the dorms and the UCen, enter the management area on the steep slope near the San Miguel dormitory. Either these trails should be improved to encourage people to use them rather than other parts of the slope to avoid further environmental damage or barriers should be installed to prevent students from using the slope as a shortcut.

To help reduce further traffic-induced erosion in the management area, a variety of techniques and programs should be implemented by UCSB that are aimed at educating and involving people in reducing impacts. Examples could include informational signs and interpretive exhibits, printed materials distributed to students and student organizations, and involvement by student groups and organizations such as bike clubs in organized activities that encourage awareness and self-policing (e.g., debris cleanup, exotic plant removal, revegetation, path repair, erosion repair, and sign and barrier placement). Other actions by UCSB may include deterrence through occasional patrols and issuance of warnings and possibly community service requirements or fines payable to the university to be earmarked for erosion prevention activities.

In accordance with the California Building Code (24 CCR Part 2) and the federal Americans with Disabilities Act (ADA), UCSB must provide full and equal access to all new facilities for people's use. UCSB has established a policy of providing access for physically challenged people where it is feasible and not constrained by topographical and environmental conditions (UCSB 1990). For new facilities developed in the management area, UCSB should adhere to this policy in accordance with state and federal requirements.

Most access to the management area is down steep grades or stairs from the surrounding campus mesa and west bluff or along sandy beaches. Several access locations to the lagoon area that are fully accessible to physically challenged people are located on the lagoon's north side, which is the portion that receives the most use. In the southern half of the management area, the steep slopes (e.g., at the west bluff, Lagoon Island, and Goleta Point) and the soft, sandy surfaces of the roads, paths, and beaches effectively limit access for people with wheelchairs. Providing full access up the steep slopes and bluffs to the top of Lagoon Island and Goleta Point would require substantial regrading or building of structures to create access paths and could be very costly. If educational or other public use facilities (e.g., an interpretive trail or overlook) are planned to be constructed on Goleta Point or Lagoon Island, UCSB will need to carefully consider the environmental impacts and costs of constructing these facilities.

Bicycles are used extensively on the campus and throughout the surrounding area. UCSB encourages the use of bicycles and provides designated bike routes and facilities for their use. Bicycle riding is permitted in all parts of the lagoon area except on Lagoon Island and Goleta Point. As the use of mountain bikes has grown in popularity in recent years, they have become a growing problem in the lagoon area. Bicycles are often used in the restricted zones of the management area, and bicycle use has been responsible for erosion damage to slopes and paths. The west bluff and its eastern face at the southern end, where bikes are not restricted, has also been damaged by bicycle and foot traffic. Coastal access signs that identify restrictions are often ignored and occasionally vandalized or removed. Restrictions on bicycle use should be enforced on a regular basis by UCSB police and student workers in areas that may be sensitive to erosion (i.e., on all unprotected soil surfaces, slopes, and Lagoon Island and Goleta Point) (see also the discussion under "Erosion and Slope Management"). Slopes and the mesa top in the West Lagoon Park

management zone, especially the habitat area for special-status plants, should be included as part of the restricted area for bicycles. Barriers should be installed to discourage access to eroded slopes, and improved informational signs should be placed in visible locations. Also, entry points and fences should be improved at the existing bicycle access points on the north side of Goleta Point and the west side of Lagoon Island to discourage bicycle use.

The slope from the west bluff down to the south beach in the southern part of the West Lagoon Park management zone has been eroded by extensive public use. To protect this area and maintain public access, eroded portions of the slope should be protected and allowed to revegetate. An accessible path is available because the existing improved path down the slope and emergency vehicle access are maintained along the improved, full-access path from the west bluff down to the beach.

Barriers should be installed at the top of the west bluff slope to discourage people from using parts this area. All improvements should avoid impacts on special-status plants that occur in this area, and barriers should be installed to discourage access to habitat areas for these plants. Because this is a well-used entrance to the management area, an informational sign should be located there to identify the access route to the beach and ways to help protect the habitat. An interpretive exhibit should also be placed there that discusses the plants and other natural and cultural elements of the area.

In both sand dune areas in the South Beach management zone, barriers and informational signs should placed to discourage traffic in sensitive dune area. Essential paths (at least two in each dune area) should be designated for public access, and the remaining, nonessential trails should be repaired and revegetated.

Potential improvements to the east lagoon barrier are described under "Erosion and Slope Management" and illustrated in Figure 3-2. Besides protecting the structural integrity of the barrier and lagoon, improvements to the barrier are intended to maintain and improve public access from the Main Campus to the beach and Goleta Point. Access improvements include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, and providing stairs to the beach at the pumphouse. Other access improvements proposed at the east lagoon barrier, which are primarily for public safety, are described below under "Public Safety".

Public Safety

Protecting public safety is a primary concern for the management area. Parts of the management area are remote, hazardous areas such as steep slopes and bluffs are present, and some areas pose a fire danger. Maintaining access for emergency service vehicles is a high management priority. All existing emergency access should be maintained in the lagoon area, including all vehicle entry points and paved roads shown in Figure 3-2. For any improvements that occur in the West Lagoon Park management zone, access should be maintained from Ocean Road into the lower lagoon area. The existing road grade down the slope is adequate and should be maintained for fire access and regular police patrols. The paved roads along the northern and western sides should also be maintained for emergency vehicle use. Proposed improvements to the east lagoon barrier should be made as part of the proposed comprehensive upgrading of the marine laboratory seawater system and subject to approval by the Regents and CCC. The design program for the seawater system replacement project calls for placing a removable bollard across

the road to provide emergency access near the marine laboratory, paving the road on top of the barrier, and providing a hammerhead turnaround at the base of the north-facing bluff.

Police vehicles patrol the lagoon area daily on the paved roads that extend around most of the lagoon. Maintaining vehicle access is important for quick response times and personal safety. The police currently use a small path on Goleta Point to drive closer to the edge for good visibility of the area, especially the beaches. The path on the slope, which is presently used by patrol vehicles, should continue to be maintained to allow access by police vehicles.

Fire poses a significant concern in the lagoon area. The eucalyptus groves in the North Margin management zone are a hazard because of their extreme flammability and proximity to residence halls. Large stands of these trees were thinned and cut during summer 1994 to reduce the fire hazard and open up views of the lagoon area for dormitory residents. The eucalyptus groves should continue to be thinned and maintained in this manner; however, many of the eucalyptus trees should be removed permanently to reduce fire danger and to improve native plant and wildlife habitat and aesthetics. Native trees, shrubs, and groundcovers should be established to replace and improve the habitat values lost from the eucalyptus trees but maintain a low fire hazard. Eucalyptus trees identified as important for nesting or roosting should be retained and gradually removed as native vegetation begins to provide similar habitat values in the area.

Other fire hazard areas in the isolated parts of the management area are Goleta Point, Lagoon Island, and West Lagoon Park. Firebreaks are maintained on the mesa top of Lagoon Island by mowing down the vegetation in 10-foot-wide swaths in the spring. Mowing in spring is disruptive to wildlife and damages the native habitat of the area. Although mowing may reduce fire danger on the remote mesa top, the isolated location of Lagoon Island is probably a more effective deterrent to the spread of fire. Mowing the firebreaks on Lagoon Island is probably not effective or necessary. UCSB should coordinate with the campus fire marshal to determine when to mow firebreaks on Lagoon Island as necessary for public safety.

The steep coastal bluffs in the management area are a potential hazard for people at the top and near the base of the bluffs. The sheer dropoff of 25-30 feet and the loose, erosive material at the edge create a potential hazard for people who may stand too close to the edge. People who sunbathe, sit, or walk near the base of the bluffs are exposed to the potential hazards of falling debris that either falls off naturally or is dislodged by people near the bluff edge above. To reduce the dangers of people slipping and of falling debris, people should be discouraged from approaching the bluff edge. Low barriers that would not be visually intrusive should be located near the bluff edge to help reduce these hazards. Barriers for placement near the bluff edge are described in "Erosion and Slope Management" in this chapter.

Activities and Facilities

Recreational use and other activities are generally passive and dispersed in the lagoon area; few developed facilities are available for public use. Generally, activities should continue to be managed in this manner.

The annual commencement ceremony should continue to be conducted at the Commencement Green; however, the stage and other facilities should be located to avoid interference with the new wetland area.

Although rowing on the lagoon is possibly disruptive for wildlife and is not consistent with managing the area as an ESHA, it has been a long-standing use of the lagoon and may be considered a historical and nonconforming use. The boat dock serves as a good roosting area for birds, including the endangered brown pelican and other special-status species. It is one of the few places available in the lagoon for birds to rest in a protected location. As part of the wetlands development project under construction on the north edge of the lagoon, the boat dock has been moved slightly and an improved, lockable gate installed to control public access. Provided the intensity of use remains at its current level or below, use of the lagoon for rowing practice by the UCSB crew team should continue to be permitted and the boat dock should remain in place with the addition of the improved, lockable gate to control public access. Also, rowing practices should be conducted so that the most sensitive wildlife habitat areas of the lagoon are avoided during the breeding season.

As described above, prohibitions on bicycle use in restricted parts of the lagoon area should be enforced, improvements should be made to entry areas to Lagoon Island and Goleta Point to discourage bicycle access, and informational signs should be posted to explain the reasons for these restrictions. Also, biking should be prohibited in the West Lagoon Park management zone except on paved roads or paths. Biking should be permitted on new, paved paths or roads that are constructed in this area as part of future plans to develop the park.

The present management of the beach areas should be maintained, except that the damaged portions of the sand dune areas should be protected and allowed to revegetate naturally. Impacts on vegetation and the dunes have been fairly severe in this area because of extensive use. Protecting the dune areas and designating paths to the beach may help reduce dune area impacts. The operation and use of designated fire rings at the beach and dune areas should continue to be maintained without additions or changes.

The restroom at the East Beach management zone should continue to be managed for public use, and access should be improved for physically challenged people. Access improvements should be a part of improvements to the east lagoon barrier when the seawater system replacement project is constructed.

Education and Research Activities

The lagoon area provides excellent opportunities for education and research activities on the UCSB campus. These uses of the lagoon area should continue to be actively encouraged.

The lagoon area also provides excellent opportunities for environmental education because many people use the area and it contains a variety of habitat types and other opportunities for interpretation. Information regarding other public use restrictions in the management area should be combined with interpretation and environmental education whenever possible. Interpretive exhibits should be placed at important entrances to sensitive areas of the lagoon and in other areas where such opportunities exist. Some possible locations for placing interpretive exhibits are shown in Figure 3-1. Three high-priority, primary locations for interpretive and use restriction information are identified; additional lower-priority, secondary locations are also indicated. Exhibits should be designed to be durable and resist vandalism. Themes should focus on interpreting the unique environmental and cultural aspects of the lagoon area.

Management Actions

Goal PU: Provide improved, high-quality, and safe public use opportunities that are consistent with other purposes of the management area.

Objective PU-1: Maintain and improve public access opportunities for the lagoon area.

Action PU-1.1: Parking areas and access routes should continue to be maintained in accordance with UCSB and CCC policy. UCSB should continue to make available and maintain access routes throughout the management area for public use.

Action PU-1.2: Informational signs should continue to be maintained at the parking areas. When informational signs are removed or damaged beyond repair, new signs that are more resistant to vandalism should be installed by UCSB as replacements.

Action PU-1.3: All currently available vehicle access routes for emergency services, maintenance, and other UCSB-authorized purposes should be maintained as necessary for public safety in the lagoon area.

Action PU-1.4: Traditional access routes to beaches and other important destinations through and into the management area should be maintained in a manner that causes the least amount of environmental damage to the area. (See also ES-1.2, ES-1.3, and ES-1.5.)

Action PU-1.5: Two volunteer trails leading into the management area on the steep slope near the San Miguel dormitory could be improved to maintain access and reduce environmental impacts on the rest of the slope, or barriers should be installed to discourage students from using the slope as a shortcut. (See also ES-1.1.)

Action PU-1.6: For new facilities developed in the management area, UCSB should adhere to its existing policy (in accordance with state and federal requirements) to provide full and equal access to all new facilities for people, including those who are physically challenged, where it is feasible and not restricted because of topographical and environmental constraints.

Action PU-1.7: For any educational or other public use facilities (e.g., interpretive trails, exhibits, or overlooks) planned to be constructed on Goleta Point or Lagoon Island, UCSB should carefully consider the environmental impacts and costs of constructing these facilities and work with local interest groups to develop appropriate ways to meet federal and state requirements for providing full access.

Objective PU-2: Control public access in the lagoon area to reduce environmental impacts.

Action PU-2.1: Restrictions on bicycles should continue to be enforced on a regular basis by UCSB police and student workers for all areas where bicycle riding is restricted in the management area (e.g., Lagoon Island and Goleta Point) (see also discussion under "Erosion and Slope Management").

Action PU-2.2: Bicycle riding should continue to be prohibited in the West Lagoon Park management zone except on paved surfaces that are present now or are planned with future development of the park. (See also ES-1.1 and PU-2.5.)

Action PU-2.3: To discourage bicycle access to Goleta Point and Lagoon Island, informational signs and barriers should be installed, and entry points and fences should be improved at the existing bicycle access points to these areas. (See also ES-1.2 and ES-1.3.)

Action PU-2.4: UCSB should implement a variety of techniques and programs to involve and educate people about ways to reduce erosion in the management area (e.g., interpretive exhibits, printed informational materials, involvement by student groups in organized activities to encourage awareness and self-policing). (See also PU-5.1.)

Action PU-2.5: To protect and repair the eroded east-facing slope of the west bluff in the southern portion of the West Lagoon Park management zone, barriers should be installed at the top of the slope; an informational sign should be installed to help direct people to the access path to the beach; eroded parts of the slope should be allowed to revegetate; the existing accessible path down the slope should continue to be maintained; and emergency vehicle access should be maintained along the improved, full-access path from the west bluff to the beach area. All improvements should avoid impacts on special-status plants in this area. (See also ES-1.5, VH-2.5, PU-2.2, and ES-2.1.)

Action PU-2.6: In both sand dune areas in the South Beach management zone, barriers and informational signs should be placed to discourage traffic in these sensitive dune areas, essential paths (at least two in each dune area) should be designated for public access, and remaining nonessential trails should be allowed to revegetate naturally. (See also ES-3.2 and VH-2.2.)

Action PU-2.7: Proposed improvements to the east lagoon barrier should be constructed to maintain and improve public access from the Main Campus to the beach and Goleta Point as part of the proposed seawater system replacement project and subject to review and approval by the Regents and CCC. Proposed access improvements as part of this project include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, and providing stairs to the beach at the pumphouse. (See also ES-3.1 and A-1.2.)

Objective PU-3: Maintain and improve public safety and access for emergency service vehicles at the lagoon area.

Action PU-3.1: All existing emergency service vehicle access routes should continue to be maintained in the lagoon area, including all vehicle entry points and paved roads shown in Figure 3-2. (See also PU-2.5 and ES-1.5.)

Action PU-3.2: Proposed improvements should be made to the east lagoon barrier for emergency vehicle access as part of the seawater system replacement project; these include placing a removable bollard across the access road near the marine laboratory for

emergency access, paving the road on top of the barrier, and providing a hammerhead turnaround at the base of the north-facing bluff. (See also ES-3.1 and PU-2.7.)

Action PU-3.3: The eucalyptus groves in the North Margin management zone should continue to be maintained by gradual thinning and permanent removal of some trees identified in coordination with the campus fire marshal to reduce fire danger and for other purposes. As opportunities become available, native trees, shrubs, and groundcovers should be established to replace and improve the wildlife habitat values lost from the eucalyptus trees but maintain a low fire hazard. Eucalyptus trees identified as important roosting or nesting habitat should be retained until their habitat value is provided by native vegetation, and all eucalyptus trees with 4-inch or less calipers should be removed and controlled regularly. (See also VH-2.4 and VH-3.1.)

Action PU-3.4: Mowing to create firebreaks on Lagoon Island should be coordinated with the campus fire marshal and performed as necessary to protect public safety. (See also VH-
1.3.)

Action PU-3.5: To reduce the danger of people falling or being struck by falling debris, low barriers that would not be visually intrusive should be permanently installed along and near the steep coastal bluff edges at Lagoon Island and Goleta Point. (See also ES-2.1.)

Objective PU-4: Maintain and improve activities and facilities that are appropriate in the management area and are consistent with other purposes for the area.

Action PU-4.1: The annual commencement ceremony and other events should continue to be conducted at the Commencement Green in areas that do not adversely affect or interfere with the new wetland area.

Action PU-4.2: Use of the lagoon for rowing practice by the UCSB crew team should continue to be permitted, provided the intensity of use remains at or below its current level and it is conducted so that the most sensitive wildlife habitat areas at the lagoon are avoided during the breeding season.

Action PU-4.3: Present facilities (e.g., metal fire rings) and management of the beach areas should continue without alternation or increase.

Objective PU-5: Maintain and actively encourage use of the lagoon area for teaching and passive recreation activities that are appropriate and consistent with other purposes of the management area.

Action PU-5.1: Interpretive exhibits should be placed at three important primary, high-priority entry points to sensitive areas of the lagoon and possibly in other secondary areas where interpretive opportunities may exist. Exhibits should be designed to be durable and resist vandalism. Themes will focus on interpreting the unique environmental and cultural aspects of the lagoon area. (See also PU-2.4.)

CULTURAL RESOURCE MANAGEMENT

Management Rationale

Only one recorded archeological site is present in the management area. This site (SBa563) is considered of scientific importance and is located on top of the mesa in the Goleta Point management zone. It consists of a dense shell mound, or midden, about 50 feet in diameter, and was probably associated with a prehistoric base camp. Some of the midden was removed and asphalt paving placed on a portion of it in 1948, while the military occupied the campus area. (MacKay 1992.)

Cultural resources are protected by federal and state laws and should be managed to protect their integrity and preserve them. The site described above should be preserved and protected by essentially leaving it undisturbed. No driving of vehicles, digging, planting, or removal of plants should occur in or immediately around the site; plants should be allowed to establish naturally at this location. Also, the asphalt paving that presently covers the site should not be removed or disturbed in any way because it helps to protect the site and removing it could cause damage.

Other sites or artifacts of historic or archeological importance may exist in the management area. If any are discovered, they should be reported to local authorities and the proper steps taken to protect them. Also, before any groundbreaking activities can be conducted in the management area, UCSB must comply with applicable laws and regulations for avoiding impacts on important cultural resources.

Management Actions

Goal CR: Protect important cultural resources in the management area.

Objective CR-1: Protect and preserve known cultural resource sites and any new sites that may be discovered, consistent with applicable laws, regulations, UCSB policies, and mitigation measures identified in the LRDP EIR and elsewhere.

> **Action CR-1.1**: The known cultural resource site on Goleta Point will be preserved and protected by not driving vehicles, digging, planting, removing plants, removing or disturbing the existing asphalt paving that presently covers a portion of the area, or in any other way disturbing the site or the area immediately around the site.
>
> **Action CR-1.2**: If any new sites or artifacts of historic or archeological importance are discovered in the management area by UCSB, they will be reported to local authorities and the proper steps taken to protect them.
>
> **Action CR-1.3**: Before any groundbreaking activities are conducted in the management area, UCSB will comply with applicable laws and regulations for avoiding impacts on important cultural resources.

AESTHETIC MANAGEMENT

Management Rationale

The visual character of the Campus Lagoon management area is mostly natural and of high quality. Important views from the management area are of the ocean, coastline, distant hills, the Main Campus area, and most areas visible from within the lagoon area itself. Within the management area, important views include those of the coastal bluffs, areas of vegetation, the beaches, the rocky point, wildlife, and the lagoon itself. Important views of the lagoon area are from areas on the Main Campus where large numbers of people gather, including areas in and around the University Center and Commencement Green. Other important viewing areas are the road along the north lagoon margin, the east bluff near the marine laboratory, the Pearl Chase Memorial Garden, the west bluff, and several residence halls.

Low-quality views within the management area are of eroded slopes and paths; the eroded east face of the east lagoon barrier, including sand bags and plastic pipes; some trash and debris in the lagoon; and small built elements, including the outflow weir and the two discharge pipes near the marine laboratory.

The high visual quality of the management area could be improved and preserved by eliminating or reducing the visual impacts associated with visually intrusive elements. Eroded slopes and paths should be allowed to revegetate as described in the "Erosion and Slope Management" section. The eroded east face of the east lagoon barrier should be improved for aesthetic purposes as part of the seawater system replacement project improvements. Visual quality of the barrier would be improved by replacing the sand bags with a permanent rock revetment that blends with the surrounding rocks and existing revetments, removing the large plastic pipes in the east face, and improving the appearance of the pumphouse. The outflow weir at the south end of the west arm should be replaced, when improvements are made for water quality and circulation, with a structure that is more visually pleasing and less obtrusive. The two discharge pipes near the marine laboratory should be improved in appearance or screened as part of the seawater system replacement project. In addition, trash and debris in the lagoon should continue to be cleaned up on a regular basis.

To preserve the high visual quality of the management area, important views and visual features in the area should be maintained and protected. Any new elements that are constructed in or adjacent to the management area (e.g., student housing, paths, and landscaping on the west bluff [Figure 3-10]) should be carefully designed to blend with their surroundings and the visual character of the lagoon area. Features such as fences, barriers, stairs, paths, ramps, and signs should be designed to have a low profile and use earthtone colors. Bright or highly reflective surfaces on structures or signs would generally be inappropriate. Appropriate materials may include wood, stone, and other natural appearing materials. Using native plants to help screen built elements would be generally appropriate. Plantings should be placed carefully to avoid interfering with or screening important views in, of, from, or through the lagoon area.

Management Actions

Management Goal A: Preserve and improve the visual quality of and enhance viewing opportunities in the management area.

Objective A-1: Improve the visual quality of the management area by reducing intrusive visual features.

Action A-1.1: Eroded slopes and paths should be allowed to revegetate as described in the "Erosion and Slope Management" section.

Action A-1.2: The eroded east face of the east lagoon barrier should be improved for aesthetic purposes as part of the seawater system replacement project improvements, by replacing the sand bags with a permanent rock revetment that blends with the surrounding rocks and existing revetments, removing the large plastic pipes in the east face, and improving the appearance of the pumphouse.

Action A-1.3: The outflow weir at the south end of the west arm should be replaced, when improvements are made for water quality and circulation, with a structure that is more visually pleasing and less obtrusive.

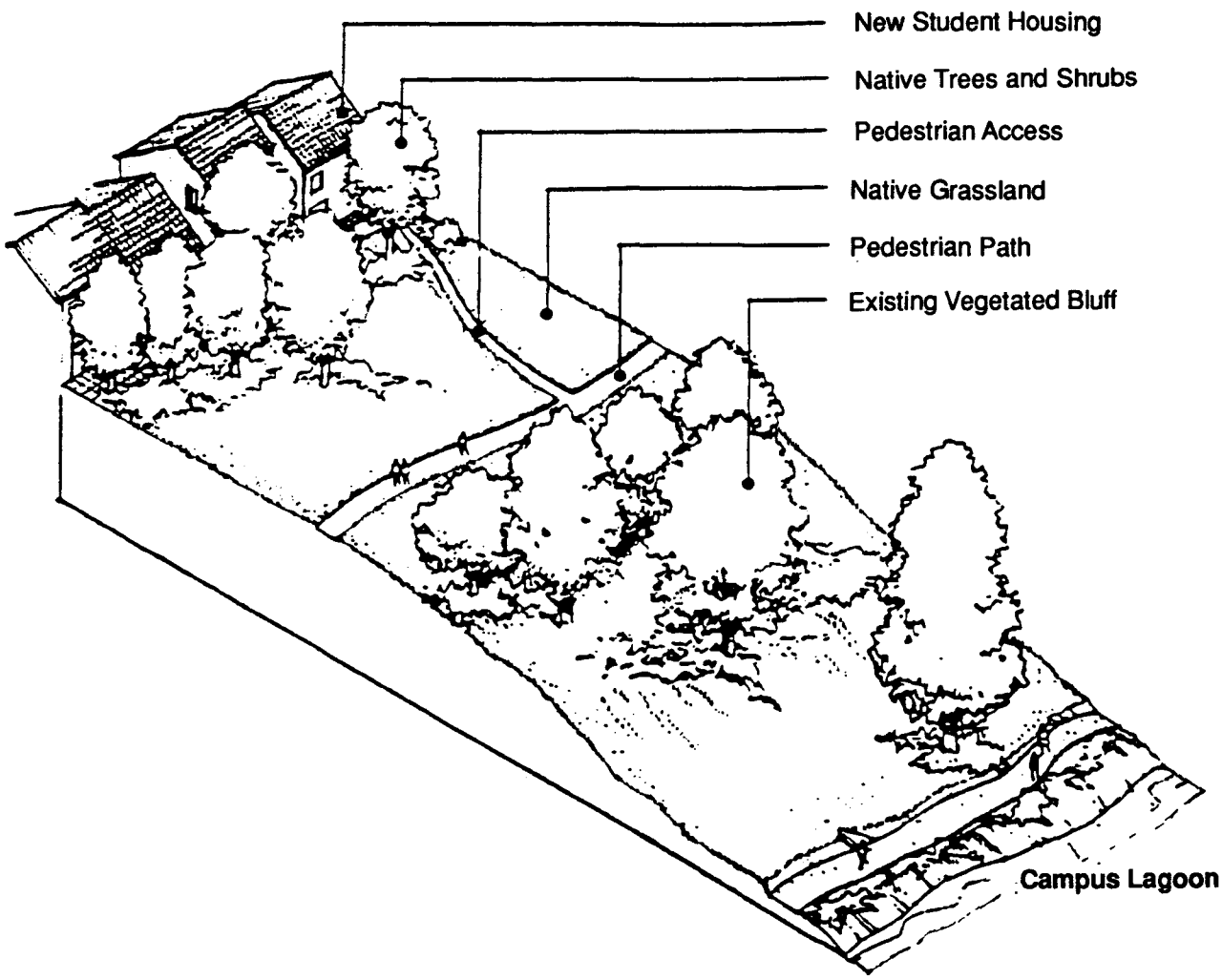
Action A-1.4: The two discharge pipes near the marine laboratory should be improved in appearance or screened as part of the seawater system replacement project.

Action A-1.5: Trash and debris in the lagoon should continue to be cleaned up on a regular basis.

Objective A-2: Preserve the visual quality of the management area by maintaining important views and protecting visual features.

Action A-2.1: Any new elements (e.g., fences, barriers, stairs, and signs) that are constructed in or adjacent to the management area should be designed carefully to blend with their surroundings and the visual character of the lagoon area by avoiding use of bright or highly reflective surfaces and inappropriate materials or colors; being of small scale and low profile; and using primarily earthtone colors and natural- appearing materials.

Action A-2.2: For all new plantings installed in or adjacent to the lagoon management area, use of native plants should be emphasized and plants should be placed carefully to avoid interfering with or screening important views in, of, from, or through the lagoon area.



Source: Long Range Development Plan, 1990

Jones & Stokes Associates, Inc.

Figure 3-10.
Illustration for Lagoon Park

Chapter 4. Management Implementation Plan

This chapter of the management plan outlines the recommended strategy for implementing the actions described in Chapter 3.

The approach used in this program is to focus on the actions that incrementally will have greatest yield in improving the Lagoon area by protecting the exiting biological resources of most merit and making the area more enjoyable for campus and community visitors.

A more ambitious program was initially considered, including complete removal of exotic plants, extensive replanting of native species, large scale habitat restoration, comprehensive hydrologic studies, and extensive visitor improvements. The cost of that approach was estimated to be over $1.5 million. After consultation with University biological sciences faculty and campus administrators the program was thought to be infeasible because of its high initial cost, difficulty in maintaining with existing staffing, and incompatibility with large number of users who value the area for its aesthetic and recreational character. With no identified funding source to implement the prior plan, the recommended approach seeks to strike a balance between biological resource needs, visitor uses, and the limited funding likely to be available.

Consultation

In the course of preparing this draft plan, consultation has occurred with biological sciences faculty, Museum of Systematics and Ecology staff and Facilities Management to identify the most effective way of managing this area. Consultation with faculty included professors Scott Cooper, Bruce Mahall, John Melack, Leal Mertes and Russell Schmidt. Wayne Ferren Jr. and Mark Holmgren from the Museum of Systematics and Ecology were also consulted for their expertise on local botany and zoology.

Management Approach

Special consideration was given to the traditional project management approach used to create and expand the wetlands south of the University Center (UCen wetlands) versus the approach used to restore the campus bluffs along University Road, known as the North Bluffs restoration project. The UCen wetlands project was a traditional University capital improvement project involving the use of specialized designers and consultants who prepared construction and contract documents for competitive bidding. The lowest cost bid was awarded to a contractor who constructed the project. Long term maintenance is to be provided by grounds staff with existing resources.

The North Bluffs restoration project was funded by a private developer fee exaction to replace lost habitat near Lake Los Carneros. The funds were limited and non-reoccurring,

so the approach was to transfer the funds to the Museum of Systematics and Ecology who operated under a simple working plan and concept. The Museum Director, Wayne Ferren, Jr., recruited a core group and combined it with students, former students, and community volunteers. They used the existing Storke Campus Greenhouse as a plant nursery, rented the necessary equipment, purchased the supplies to remove invasive, non-native plants and are restoring the bluffs as an Oak Woodland. The restoration project was consistent with the Long Range Development Plan and Campus Wetlands Plan, so only a working concept or plan was necessary. No specialized consultants were engaged because of the extensive expertise of Museum staff. Students and volunteers reduced labor costs. An extensive amount of informal coordination occurred between academic departments, their students, and Facilities Management staff to make the project work. Maintenance is expected to be minimal once the plants are established. The involvement of so many different people from the campus-community offers a large pool of potential volunteers who can assist Grounds staff in keeping the area well maintained.

In the last two years the UCSB Habitat Restoration Club has taken responsibility for other restoration projects on campus. Most recently the club has adopted the Lagoon bluffs between Ortega Commons and San Nicholas Hall. They are restoring the area with native coastal sage scrub vegetation to stabilize the slope, reduce soil erosion and enhance the area's visual character and ecological value. The improvements to the remnant riparian wetland and drainage channel south of Old Pool are also a Restoration Club project. Student volunteers have cleared and replanted this long overlooked area of the central campus.

Management Actions and Costs

Based on the results of campus consultation and the success of the North Campus Bluffs restoration project, the recommended approach for implementing the Lagoon Management Plan is to designate the Museum of Systematics and Ecology as the responsible unit for implementing the actions of the plan. The Museum requires at least 0.5 FTE for an annual cost of $33,500 to perform the work. The capital cost of improvement projects would be approximately $387,000 to be spread over 5 years based on the priorities discussed below.

The Natural Reserve Committee is also considering the need for a 0.5 FTE for a Coal Oil Point Reserve steward in connection with the North Campus housing program and proposed addition to the Reserve. These separate part-time functions could be combined so that there was one funded position with responsibility for maintaining and improving the environmentally sensitive areas of the campus. Currently, there is no single person or position responsible for improvements to the natural areas of the campus. Improvements are typically made two ways: 1. requirements of regulatory approvals for campus development projects and 2. small *ad hoc* projects as funding and staff time permits.

Extramural Funding

Based on this draft plan, UCSB applied for State Transportation Enhancement Activity (TEA) funding to construct the coastal access improvements in the Lagoon Island area, such as the stairways and bluffs fencing. The application was one of five projects the Santa Barbara County Association of Governments (SBCAG) staff recommended in March 1996 to be forwarded to the State Transportation Commission for funding. Unfortunately, UCSB's application was one of two projects SBCAG dropped in favor of funding the

purchase of the Wilcox property. UCSB has forwarded the proposal for funding from the Petroleum Violation Escrow Account, and expects to be notified by July 1996 if this application has been successful.

If funding is received from this source it will reduce the capital costs of the recommended program, however, there is no guarantee of extramural funding.

In terms of implementation, management actions have been organized into three categories:

1. One-time capital improvements for "hardscape" elements such as fences, and stairways and major restoration projects such as in the sand-dunes areas;

2. Continuing vegetation and habitat management activities such as controlling invasive exotic plants, replanting, supervising students and volunteers;

3. Existing operations and maintenance activities.

Category 1

These capital projects would be phased over 5 years, beginning in 1997-98 by replacing the outflow weir at the eastern end of the Lagoon. The weir is the first priority because of its poor condition, likelihood of failure, and the basic need to control inflow and outflow of Lagoon water to manage the area. In 1988-89, the focus will be on visitor improvements such as stairs and bicycle barriers. These improvements will enhance the area for pedestrians, concentrate visitors to specific areas, and make it more difficult for bicycles to compact the soil, destroy plant life, and increase erosion. In 1999-2000, barriers would be erected to protect special status plants and the circulation system re-worked to confine access to defined trails and repair the road used for emergency access. In 2000-01, invasive plants would be removed and some revegetation of the dunes would occur. Interpretive signs would be posted for visitor education and some rehabilitation would occur for the discontinued trails if they had not recovered. Lastly, in anticipation of greater use in part because the area has been improved, selected portions of the bluff would be fenced to discourage erosion and provide an additional measure of public safety.

The total amount of funding needed for these projects would be approximately $378,00.00. The projects will be implemented in order of priority as set out below. The estimate of costs is a general estimate based on the best available information and extensive discussions between the Office of Budget and Planning and Facilities Management staff.

The program would be administered by the Museum of Systematics and Ecology. Museum staff would contract with Facilities Management or outside contractors, as they determined to be necessary.

The Director of the Museum of Systematics and Ecology would prepare an annual report identifying upcoming priorities and funding needs. This report would be submitted to the Office of Budget and Planning and would be the basis for determining the amount of funds released for the following year.

A key component of the Lagoon's preservation is the revetment near the Marine Laboratory. It is not included in this program because it is part of the comprehensive upgrading of the Marine Laboratory and Seawater System Replacement Project currently included for funding in the Five-year State Funded Major Capital Improvement Program.

Year	Item	Estimated Costs
1997 - 98	Outflow weir	$95,000
1998 - 99	Campus Point Island north entrance, stairs & bicycle barriers	$40,000
	Lagoon Island west entrance, stairs & bicycle barriers	$43,000
1999 - 00	Protection of special status plants	$7,000
	Divert paths around highly eroded slopes and install barriers	$40,000
	Patch access road	$15,000
2000 - 01	Invasive plant removal and dune revegetation	28,000
	Interpretive exhibits	$36,000
	Rehabilitation and closure of paths	$43,000
2001 - 02	Bluff fencing	$40,000
	TOTAL	**$387,000**

Category 2

With annual funding of $33,500 the Museum would be responsible for implementing the vegetation and habitat management work described in the plan. There are a number of reasons to think the Museum is the logical place to coordinate efforts of this sort.

- Successful track record of similar projects,
- Well situated to work with community or UCSB volunteers such as the Habitat Restoration Club,
- Extensive botanical and zoological knowledge required for this type of work, and
- Ability to coordinate restoration work with instructional opportunities.

The instructional aspects of the implementation program is a key component of the recommended approach. The annual funding would go much further if portions of the work is performed by volunteers or as part of class exercises. It is anticipated that Museum staff will use some of the funding to seek grants.

To monitor implementation of the plan, the Director of the Museum of Systematics and Ecology would prepare an annual status report describing management actions accomplished during the preceding year, and submit it to the Office of Budget and Planning, for distribution to members of the Wetlands Committee and Landscape Committee.

Category 3

Existing campus activities that are related to management of the lagoon area include such things as maintenance of the outflow weir, roads, fences, stairways, and parking lots, replacement of signs, and law enforcement. The Management Plan assumes the existing activities and responsibilities of Police, Fire, Environmental Health & Safety and Facilities Management will continue. The current maintenance of the campus physical plant would be

supplemented by new habitat management activities under the direction of the Museum. The additional burden of maintaining these areas would not fall to existing Grounds personnel who are already committed to maintaining the more urbanized portions of the campus.

Summary of Management Actions by Category

The remainder of this chapter of the management plan summarizes the management actions described in Chapter 3. The management actions are listed in Chapter 3 in order of the Management Elements: Erosion and Slope Management, Hydrology Management; Water Quality Management; Vegetation Management and Habitat Improvements; Public Use; Cultural Resource Management; and Aesthetic Management. This summary lists them under the three categories described earlier in this chapter. The Category 1 management actions are prioritized and Category 2 and 3 management actions are not prioritized. A portion of the Category 2 actions are prioritized in Chapter 3, where Table 3-2 lists priorities for managing invasive exotic plants.

The management actions referenced in this Summary are described in more complete detail in Chapter 3. References are furnished so the reader can refer to the full context of the actions and their objectives. Cross-references are provided because there is some repetition between the management actions as they are identified in Chapter 3.

CAPITAL IMPROVEMENTS (Category 1)
In order of priority

Outflow Weir

Construct a new overflow weir and outflow structure to replace the existing weir and outflow at the western terminus. References: Action H-1.1, WQ-1.1, SQ-1 and A-1.3.

Bicycle Barriers, Entrances and Stairs

Construct a gate structure, install an informational sign, and improve the existing fence near the base of the west slope of Lagoon Island. References: Action ES-1.2, PU 1.4, 1.6, and 2.3.

Improve the existing wooden entry structure, install an informational sign, and improve the existing fence at the south end of the East Margin management zone near the base of the north slope of Campus Point. References: Action ES-1.3, and PU 2.3.

Install informational signs and barriers, and improve entry points and fences at the existing bicycle access points to Campus Point and Lagoon Island to discourage bicycle access. References: Action PU-2.3, ES-1.2, and ES-1.3.

Barrier fencing and major revegetation projects (protect special-status plants, steep slopes & highly eroded areas.

Construct physical barriers around special-status plant species, and install informational signs to educate people about the special-status species. References: Action VH-1.2, and Objective PU-2.5

Install barriers at the top of the eroded east-facing slope of the west bluff in the southern portion of the West Lagoon Park management zone; install an informational sign to help direct people to the access path to the beach; allow eroded parts of the slope to revegetate; continue to maintain the existing accessible path down the slope; and maintain emergency vehicle access along the improved, full-access path from the west bluff to the beach area. All improvements should avoid impacts on special-status plants in this area. References: Action PU-2.5, ES-1.5, VH-2.5, PU-2.2, and ES-2.1.)

Install structural and vegetative barriers around eroded areas and install informational signs. References: Action ES-1.1, PU-1.5, and PU-2.2.

Install barriers at entries to already eroded areas and nonessential paths. References: Action ES-1.4.

Repair damaged areas (bluff edges and steep slopes) using structural techniques. References: Action ES-2.1, and PU-3.5.

Install barriers and informational signs in both sand dune areas in the South Beach management zone, to discourage traffic in these sensitive dune areas, designate essential paths (at least two in each dune area) for public access, and allow remaining nonessential trails to revegetate naturally. References: Action PU-2.6, ES-3.2, and VH-2.2.

Interpretive Exhibits

Place interpretive exhibits at three important primary, high-priority entry points to sensitive areas of the lagoon and possibly in other secondary areas where interpretive opportunities may exist. Exhibits should be designed to be durable and resist vandalism. Themes will focus on interpreting the unique environmental and cultural aspects of the lagoon area. References: Action PU-5.1 and PU-2.4.

Bluff Fencing

Install low fences and barriers along the south-facing edges of the coastal bluffs in the West Lagoon Park and Lagoon Island management zones, and along the south- and east-facing bluff edges in the Campus Point management zone. References: Action ES-2.1 and PU-3.5.

Permanently install low barriers that would not be visually intrusive along and near the steep coastal bluff edges at Lagoon Island and Campus Point. References: Action PU-3.5 and ES-2.1.

Revetment

Improve the east lagoon barrier as part of the comprehensive upgrading of the Marine Laboratory and seawater system replacement project and as approved by the Regents and the CCC. References: Action ES-3.1 and PU-2.7.

Subject to review and approval by the Regents and CCC, construct proposed improvements to the east lagoon barrier to maintain and improve public access from the Main Campus to the beach and Campus Point as part of the proposed seawater system replacement project. Proposed access improvements as part of this project include regrading the existing access road down the slope to the barrier, providing a ramp for full access to the beach and restrooms, and providing stairs to the beach at the pumphouse. References: Action PU-2.7, ES-3.1 and A-1.2.

Proposed improvements to the east lagoon barrier should include provision for emergency vehicle access, including: placing a removable bollard across the access road near the marine laboratory for emergency access; paving the road on top of the barrier; and providing a hammerhead turnaround at the base of the north-facing bluff. References: Action PU-3.2, ES-3.1 and PU-2.7.

Proposed improvements to the east lagoon barrier should include improving the eroded east face for aesthetic purposes, by replacing the sand bags with a permanent rock revetment that blends with the surrounding rocks and existing revetments, removing the large plastic pipes in the east face, and improving the appearance of the pumphouse. References: Action A-1.2:

Development Guidelines

Adhere to existing policy (in accordance with state and federal requirements) to provide full and equal access to all new facilities for people, including those who are physically challenged, where it is feasible and not restricted because of topographical and environmental constraints. References: Action PU-1.6

For any educational or other public use facilities (e.g., interpretive trails, exhibits, or overlooks) planned to be constructed on Campus Point or Lagoon Island, UCSB should carefully consider the environmental impacts and costs of constructing these facilities and work with local interest groups to develop appropriate ways to meet federal and state requirements for providing full access. References: Action PU-1.7

Carefully design any new elements (e.g., fences, barriers, stairs, and signs) that are constructed in or adjacent to the management area to blend with their surroundings and the visual character of the lagoon area by avoiding use of bright or highly reflective surfaces and inappropriate materials or colors; being of small scale and low

profile; and using primarily earth tones colors and natural- appearing materials. References: Action A-2.1

Replace the outflow weir at the south end of the west arm with a structure that is more visually pleasing and less obtrusive. References: Action A-1.3:

Improve the appearance of or screen the two discharge pipes near the marine laboratory as part of the seawater system replacement project. References: Action A-1.4:

CONTINUING MANAGEMENT ACTIVITIES (Category 2)
Not in order of priority

Maintain the existing natural surface of well-established essential paths in a manner that is appropriate to the natural character of the area. References: Action ES-1.5.

Repair damaged areas (bluff edges and steep slopes) using revegetation techniques, and public education and awareness programs. References: Action ES-2.1 and PU-3.8.

Revegetate severely eroded areas along the top of the bluffs with native plants, and, where possible repair eroded drainage's or direct drainage away from problem areas. References: Action ES-2.2 and PU-2.5.

Monitor and stabilize the two lagoon barriers located on either side of Lagoon Island primarily through revegetation and control of public access. References: Action ES-3.2 and PU-2.6.

Operate the new overflow weir to maintain water levels to support wetland vegetation along the lagoon margins, based on monitoring described in Action H-3.1. Reference: Action H-2.1

Install a staff gauge at the overflow weir and monitor lagoon water levels periodically from July to October and during significant storm events year round. Another staff gauge could be placed near the marine laboratory outfalls to facilitate quick access by maintenance personnel. References: Action H-3.1 H-1.1 and H-2.1.

Operate the new overflow weir to increase lagoon circulation and stabilize salinity as much as possible and coordinate with monitoring actions described below. References: Action WQ-1.1, H-1.1, H-2.1, and H-3.1.

Existing non-structural BMPs being implemented as required in the LRDP should continue to be implemented and should focus on reducing pollutants in stormwater while maintaining flows. Other BMPs that will be evaluated for implementation in this program are as follows:

- Regularly inspect and clean out culverts and storm drains draining to the lagoon.
- Identify disturbed, erodible, or bare soils in the watershed and cover or revegetate important areas to reduce erosion and sedimentation.
- Develop and conduct a public education/participation program to inform UCSB staff, students, and faculty about ways to improve lagoon water quality. The program should explain the lagoon ecosystem, the stormwater drainage system, the potential sources of pollutants entering the lagoon, and the need for BMPs to reduce pollutant levels. Reference: Action WQ-2.1

A monitoring program should be implemented that includes inorganic parameters such as nitrate, phosphate, suspended solids, and total dissolved solids every month from May through October at three points in the lagoon: near the seawater discharge, near the overflow weir, and at the dock at the northwest end of the lagoon. Temperature, pH, specific conductance, and dissolved oxygen content also should be monitored. Reference: Action WQ-3.1

Control invasive exotic plants using appropriate chemical and mechanical methods to reduce their adverse effects on special-status plant species and other native plant habitats in areas (e.g. vernal pools and coastal sand dunes) that may contain special-status plants. Reference: Action VH-1.1:

Monitor and map the populations of special-status plant species. References: Action VH-1.2 and actions under Objective PU-2.

Coordinate with the campus fire marshal to determine whether it is necessary for public safety to continue mowing firebreaks. References: Action VH-1.3 and PU-3.7.

Retain outstanding ornamental plant specimens . References: Action VH-1.4

Protect saltmarsh habitat and, as opportunities become available, enhance saltmarsh habitat along the lagoon margin through revegetation and water management based on evaluation of the existing saltmarsh enhancement efforts in the wetlands management zone. References: Action VH-2.1, H-2.1, WQ-1.1, and WQ-2.1.

Protect coastal dune vegetation and, as opportunities become available, enhance coastal dune vegetation on the bare sand dune areas through revegetation and planting once invasive exotic plants have been controlled. References: Action VH-2.2, VH-1.1, and PU-2.6.

Protect California sagebrush series vegetation and, as opportunities become available, enhance California sagebrush series vegetation along the coastal bluffs, once invasive exotic plants have been controlled, by collecting, growing, and planting native plants or through natural revegetation resulting from other protection efforts. References: Action VH-2.3, ES-1.1, ES-2.1, and PU-2.4.

Control eucalyptus trees in the North Margin management zone and gradually replace with native trees and shrubs. References: Action VH-2.4, VH-3.1, and PU-3.3.

Protect vernal pools and, if possible, restore Vernal pools in the West Lagoon Park management zone by controlling public access; controlling invasive exotic plants; monitoring conditions of the pools; and implementing an enhancement plan to improve the functions and values of the vernal pools, if necessary. References: Action VH-2.5 and PU-2.5.

Temporarily protect some eucalyptus trees in the North Lagoon Margin management zone and retain as habitat for herons and raptors and gradually thin and remove most trees and replace with native plants as opportunities become available. Minimize human disturbance within 300 feet of the known nesting locations for heron, owl, and

other raptors in eucalyptus trees during the breeding season (January 1-August 1). References: Action VH-3.1, VH-2.4 and PU-3.3.

Retain snags whenever possible, when they do not create a public safety hazard, to preserve nest and roost cavities and perches for wildlife. References: Action VH-3.2

As opportunities become available, additional roosting and rearing habitat for bats could be created by constructing, placing, and maintaining bat boxes in appropriate locations and monitoring their use. References: Action VH-5.1

As opportunities become available, habitat islands and water bird roosts could be constructed in the lagoon. References: Action VH-5.2

Improve two volunteer trails leading into the management area on the steep slope near the San Miguel dormitory to maintain access and reduce environmental impacts on the rest of the slope, or install barriers to discourage students from using the slope as a shortcut. References: Action PU-1.5 and ES-1.1.

Implement a variety of techniques and programs to involve and educate people about ways to reduce erosion in the management area (e.g., interpretive exhibits, printed informational materials, involvement by student groups in organized activities to encourage awareness and self-policing). References: Action PU-2.4 and PU-5.1.

Continue to maintain the eucalyptus groves in the North Margin management zone by gradual thinning and permanent removal of some trees identified in coordination with the campus fire marshal to reduce fire danger and for other purposes. As opportunities become available, establish native trees, shrubs, and ground covers to replace and improve the wildlife habitat values lost from the eucalyptus trees but maintain a low fire hazard. Retain eucalyptus trees identified as important roosting or nesting habitat until their habitat value is provided by native vegetation, and regularly remove all eucalyptus trees with 4-inch or less calipers . References: Action PU-3.3, VH-2.4 and VH-3.1.

Coordinate with the campus fire marshal on mowing to create firebreaks on Lagoon Island as necessary to protect public safety. References: Action PU-3.4 and VH-1.3.

Allow eroded slopes and paths to revegetate as described in the "Erosion and Slope Management" section. References: Action A-1.1

Development Guidelines

For all new plantings installed in or adjacent to the lagoon management area, use of native plants should be emphasized and plants should be placed carefully to avoid interfering with or screening important views in, of, from, or through the lagoon area. References: Action A-2.2:

EXISTING OPERATIONS AND MAINTENANCE ACTIVITIES (Category 3)
Not in order of priority

Existing non-structural BMPs being implemented as required in the LRDP should continue to be implemented and should focus on reducing pollutants in stormwater while maintaining flows. BMPs that will be continued for implementation in this program are as follows:

- Continue the program of good housekeeping practices focusing on spill prevention and cleanup, use of products that have reduced pollutant levels, and material storage controls.
- Continue to avoid the use of toxic chemicals in areas draining to the stormwater system or replace with non-toxic products.
- Continue to sweep large parking lots and roadway areas in mid-fall before the start of the rainy season.
- Continue to implement a program of vehicle leak and spill control for the UCSB vehicle fleet.
- Continue the recycling program for oil, solvents, and other hazardous materials commonly used at UCSB. References: Action WQ-2.1

Continue to implement structural BMPs in association with new projects for parking lots and other large, impervious areas to control sediment, oil and grease, and other pollutants. The BMPs to evaluate for these areas are water quality inlets, VFSs, and small detention basins. References: Action WQ-2.2

Continue to enforce existing regulations that require all dogs entering the management area to be leashed and should and, as necessary, replace signs indicating this requirement. References: Action VH-4.1

Continue to maintain parking areas and access routes in accordance with UCSB and CCC policy. Continue to make available and maintain access routes throughout the management area for public use. References: Action PU-1.1

Continue to maintain informational signs at the parking areas. When informational signs are removed or damaged beyond repair, new signs that are more resistant to vandalism should be installed by UCSB as replacements. References: Action PU-1.2

Maintain all currently available vehicle access routes for emergency services, maintenance, and other UCSB-authorized purposes as necessary for public safety in the lagoon area. References: Action PU-1.3

Maintain traditional access routes to beaches and other important destinations through and into the management area in a manner that causes the least amount of

environmental damage to the area. References: Action PU-1.4 ES-1.2, ES-1.3, and ES-1.5

Continue to conduct the annual commencement ceremony and other events should continue to be conducted at the Commencement Green in areas that do not adversely affect or interfere with the new wetland area.
References: Action PU-4.1

Continue to permit use of the lagoon for rowing practice by the UCSB crew team, provided the intensity of use remains at or below its current level and it is conducted so that the most sensitive wildlife habitat areas at the lagoon are avoided during the breeding season. References: Action PU-4.2

Continue to use present facilities (e.g., metal fire rings) and management of the beach areas without alteration or increase. References: Action PU-4.3

Protect and preserve the known cultural resource site on Campus Point by not driving vehicles, digging, planting, removing plants, removing or disturbing the existing asphalt paving that presently covers a portion of the area, or in any other way disturbing the site or the area immediately around the site. References: Action CR-1.1

If any new sites or artifacts of historic or archeological importance are discovered in the management area by UCSB, they will be reported to local authorities and the proper steps taken to protect them. References: Action CR-1.2

Before any groundbreaking activities are conducted in the management area, UCSB will comply with applicable laws and regulations for avoiding impacts on important cultural resources. References: Action CR-1.3

Continue to clean up trash and debris in the lagoon on a regular basis. References: Action A-1.5

Continue to enforce restrictions on bicycles on a regular basis (by UCSB police and student workers) for all areas where bicycle riding is restricted in the management area (e.g., Lagoon Island and Campus Point) (discussion under "Erosion and Slope Management"). References: Action PU-2.1:

Continue to be prohibit bicycle riding in the West Lagoon Park management zone except on paved surfaces that are present now or are planned with future development of the park. References: Action PU-2.2, ES-1.1 and PU-2.5.

Continue to maintain all existing emergency service vehicle access routes in the lagoon area, including all vehicle entry points and paved roads shown in Figure 3-2. References: Action PU-3.1, PU-2.5 and ES-1.5.

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Appendix A. Vascular Plants of the UCSB Campus Lagoon Management Area, Santa Barbara County, California

Appendix A. Vascular Plants of the UCSB Campus Lagoon Management Area, Santa Barbara County, California

Scientific Name	Common Name	Habit	Wetland Indicator Status	Family
Abronia maritima	Red sand-verbena	PH	.	Nyctaginaceae
Acacia longifolia +#	Golden or Sydney wattle	S	.	Fabaceae
Ambrosia chamissonis [A. c. var. bipinnatisecta; Franseria c.]	Beach bursage	PH	.	Asteraceae
Ambrosia psilostachya var. californica	Western ragweed	BH	FAC	Asteraceae
Anagallis arvensis #	Scarlet pimpernel	AH	FAC	Primulaceae
Artemisia californica	California sagebrush	S	.	Asteraceae
Artemisia douglasiana	Mugwort	PH	FACW	Asteraceae
Arundo donax #	Giant reed	PG	FACW	Poaceae
Atriplex coulteri	Coulter's saltbush	AH	FACU	Chenopodiaceae
Atriplex lentiformis var. breweri	Brewer saltbush	S	FAC	Chenopodiaceae
Atriplex leucophylla	Whiteleaf, beach saltbush/seascale	PH	FAC*	Chenopodiaceae
Atriplex patula ssp. patula [A. p. var. bracteata]	Fat hen	AH	FACW	Chenopodiaceae
Atriplex semibaccata #	Australian saltbush	PH	FAC	Chenopodiaceae
Avena fatua #	Wild oat	AG	.	Poaceae
Baccharis pilularis [ssp. consanguinea]	Coyote brush	S	.	Asteraceae
Bassia hyssopifolia #	Five-hook, smother-weed	AH	FAC	Chenopodiaceae
Beta vulgaris #	Sugar beet	PH	FACU	Apiaceae
Bougainvillea glabra +	Paper flower bougainvillea	S	.	Nyctaginaceae
Brassica rapa #	Field mustard	AH	.	Brassicaceae
Bromus diandrus #	Ripgut grass	AG	(FACU)	Poaceae
Bromus hordeaceus # [B. mollis]	Soft chess	AG	FACU-	Poaceae
Cakile maritima # [C. cakile]	European searocket	AH	FACW	Brassicaceae
Calystegia macrostegia ssp. cyclostegia	Purple-bracted morning-glory	PV	.	Convolvulaceae
Calystegia soldonella	Beach morning-glory	PV	.	Convolvulaceae
Camissonia cheiranthifolia ssp. suffruticosa [Oenothera c. ssp. s.]	Beach primrose	PH	.	Onagraceae
Camissonia micrantha	Tiny primrose	AH	.	Onagraceae
Carpobrotus chilense #+ [C. aequilateris; Mesembryanthemum c.]	Sea fig	PH/S	.	Aizoaceae
Carpobrotus edulis #+ [Mesembryanthemum e.]	Hottentot fig	PH/S	.	Aizoaceae
Ceanothus arboreus +	Island ceanothus	S	.	Rhamnaceae

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Appendix A. Vascular Plants of the UCSB Campus Lagoon Management Area, Santa Barbara County, California

Scientific Name	Common Name	Habit	Wetland Indicator Status	Family
Centaurea melitensis #	Tocalote	AH	.	Asteraceae
Chamomilla suaveolens [Matricaria matricarioides]	Pineapple weed	AH	FACU	Asteraceae
Chenopodium ambrosioides #	Mexican tea	PH	FAC	Chenopodiaceae
Chenopodium berlandieri #	Berlander's goosefoot	AH	.	Chenopodiaceae
Cortedaria jubata # [C. atacamensis]	Andean pampas grass	PG	.	Poaceae
Cotula coronopifolia #	African brass-buttons	AH	FACW+	Asteraceae
Cressa truxillensis var. truxillensis	Spreading alkali-weed	PH	FACW	Convolvulaceae
Cupressus macrocarpa +	Monterey cypress	T	.	Cupressaceae
Cuscuta salina	Marsh dodder	AV	.	Cuscutaceae
Cynodon dactylon #	Bermuda grass	PG	FAC	Poaceae
Distichlis spicata [vars. stricta, nana, stolonifera, divericata]	Saltgrass	PG	FACW	Poaceae
Encelia californica	California bush sunflower	S	.	Asteraceae
Eucalyptus caesia +	Gungurru	T	.	Myrtaceae
Eucalyptus dundasii +	Pundas-blackbutt	T	.	Myrtaceae
Eucalyptus dwyeri +	Dwyer's mallee	S	.	Myrtaceae
Eucalyptus erythronema +	Red-flowered mallee	T	.	Myrtaceae
Eucalyptus globulus Cv. 'compacta' +	Dwarf blue gum	T	.	Myrtaceae
Eucalyptus globulus +#	Tasmanian blue gum	T	.	Myrtaceae
Eucalyptus grossa +	Coarse-leaved mallee	S	.	Myrtaceae
Eucalyptus gunnii +	Cider gum	T	.	Myrtaceae
Eucalyptus incrassata + [E. angulosa, E. i. var. a.]	Ridge-fruited mallee	S/T	.	Myrtaceae
Eucalyptus kruseana +	Kruse's mallee	S	.	Myrtaceae
Eucalyptus lehmannii var. 'Max Watson' +	Fingerstall gum	S	.	Myrtaceae
Eucalyptus lehmannii +	Bushy yate	S	.	Myrtaceae
Eucalyptus maculata +	Spotted gum	T	.	Myrtaceae
Eucalyptus melliodora +	Yellow box	T	.	Myrtaceae
Eucalyptus nicholii +	Nichol's willow-leaved peppermint	T	.	Myrtaceae
Eucalyptus odontocarpa +	Teeth-fruited gum	S/T	.	Myrtaceae
Eucalyptus perriniana +	Round-leaved snow gum	T	.	Myrtaceae

Appendix A. Vascular Plants of the UCSB Campus Lagoon Management Area, Santa Barbara County, California

Scientific Name	Common Name	Habit	Wetland Indicator Status	Family
Eucalyptus platypus +	Round-leaved moort	T	.	Myrtaceae
Eucalyptus polyanthemos +	Silver-dollar gum	T	.	Myrtaceae
Eucalyptus rhondantha X + (E. macrocarpa X E. pyriformis)	Rose mallee	S	.	Myrtaceae
Eucalyptus sideroxylon + [E. s. var. rosea]	Red ironbark	T	.	Myrtaceae
Eucalyptus spathulata +	Swamp mallee	S/T	.	Myrtaceae
Ficus elastica +	Rubber tree	S/T	.	Moraceae
Ficus macrophylla +	Moreton Bay fig	T	.	Moraceae
Frankenia salina [F. grandiflora & var. campestris]	Alkali heath	PH	FACW+	Frankeniaceae
Fremontodendron mexicanum +	Flannel bush	S	.	Sterculiaceae
Gnaphalium bicolor	Bicolored everlasting	A/BH	.	Asteraceae
Hakea laurina + [H. eucalyptoides]	Sea-urchin tree	S/T	.	Proteaceae
Hakea suaveolens + [H. pectinata]	Sweet hakea	S	.	Proteaceae
Hemizonia fasciculata [H. ramosissima]	Fasciculed tarplant	AH	.	Asteraceae
Hemizonia parryi ssp. australis [H. a.]	Southern tarplant	AH	FAC	Asteraceae
Heterotheca grandiflora	Telegraph weed	PH	.	Asteraceae
Hirschfeldia incana # [Brassica geniculata]	Summer mustard	PH	.	Brassicaceae
Hordeum brachyantherum ssp. californicum [H. c.]	California barley	AG	FACU	Poaceae
Hordeum marinum ssp. gussoneanum # [H. geniculatum; H. hystrix]	Mediterranean barley	AG	FAC	Poaceae
Hordeum murinum #	Hare barley	AG	.	Poaceae
Jaumea carnosa	Fleshy jaumea	PH	OBL	Asteraceae
Lactuca serriola #	Prickly wild lettuce	AH	FAC	Asteraceae
Lamium amplexicaule #	Henbit	AH	.	Lamiaceae
Lasthenia californica	California goldfields	AH	FACU*	Asteraceae
Lepidium lasiocarpum	Peppergrass	AH	.	Brassicaceae
Lepidium virginicum	Virginia peppergrass	AH	FACU	Brassicaceae
Lotus scoparius var. [ssp.] scoparius	Deerweed, California broom	PH	.	Fabaceae
Lupinus arboreus var. arboreus	Bush lupine	S	.	Fabaceae
Lupinus bicolor	Shy lupine	AH	.	Fabaceae
Medicago polymorpha #	Burclover	AH	.	Fabaceae

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Appendix A. Vascular Plants of the UCSB Campus Lagoon Management Area, Santa Barbara County, California

Scientific Name	Common Name	Habit	Wetland Indicator Status	Family
Medicago sativa #	Alfalfa	PH	.	Fabaceae
Melaleuca armillaris +	Bracelet honey myrtle	S/T	.	Myrtaceae
Melaleuca decussata +	Lilac melaleuca	S/T	.	Myrtaceae
Melaleuca nesophila +	Western tea myrtle	S/T	.	Myrtaceae
Melilotus alba #	White sweetclover	A/BH	FACU+	Fabaceae
Myoporum laetum +#	Myoporum	S/T	(FAC)	Myoporaceae
Nassella pulchra [Stipa p.]	Purple needlegrass	PG	.	Poaceae
Parapholis incurva #	Sickle grass	AG	.	Poaceae
Pennisetum clandestinum #	Kikuyu grass	PG	FACU+	Poaceae
Phacelia distans	Wild heliotrope	PH	.	Hydrophyllaceae
Picris echioides #	Bristly ox-tongue	AH	.	Asteraceae
Pinus radiata +	Monterey pine	T	.	Pinaceae
Pinus torreyana +	Torrey pine	T	.	Pinaceae
Piptatherum miliaceum # [Oryzopsis miliacea]	Smilo grass	PG	(FACU-)	Poaceae
Plantago bigelovii	Broadleaf or common plantain	AH	OBL	Plantaginaceae
Plantago lanceolata #	Narrowleaf or English plantain	PH	FAC-	Plantaginaceae
Polygonum arenastrum # [P. montereyense; P. aviculare not in CA]	Common knotweed, doorweed	AH	FAC	Polygonaceae
Polypogon monspeliensis #	Rabbitsfoot or annual beard grass	AG	FACW+	Poaceae
Prunus lyoni +	Catalina Island cherry	S	.	Rosaceae
Psilocarpus brevissimus var. brevissimus	Woolly marbles	AH	OBL	Asteraceae
Quercus ilex +	Holly oak	T	.	Fagaceae
Raphanus sativus #	Wild radish	AH	.	Brassicaceae
Rhus ovata	Sugar bush	S	.	Anacardiaceae
Rumex acetosella # [R. angiocarpus]	Sheep sorrel	PH	FAC-	Polygonaceae
Salicornia virginica	Pickleweed or swampfire	S	OBL	Chenopodiaceae
Salix lasiolepis [vars. bracelinae & sandbergii; S. lutea var. nivaria; S. tracyi]	Arroyo willow	T	FACW	Salicaceae
Salsola tragus # [S. australis; S. iberica; S. kali var. tenuifolia]	Russian thistle, tumbleweed	AH	FACU+	Chenopodiaceae
Sambucus mexicana [S. caerulea vars. c. & m.]	Blue elderberry	S	FAC	Caprifoliaceae
Schinus molle +#	Peruvian pepper tree	T	.	Anacardiaceae

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Appendix A. Vascular Plants of the UCSB Campus Lagoon Management Area, Santa Barbara County, California

Scientific Name	Common Name	Habit	Wetland Indicator Status	Family
Scirpus maritimus	Alkali bulrush	PH	OBL	Cyperaceae
Sonchus oleraceus #	Common sow-thistle	AH	NI*	Asteraceae
Spergularia macrotheca	Beach sandspurry	AH	FAC+	Caryophyllaceae
Spergularia marina	Marsh spurry	AH	OBL	Caryophyllaceae
Suaeda calceoliformis [S. depressa var. erecta]	Horned sea-blite	AH	FACW-	Chenopodiaceae
Tetragonia tetragoinoides # [T. expansa]	New Zealand spinach	PH	.	Aizoaceae
Vicia benghalensis #	Purple vetch	AH	.	Fabaceae
Xanthium strumarium [sspp./vars. canadense & glabratum]	Cocklebur	AH	FAC+	Asteraceae

Notes: Scientific nomenclature follows Hickman (1993) for natives, Skinner and Pavlik (1994) for rare plants, and Bailey and Bailey (1976) for ornamentals. Common names follow Abrams and Ferris (1960), Niehaus and Ripper (1976), and DeGarmo (1980) for natives and Bailey and Bailey (1976) for ornamentals. A "#" indicates non-native species that have become naturalized or persist without cultivation.
A "+" indicates non-native species that have been planted and are actively cultivated or persist but do not reproduce.

Habit definitions:
AG = annual grass.
AH = annual herb.
AV = annual vine.
BH = biennial herb.
PG = perennial grass.
PH = perennial herb.
PV = perennial vine.
S = shrub.
T = tree.

Wetland indicator status (Reed 1988):
OBL = obligate wetland species, occurs almost always in wetlands (>99% probability)
FACW = facultative wetland species, usually found in wetlands (67-99% probability).
FAC = facultative species, equally likely to occur in wetlands or nonwetlands (34-67% probability).
FACU = facultative upland species, usually occur in nonwetlands (67-99% probability).

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NI = no indicator has been assigned due to a lack of information to determine indicator status.
+ or - symbols are modifiers that indicate greater or lesser affinity for wetland habitats.
* = a tentative assignment to that indicator status by Reed (1988).
A period "." indicates that no wetland indicator status has been given in Reed (1988).
Parentheses around an indicator status indicate the wetland status as suggested by David Magney.

Appendix B. Common and Scientific Names of Wildlife Species and Fish Known to Occur in the Campus Lagoon Area

Appendix B. Common and Scientific Names of Wildlife Species and Fish Known to Occur in the Campus Lagoon Area

Common Name	Scientific Name
Invertebrates	
Bloodworm	*Euzonas mucronata*
Pismo clam	*Tivela stultorum*
Mimic tryonia (California brackishwater snail)	*Tryonia imitator*
Bubble-shell snail	*Haminoea virescens*
Horn snail	*Cerithdea californica*
Purple olive snail	*Olivella biplicata*
Rock crab	*Pachygrapsis crassipes*
Sand crab	*Emerita araloga*
Mud crab	*Hemigrapsus oregonensis*
Bay mussel	*Mytilus edulis*
Monarch butterfly	*Danaus plexippus*
Wandering (saltmarsh) skipper	*Panoquina errans*
Fish	
Pacific (California) killifish	*Fundulus parvipinnis*
Topsmelt	*Atherinops affinis*
Tidewater goby	*Eucyclogobius newberryi*
Longjaw mudsucker	*Gillichthys mirabilis*
Pacific staghorn sculpin	*Leptocottus armatus*
Opaleye	*Girella nigricans*
Amphibians	
California slender salamander	*Batrachoseps attenuatus*
Western toad	*Bufo boreas*
Pacific chorus frog (treefrog)	*Pseudacris (Hyla) regilla*

Appendix B. Continued

Common Name	Scientific Name
Reptiles	
Western fence lizard	*Sceloporus occidentalis*
Western skink	*Eumeces skiltonianus*
Southern alligator lizard	*Gerrhonotus multicarinatus*
California legless lizard	*Anniella pulchra*
Ringneck snake	*Diadophis punctatus*
Gopher snake	*Pituophis melanoleucus*
Common kingsnake	*Lampropeltis getulus*
Western terrestrial garter snake	*Thamnophis elegans*
Western aquatic garter snake	*Thamnophis couchi*
Birds	
Red-throated loon	*Gavia stellata*
Pied-billed grebe	*Podilymbus podiceps*
Horned grebe	*Podiceps auritus*
Eared grebe	*Podiceps nigricollis*
Western grebe	*Aechmophorus occidentalis*
American white pelican	*Pelecanus erythrorhynchos*
California brown pelican	*Pelecanus occidentalis californicus*
Double-crested cormorant	*Phalacrocorax auritus*
Brandt's cormorant	*Phalacrocorax penicillatus*
Pelagic cormorant	*Phalacrocorax pelagicus*
American bittern	*Botaurus lentiginosus*
Great blue heron	*Ardea herodias*
Great egret	*Casmerodius albus*
Snowy egret	*Egretta thula*
Cattle egret	*Bubulcus ibis*
Green-backed heron	*Butorides striatus*
Black-crowned night-heron	*Nycticorax nycticorax*
Roseate spoonbill	*Ajaia ajaja*
Brant	*Branta bernicla*
Green-winged teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*

Appendix B. Continued

Common Name	Scientific Name
Gadwall	*Anas strepera*
American wigeon	*Anas americana*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
White-winged scoter	*Melanitta fusca*
Bufflehead	*Bucephala albeola*
Hooded merganser	*Lophodytes cucullatus*
Red-breasted merganser	*Mergus serrator*
Ruddy duck	*Oxyura jamaicensis*
Turkey vulture	*Cathartes aura*
White-tailed kite	*Elanus leucurus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Red-tailed hawk	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
California quail	*Callipepla california*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Black-bellied plover	*Pluvialis squatarola*
Lesser golden plover	*Pluvialis dominica*
Snowy plover	*Charadrius alexandrinus*
Semipalmated plover	*Charadrius semipalmatus*
Piping plover	*Charadrius melodus*
Killdeer	*Charadrius vociferus*
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Solitary sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Wandering tattler	*Heteroscelus incanus*
Spotted sandpiper	*Actitis macularia*
Whimbrel	*Numenius phaeopus*
Long-billed curlew	*Numenius americanus*
Marbled godwit	*Limosa fedoa*
Ruddy turnstone	*Arenaria interpres*
Black turnstone	*Arenaria melanocephala*

Appendix B. Continued

Common Name	Scientific Name
Surfbird	*Aphriza virgata*
Sanderling	*Calidris alba*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
Baird's sandpiper	*Calidris bairdii*
Pectoral sandpiper	*Calidris melanotos*
Dunlin	*Calidris alpina*
Short-billed dowitcher	*Limnodromus griseus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Wilson's phalarope	*Phalaropus tricolor*
Red-necked phalarope	*Phalaropus lobatus*
Red phalarope	*Phalaropus fulicaria*
Franklin's gull	*Larus pipixcan*
Bonaparte's gull	*Larus philadelphia*
Heermann's gull	*Larus heermanni*
Mew gull	*Larus canus*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Herring gull	*Larus argentatus*
Thayer's gull	*Larus thayeri*
Western gull	*Larus occidentalis*
Glaucous-winged gull	*Larus glaucescens*
Glaucous gull	*Larus hyperboreus*
Black-legged kittiwake	*Rissa tridactyla*
Caspian tern	*Sterna caspia*
Royal tern	*Sterna maxima*
Elegant tern	*Sterna elegans*
Common tern	*Sterna hirundo*
Forster's tern	*Sterna forsteri*
California least tern	*Sterna antillarum browni*
Rock dove	*Columba livia*
Band-tailed pigeon	*Columba fasciata*
Mourning dove	*Zenaida macroura*
Barn owl	*Tyto alba*
Western screech-owl	*Otus kennicottii*
Great horned owl	*Bubo virginianus*
Vaux's swift	*Chaetura vauxi*
White-throated swift	*Aeronautes saxatalis*
Anna's hummingbird	*Calypte anna*

Appendix B. Continued

Common Name	Scientific Name
Calliope hummingbird	*Stellula calliope*
Rufous hummingbird	*Selasphorus rufus*
Allen's hummingbird	*Selasphorus sasin*
Belted kingfisher	*Ceryle alcyon*
Acorn woodpecker	*Melanerpes formicivorus*
Red-breasted sapsucker	*Sphyrapicus ruber*
Nuttall's woodpecker	*Picoides nuttallii*
Northern flicker	*Colaptes auratus*
Olive-sided flycatcher	*Contopus borealis*
Western wood-pewee	*Contopus sordidulus*
Pacific-slope flycatcher	*Empidonax difficilis*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Western kingbird	*Tyrannus verticalis*
Horned lark	*Eremophila alpestris*
Purple martin	*Progne subis*
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Bank swallow	*Riparia riparia*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
American crow	*Corvus brachyrhynchos*
Plain titmouse	*Parus inornatus*
Bushtit	*Psaltriparus minimus*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Rock wren	*Salpinctes obsoletus*
Bewick's wren	*Thryomanes bewickii*
Marsh wren	*Cistothorus palustris*
Golden-crowned kinglet	*Regulus satrapa*
Ruby-crowned kinglet	*Regulus calendula*
Blue-gray gnatcatcher	*Polioptila caerulea*
Western bluebird	*Sialia mexicana*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Wrentit	*Chamaea fasciata*
Northern mockingbird	*Mimus polyglottos*
American pipit	*Anthus rubescens*

Appendix B. Continued

Common Name	Scientific Name
Loggerhead shrike	*Lanius ludovicianus*
European starling	*Sturnus vulgaris*
Hutton's vireo	*Vireo huttoni*
Warbling vireo	*Vireo gilvus*
Tennessee warbler	*Vermivora peregrina*
Orange-crowned warbler	*Vermivora celata*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigrescens*
Townsend's warbler	*Dendroica townsendi*
Ovenbird	*Seiurus aurocapillus*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Western tanager	*Piranga ludoviciana*
Black-headed grosbeak	*Pheucticus melanocephalus*
Rufous-sided towhee	*Pipilo erythrophthalmus*
California towhee	*Pipilo crissalis*
Chipping sparrow	*Spizella passerina*
Savannah sparrow	*Passerculus sandwichensis*
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
Golden-crowned sparrow	*Zonotrichia atricapilla*
White-crowned sparrow	*Zonotrichia leucophrys*
Dark-eyed junco	*Junco hyemalis*
Red-winged blackbird	*Agelaius phoeniceus*
Tricolored blackbird	*Agelaius tricolor*
Western meadowlark	*Sturnella neglecta*
Brewer's blackbird	*Euphagus cyanocephalus*
Brown-headed cowbird	*Molothrus ater*
Northern oriole	*Icterus galbula*
House finch	*Carpodacus mexicanus*
Pine siskin	*Carduelis pinus*
Lesser goldfinch	*Carduelis psaltria*
Lawrence's goldfinch	*Carduelis lawrencei*
American goldfinch	*Carduelis tristis*
House sparrow	*Passer domesticus*

Appendix B. Continued

Common Name	Scientific Name
Mammals	
Virginia opossum	*Didelphis virginiana*
Broad-footed mole	*Scapanus latimanus*
California leaf-nosed bat	*Macrotus californicus*
Big brown bat	*Eptesicus fuscus*
Brush rabbit	*Sylvilagus bachmani*
Black-tailed hare	*Lepus californicus*
Botta's pocket gopher	*Thomomys bottae*
Western harvest mouse	*Reithrodontomys megalotis*
California mouse	*Peromyscus californicus*
Deer mouse	*Peromyscus maniculatus*
California vole	*Microtus californicus*
House mouse	*Mus musculus*
Gray fox	*Urocyon cinereoargenteus*
Long-tailed weasel	*Mustela frenata*
Striped skunk	*Mephitis mephitis*