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COAL OIL POINT RESERVE

MANAGEMENT PLAN

UNIVERSITY OF CALIFORNIA

SANTA BARBARA, CALIFORNIA

Coal Oil Point Reserve
UCSB Natural Reserve System
A division of the UC Natural Reserve System

Prepared for:

University of California
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Executive Summary

1. Introduction to the Reserve and its importance

The University of California (UC) Natural Reserve System (NRS) manages 34 sites representing nearly all the State's major ecosystems in as undisturbed a condition as possible. This reserve system protects California's natural heritage for the public trust and provides protected natural areas for research and teaching to contribute to the understanding and wise management of the Earth and its natural systems. The ecosystems and facilities offered by the 34 Reserves are available to faculty and students from institutions throughout the world. The NRS is also a trustee agency under the California Environmental Quality Act. UC Santa Barbara (UCSB) administers seven Reserves as a campus research unit, under the administration of the Marine Science Institute.

The Coal Oil Point Natural Reserve (COPR, the Reserve) consists of 165.3 acres of protected coastal habitats along the south coast of Santa Barbara County (Figure 1), in the lower drainage area of the Devereux Creek Watershed, adjacent to the West Campus of the UCSB (Figure. 2). The diversity of habitats and wildlife at the Reserve is striking and some of these are now rare along the coast. For example, the COPR beach is breeding habitat for the Pacific coastal population of the threatened Western Snowy Plover and the endangered California Least Terns. The Belding savanna Sparrow breeds on the pickleweed habitat at Devereux slough. Rare invertebrates such as the Globose Dune Beetle, the Dune Spider, and the Sand Tiger Beetle share the beach and dunes with the snowy plovers. The Reserve has one of the most pristine remnants of Coastal Dune Scrub in Santa Barbara County, and contains a number of rare plant species. Several types of wetlands such as vernal pool, dune swale, salt flat and salt marsh are part of the 5% remaining coastal wetland in California. In a short walk, visitors can observe all these habitats and learn why it is important to preserve them.

Though small, COPR receives many users. Because of its proximity to UCSB, undergraduate classes from the campus use it regularly. Students from other institutions, community schools, and educational groups visit frequently as well. It is also a site for graduate and faculty research projects ranging from field tests of ecological theory to investigations into the management of endangered species.

In addition to providing research and educational opportunities, COPR is unusual among the 34 Reserves in that a trail and portions of the beach are open to the public. This access to the Reserve's great natural beauty provides a visual and aesthetic amenity for the campus and community. For example, amateur naturalists often visit the Reserve's Devereux Slough because it is among the top ten birding areas in the Western United States. Such forms of access provide a valued public service and offer opportunities for the Reserve to foster public education.

2. Purpose of this Plan

The purpose of the COPR Management Plan (COPR MP) is to guide the Reserve in managing its sensitive resources in the public trust and to aid COPR in enhancing its value as a research and educational facility. The COPR MP describes "**Programs,**" each with their own Status, Policies, Goals and Actions. These programs are grouped into four areas: Users, Habitat Conservation, Stewardship, and Administration. The 18 separate and distinct programs described here comprise the ongoing and planned activities for the COPR. When the actions of a program are ready to be implemented, a detailed "**Plan**" will be developed. The Access Plan (of the Public Access Program) and the Snowy Plover Management Plan (of the Endangered Species Protection and Recovery Program) provide enough detail to implement as soon as funds are available. The Habitat Conservation Programs and the Access Plan need to be implemented soon because of the challenge to properly balance public access to the Reserve with resource protection and academic use.

The COPR MP integrates the policies of the California Coastal Act, as stipulated in the 1990 UCSB Long Range Development Plan (UCSB LRDP), with the UCNRS Reserve

Use Guidelines (see Appendices). The COPR MP proposes some new policies that are necessary to guide normal Reserve functions, which will be subject to appropriate University reviews and approvals, and where applicable, other agency approvals. Many actions will require resources outside the scope of the Reserve's recurring budget and, therefore, will be subject to the availability of funds and may require several years to accomplish.

After a review and approval process by the UCSB Natural Reserve System Advisory Committee, the UCSB administration, and the UCNRS System-wide Office, the Reserve's Access Plan, which is a part of the COPR Management Plan, will be referenced in an amendment to the UCSB 1990 Long Range Development Plan (LRDP). The LRDP amendment will be subject to both CEQA and the California Coastal Commission review and approval process.

3. Summary of programs

Reserve Users and Visitors

The Reserve is used regularly for research, instruction and field trips (users). Parts of the beach and a trail are open to the public and are visited by individuals seeking to enjoy its natural beauty (visitors). The Reserve Director reviews user applications (available on the COPR website, http://coaloilpoint.ucnrs.org) for consistency with NRS Use Guidelines and approves parking in the Coal Oil Point parking lot for reserve users. Research is a mandated priority program for the Natural Reserve System and COPR is an important research site for faculty and their graduate and undergraduate students in several fields. Research use at COPR is expanding. To attract more research use in the short term, the Reserve will seek to inform faculty and graduate students on research opportunities and make resource information available. Over the longer term the Reserve will install monitoring stations to measure weather conditions and slough flow and develop a small laboratory and overnight room for researchers. The Reserve contributes to its public-service mission by providing outdoor experiences for a wide range of K-12 classes and

community groups. The Reserve will seek to enhance educational programs by providing guided tours, improving the public-access trail (Dune Pond Trail), adding overlook sites, updating its tour brochure, developing an interpretive trail, and by expanding its website. The Reserve will build a classroom to accommodate classes, interpretive information to visitors, and a place to train docents and volunteers.

Habitat Conservation

COPR contains a number of endangered and threatened species and environmentally sensitive habitats (ESHA). Following the mandates of the Endangered Species Act (ESA), it is the Reserve's responsibility to create management plans to protect listed species. Furthermore, preservation of ESHAs is essential for the Reserve and University to fulfill their missions of stewardship and research support. Most research projects currently being conducted at COPR (see Research Program) can only be developed in protected natural areas, now rare in coastal California. The results from these projects provide the foundation for our understanding of the earth and, in particular, our local environment.

The Reserve will strive to conserve habitat by: (1) mapping natural resources, (2) managing access to protect sensitive habitats, and (3) restoring degraded habitats. The COPR Management Plan (Part II) provides a number of maps and tables that describe its natural resources. To conform to the Endangered Species Act (ESA) and the Wetlands Protection Act (WPA), the Access Plan (Appendix 1) aims to improve environmental protection and describes modifications to past, inappropriate forms of access. Key actions of the Access Plan that support the Habitat Conservation Programs and the Snowy Plover Management Plan include moving or modifying trails that currently traverse sensitive habitat, restricting more effectively such prohibited and inappropriate activities as unleashed pets and off-road vehicles, installing fences to protect sensitive areas from disturbance, and posting regulatory and educational signs. The Access Plan emphasizes the need to continue to restrict use of the Coal Oil Point parking lot to protect the area from over use. Many of these actions are already required by policies in the 1990 LRDP but

were not implemented due to lack of Reserve staffing, funding and a management plan. Increasing visitation of the Reserve has increased the need for active management.

A particularly sensitive species at COPR is the threatened Western Snowy Plover. The Endangered Species Act obligates the Reserve and the University to protect this species from disturbance. The Reserve has studied options that maximize protection of plovers and minimize restrictions to beach users. The Snowy Plover Management Plan aims to reduce disturbance by increasing public awareness of snowy plover issues, keeping foot traffic away from core roost and nest areas, and enforcing the leash law. In particular, the Reserve will continue to protect the main roost area and nests with a post and rope fence to redirect foot traffic, encourage compliance with the county leash law within the Reserve, and maintain a docent program for public outreach and education. The California Least Terns returned to use the beach as a post-breeding site in 2001 (when the beach was protected) and as breeding site in 2004. The management actions to reduce disturbance to plovers may be sufficient to protect Least Terns. Additional measures to improve water quality in the slough may be necessary to maintain a healthy supply of fish for Least Terns

Exotic and invasive species degrade the Reserve's natural habitats and displace native species. COPR has started removing the most invasive species, such as *Acacia*, pampas grass, iceplant, and *Myoporum*. Exotic plants generally will be removed, except when they have particularly high scenic or camouflage value, or when the plants have an irreplaceable function for sensitive animal species (native species may be planted to replace these exotic plants in the future). To the extent possible, COPR will avoid using herbicides. To protect the genetic integrity of local populations, the Reserve will use local seeds and cuts for native species propagation.

Stewardship

The University of California holds its lands in the public trust and manages its NRS lands in a manner that preserves their integrity for future generations. In addition, the Reserve supports research projects and serves as an outdoor laboratory for classes that require

pristine or protected habitats. Portions of the beach area of the Reserve, perimeter trails and an internal pedestrian nature trail will be open to the public for nature study and passive recreation (such as walking and jogging), and their visits will not require a formal application. The Reserve will work to improve these routes with respect to their safety, beauty, preservation, boundary designation, and educational value. The Reserve will provide two turnouts for bird watchers along Slough Rd. There will be three beach-access points from the bluffs, one near the Cliff House, a second near the dune pond, and the third along the Reserve's western boundary. Sands Beach also is accessible by walking along the beach from the east or west boundaries.

The Reserve will map and monitor its resources to track changes over time. To protect the slough, it will work with others in the watershed to reduce run-off, sedimentation and erosion, improve the quality of water entering the slough, and seek ways to reduce impacts of vector control practices at COPR. Much of this will require new funding.

Administration

The UCSB NRS Director heads the campus NRS administrative office and oversees, with the help of the UCSB Associate Director, the six Reserve Directors who manage seven Reserve sites. UCSB NRS reports to the UCSB Office of Research. The NRS campus administrative staff and the Marine Science Institute provide administrative support for the UCSB reserves. A campus NRS Advisory Committee, which is appointed by and reports to the UCSB Vice Chancellor for Research, advises the Director on goals and policies for Reserve operations. The campus NRS Director appoints a COPR Advisory Committee and Committee chair, and the COPR Advisory Committee provides advice to the COPR Faculty Advisor and Reserve Director regarding Reserve policies and actions. The COPR Faculty Advisor reports to the UCSB NRS Director, advises the COPR Reserve Director, and acts as a liaison between COPR and UCSB faculty. The COPR Director, who lives on site and reports to the UCSB NRS Director, is in charge of day-to-day Reserve operations, and is responsible for approving applications and seeking funds to implement Reserve programs. The Reserve presently has a modest annual budget to cover maintenance and

the salary for the Reserve Director. Extramural grants and donations augment this budget. The Reserve will need additional one-time and recurring funds to implement programs in the COPR MP. To improve the quality of infrastructure for users, the Reserve will seek funds to develop a classroom/overnight room.

The Reserve informs, protects, and assists users and evaluates their applications. A release form signed by approved Reserve users protects the University from various liabilities and serves as a means to inform users of potential hazards. Present safety improvements include a public phone at the Cliff House, a serviced porta-potty adjacent to the parking lot and a cell phone for researchers when they are conducting field-work. COPR will work with the campus to improve safety for visitors and users by installing speed controls along Slough Rd and reducing amounts of broken glass, public intoxication, and underage drinking on the beach.

The Reserve will seek help from the campus to enforce regulations, manage recreation, and increase staff number. The Reserve will develop a rapid-response protocol for potential catastrophic events. The Reserve's biological values are dependent on the integrity and health of the watershed that it resides in. The Reserve will assist in the protection and enhancement of ESHA in the Devereux Slough Ecosystem Area.

Implementation

An amendment to the UCSB Long Range Development Plan (LRDP) will be developed in accordance with this plan to ensure consistency with the Coastal Act and campus policies. The completion of the proposed actions will be contingent on the availability of funding.

4. Conclusion

COPR is one of the few reserves in the NRS with a dune system and estuarine habitat. Its proximity to the UCSB campus provides excellent opportunities for use by campus researchers and classes. To continue maintaining the Reserve in good condition,

management needs to engage in active protection of resources and restore habitats that have been degraded. COPR is surrounded by urban development, which attracts visitors; effective management of public access is a critical issue. A central priority is to accommodate appropriate public access in a manner that is compatible with resource and research protection. The key actions to achieve appropriate access will be to designate better trails, install fences, and provide adequate enforcement. Implementation of these actions is a priority for COPR. The Reserve will focus on developing the User Programs in the near future.

Mission of the University of California Natural Reserve System

In 1965, the University of California Board of Regents established the Natural Reserve System (NRS) to provide protected examples of California's natural habitats for instruction and research. In the 38 years since its formation, the NRS has grown from seven to 34 Reserves that encompass over 135,000 acres. The NRS is a University-wide program that functions as part of the Academic Affairs. Each Reserve is assigned to one of eight UC campuses for administration. The office of the UC Santa Barbara Natural Reserve System manages Coal Oil Point Reserve (COPR) and six other UC Reserves.

The mission of the Natural Reserve System is to contribute to the understanding and wise management of the Earth and its natural systems by supporting university-level teaching, research and public service at protected natural areas throughout California.

Programs

Each program of this Management Plan is divided into Status, Existing Policies, New Policies (when applicable), and Goals and Actions. The *Status* section describes present conditions at COPR. The *Existing Policies* section describes policies that are currently stated in the 1990 LRDP and the guidelines of the UC Natural Reserve System (Appendix 4). These policies have not necessarily been implemented. The *New Policies* section describes policies needed to meet the NRS mission and Reserve operations. These new policies will amend the 1990 LRDP. The *Goals and Actions* section describes specific strategies necessary to implement the existing and new policies.

A. USER PROGRAMS

Status. For thirty years, the Coal Oil Point Reserve has attracted a number of users for research, class field studies, and field trips for K-12 and adult education. Much of this use has not been reported in the past because the Reserve can be entered via public trails. Recently, an effort has been made to contact all visitors from organized groups. As a result we have learned that COPR is visited more than previously thought. The following four programs provide direction for supporting the Reserve's and University's mission. Present use is listed in Table 1 below.

Many reserves of the UC Natural Reserve System are experiencing fast growth and demand for use of their natural resources. In order to maintain these resources in perpetuity, the COPR is establishing some guidelines for use by the different user groups. These guidelines should not discourage a researcher or class from discussing their particular needs with the Reserve Director.

Existing Policies. All users must fill out an application and receive notice of approval before commencing any activity on the Reserve. Online applications are available at http://CoalOilPoint.ucnrs.edu. The Reserve Director reviews user applications for consistency with NRS use policies.

Table A.1. Use of COPR in the 2002-2003 academic year.

	UC Home		UC Other		CA Comm. Coll.		Public Service		**Totals**	
	# Users	User Day	# Users	U.D.	# Users	User Day	# Users	User Day	**# Users**	**User Day**
UNIVERSITY-LEVEL RESEARCH										
Faculty	1	10	1	5	3	25	2	70	**7**	**108**
Research Scientist	5	90	0	0			14	42	**19**	**132**
Research Assistant	12	41	0	0	1	1	0	0	**13**	**42**
Graduate Student	4	68	5	109			1	10	**10**	**187**
Undergraduate Student	17	42	0	0			0	0	**20**	**45**
Subtotal	*39*	*251*	*6*	*114*	*4*	*29*	*17*	*122*	**69**	**516**
UNIVERSITY-LEVEL INSTRUCTION										
Instructors	13	27	3	6	3	3	3	3	**22**	**39**
Students	112	271	26	86	72	72	4	108	**214**	**537**
Subtotal	*125*	*298*	*29*	*92*	*75*	*75*	*7*	*111*	**236**	**576**
PUBLIC SERVICE										
K-12	45	45	0	0			1102	1102	**1147**	**1147**
Others	91	128	6	6			290	2835	**387**	**2963**
Subtotal	*136*	*173*	*6*	*6*	*0*	*0*	*1392*	*3937*	**1534**	**4116**
Total	**300**	**722**	**41**	**212**	**79**	**104**	**1416**	**4170**	**1839**	**5208**

* Note: University–level Instruction in the Other category includes Other Calif. College users and Out-of-state users.

1. Research Program

Status. COPR is an important research facility for faculty and graduate and undergraduate students, with many projects being conducted each year. Areas of research conducted at COPR include ecology, evolution, anthropology, mineral resources, geology, oceanography, and various natural history surveys. Several reports, theses, and scientific publications document the research activities conducted at COPR and together provide a database of knowledge about the Reserve. These documents are available at the Reserve and are referenced in the Reserve's online bibliographic data base htt://coaloilpoint.ucnrs.org.

Existing policies. Research is one of the mandated activities of the NRS and is therefore a high priority for the Reserve. Manipulative research will be permitted where appropriate. Activities that are likely to interfere with ongoing research will not be allowed. Research that will or is likely to irrevocably harm natural resources is not permitted.

New policy. Each application for a research project will be evaluated individually to determine if it is suitable to be carried out at COPR.

The NRS manages its lands in the public trust and thus seeks to conserve its natural resources. Therefore, the Reserve Director will evaluate each research application to determine if it complies with the NRS guidelines and with applicable government regulations such as, for example, the Endangered Species Act and Coastal Act. Examples of the criteria that will be used to evaluate each project are:

a) The percent of the habitat or local population of a species that will be destroyed or impacted by the project. For example, observation and collections are allowed in most areas but the amount of sampling allowed will depend on the size of the population, the rarity and official status of the species, and the general sensitivity of the habitat. Only a very small percent of a population can be collected each year.

b) The duration of project impacts and the time it will take for the affected habitat and species to revert to pre-experimental conditions. Manipulative research that permanently impacts natural areas is not allowed. However, if the experiment is to be conducted in an area that is already heavily degraded, then it may be allowed in conjunction with some restoration.
c) The impact of the project on other ongoing research. Ongoing research projects have priority over new projects. Projects that require exclusive use of a habitat will be evaluated for their interference with future projects.
d) Only very limited manipulations will be allowed in the Snowy Plover and California Least Tern protected area, and no manipulations will be allowed during the breeding season. During the breeding season, research is restricted to observation and monitoring.

The map in Figure 3 shows the guidelines for the level of impact from manipulative experiments allowed in different areas of the Reserve. Figure 4 shows the same map with the habitat types indicted for cross-reference.

Goals and actions: To increase research activity at COPR, the Reserve will actively recruit researchers (e.g., through lectures, field trips, brochures, personal contacts, and publications). It will also update resource inventories and monitoring databases, which will be available to Reserve users. To minimize disturbance and vandalism of research projects, the Reserve will seek greater protection of research areas through implementation of the Access Plan (Appendix 1).

2. Class use (University/College-level)

Status. The COPR Education Program includes many levels of educational opportunities and experiences. Several UCSB courses (e.g. Walking Biology, Natural History of COPR, Ecology, Environmental Studies, Ichthyology, Vertebrate and Invertebrate Zoology) and classes from other universities and colleges use the Reserve as an outdoor laboratory. The

Reserve provides an excellent opportunity for students to study field research methods and learn about the local fauna and flora. Students from UCSB can bike to the Reserve from campus, which makes regular visits for class projects easier. The Reserve Director mentors undergraduate interns from various departments through internships. In the past, a major problem at COPR has been vandalism of class experiments and intentional and unintentional disruption of class field trips by beach users and unleashed dogs. This problem has been partially mitigated by the installation of new fencing and the daily presence of docents monitoring snowy plovers. Vandalism is still problematic in areas that are not fenced, for example in the west section of the Reserve.

Existing Policies: Educational support for University level classes is a mandated responsibility for the Reserve. Activities that are likely to interfere with ongoing class programs are not allowed. Class use that damages natural resources is not permitted.

New policies: Class use of the Reserve is allowed on the perimeter and Dune Pond trails, the beach outside the plover roost area, and in some fenced areas if approved by the Reserve Director (Figure. 5). Restricted areas include the Snowy Plover fenced area, the dunes, and the backdunes east of the dune pond trail. Class participants must remove all experimental structures, markers, etc., after the sampling or experiments have ended. A faculty, instructor or TA must accompany the students. If a student wants to conduct an independent project, he/she must request approval from the Reserve Director and fill out a separate research application as required of all researchers.

Goals and Actions. To facilitate the use of COPR for class use, the Reserve will encourage faculty to use the Reserve in their classes, offer field trips and lectures, and seek to build or restore a classroom/lab facility.

3. Public Service Program

Status. Local K-12 classes take field trips to the Reserve and constitute a large percentage of the Reserve users. Several organizations such as the Santa Barbara Audubon and the Santa Barbara Museum of Natural History lead trips to COPR as part of their educational programs. Most of the field trips and classes are self-guided, although the Reserve Director also leads monthly tours. Reserve-led tours are being increasingly requested and are an effective means of public education. K-12 classes learn about habitat restoration by adopting and restoring a degraded Reserve site through the Restore-a-Space project. A docent program has increased the opportunities for public guided tours of the plover area. Docents are members of the local community or UCSB students who are taught about the Reserve's resources and are trained to interact with the public. Presently, the Audubon Society and the Reserve jointly coordinate the Snowy Plover Docent Program. The Reserve also provides educational lectures and presentations to local community groups.

Existing Policies. Where appropriate, the Reserve is used to support educational activities by K-12 classes, community groups, and qualified non-profit organizations. Educational and outreach activities that damage natural resources are not permitted.

New policies: Field trips are permitted on approved trails and the beach outside of the Snowy Plover fenced area (Figure 6). K-12 groups will be directed to the east side of the point away from the plover nesting area during the Snowy Plover breeding season (March 15 to September 15) to avoid disturbance to breeding snowy plovers (Figure 6).

The upper size limit for a class visiting the Reserve is 30 individuals including the students and teachers. The minimum student/adult ratio for K-3rd grades is one adult for each 5 students; the ratio for 4th-12th grades is 1 adult for each 10 students. Larger, well-organized, groups may be allowed in consultation with the Reserve Director. Field trips are for educational opportunities and recreation by participants is not permitted on the Reserve, including the beach area.

Goals and Actions. To improve the educational content of self-guided tours, the Reserve will update the self-guided tour brochure, post information on the web and provide

interpretive signs along the official trail. To enhance environmental education opportunities for the community, the Reserve will develop a weekly docent-led tour. With appropriate funding, the Reserve will provide public lectures at the Cliff House.

B. HABITAT CONSERVATION PROGRAMS

Status. COPR contains a number of endangered and threatened species and Environmentally Sensitive Habitats (ESHA). Because of past heavy use and impacts in the watershed, some of these resources are presently degraded and in need of active management. The programs listed below describe the status of each resource in more detail. Figure 4 shows the main habitat types at COPR.

1. Habitat Preservation Program

Status. Federal and State legislation and University policies aim to protect sensitive habitats and rare and endangered species. Impacts to the Reserve's resources are presently significant but potentially solvable. Pollutants in urban and agricultural runoff throughout the watershed reach the slough via Devereux Creek and its tributaries. Devereux Slough also receives sediment from erosion that occurs on the UCSB North Campus property and the North Finger of the slough. Pedestrian, bike, and horse traffic can erode trails and spread weeds. Beach recreation in the dune area can trample dune vegetation, harm rare arthropods (Globose Dune Beetle, Sand Tiger Beetle, Dune Spider), and disturb shorebirds. Unauthorized parking at the Coal Oil Point parking lot contributes to increased beach use, vandalism, trespassing, and trash.

COPR does not manage the marine intertidal habitats adjacent to the Reserve; this area is under the authority of the California State Lands Commission. The California Department of Fish and Game (CDFG) has several policies to preserve these intertidal habitats and protect the organisms from unauthorized collection and overexploitation. The Reserve cooperates with the CDFG to promote the protection of biological resources in the marine intertidal zone adjacent to the Reserve boundary.

Existing Policies. Activities that will or are likely to damage Reserve resources will not be permitted. Fencing, barriers, signage and enforcement will be used to prevent damage from pedestrians, pets, bicycles, equestrians and vehicles. COPR will work with UCSB to ensure that public parking near the Reserve will be limited and controlled. With the approval of controlling authorities (e.g., California Coastal Commission), access to Sands Beach may be modified to protect sensitive resources. The Reserve has implemented a Snowy Plover Management Plan, approved by the California Coastal Commission, for protection of threatened plovers that roost and breed on the beach and foredune area of COPR.

Goals and Actions. To provide for the protection of native ecosystems, the Reserve will protect native plant communities from invading exotic plants, divert public access away from sensitive habitats, control erosion, and remove trash and debris. The impacts of unauthorized parking will be diminished by working with UCSB's Parking Services to reduce unauthorized use. For example, a gate may be installed to close the parking lot at night. To reduce the environmental impacts of recreation and public access, the Reserve will work with the campus to patrol the public areas, enhance compliance with existing laws, and maintain public areas.

2. Restoration and Enhancement Program

Status. COPR has a number of exotic and invasive species that must be eradicated or controlled (Table 2). These plants have degraded natural habitats and displaced native species. COPR has started removing the most invasive species such as *Acacia*, pampas grass, iceplant, and *Myoporum* (Figure 7). The grasslands (Figure 7) are also in need of restoration because European grasses dominate the vegetation and prevent native species to become established. Grazing and fire, which were natural phenomena at COPR, are now absent owing to fire suppression and loss of large native grazers. California native species of non-local origin have been introduced in the past to the Reserve as part of soil remediation projects, by accident, or by unauthorized planting. These plants must be

removed to avoid hybridization with local genotypes and to limit confounding effects for researchers studying these species. Sites have been restored over the years through a number of volunteer efforts or grants. Below is a summary of each project:

Eastern dune restoration: (area 1 in Figure 7). This site is located on the south-east corner of the Reserve and measures approximately 6 acres. The area was restored from 1998 to 2002 with the help of volunteers. Before it was restored, the site was dominated by acacia and there were almost no native species on site except for some nightshade, willows, and a small patch of *Scirpus mexicanus*. When the acacia was removed, the bare area revealed a complex landscape with dune and sandy loam soils. The dunes were planted with seeds collected from plant species found on the dunes on the west side of the slough. On the sandy loam soil seedlings of coastal scrub species were planted to mimic the vegetation growing on the west side of the slough. Plants were grown in the Reserve's greenhouse from seeds collected on the Reserve.

Slough margin restoration: (area 2 in Figure 7). This site is located immediately south of the bridge over the Devereux slough channel. The restoration project was funded by a Shoreline Preservation Fund grant for $13,000 in 2002. Before it was restored, the area was dominated by a number of exotic shrubs such as *Acacia*, *Myoporum*, and large *Eucalyptus* trees. Some native species such as Coastal Scrub Oak (*Quercus agrifolia*), Mugwort (*Artemisia douglasiana*), and California brome (*Bromus carinatus*) occurred in the gaps and edges of the thick exotic vegetation. The exotic shrubs and trees were planted years ago for a landscape project. The goal of the project was to restore the area with native coastal scrub species, improving the views from the public trail while visually screening the Devereux Foundation buildings. All exotic brush species were removed, eucalyptus trees were trimmed to within 2 meters from the ground, and coastal scrub species and oak trees were planted. All plants used in this restoration project, except the California Sunflower and Lemonade Berry, were propagated from seeds collected from plants found on the Reserve, and were grown in the Reserve greenhouse. Seeds of the California sunflower were collected at Goleta beach and Lemonade Berries were collected at the UCSB's north bluff because there was no source of seed for these species on the

Reserve. A professional arborist removed the trees and shrubs and the area was planted with natives with help of numerous volunteers of the Santa Barbara Chapter of the Audubon Society. A wood fence replaced a degraded barbwire fence along the slough margin at the completion of the project.

Slough margin, eastern edge: (area 3 in Figure 7) The eastern margin of the slough was restored in 1999 through a grant provided by the Coastal Resource Program (CRP) (Number 46-A-98) in collaboration with the Santa Barbara County. The project included restoration of the slough margin and the vernal pool on west campus, the installation of benches and educational signs, and planting of vegetation to screen buildings. The CRP grant was for $85,000 and $15,000 of in-kind matching funds was provided by UCSB. The slough margin was dominated by iceplant that was killed by covering it with black plastic for 8 weeks. The thatch was removed by hand and taken off-site. None of the natural plant community endemic to this very degraded site remained to provide a model for restoration. We used the plant communities found at nearby wetland sites (e.g. Hollister Ranch and Carpinteria Salt Marsh Reserve), which are similar to COPR but less degraded, to determine which species to plant and their distributions in the restored areas. Seedlings of several species from COPR were propagated in the Reserve's greenhouse.

North-east corner. (area 4 in Figure 7). This area was dominated by iceplant and restored in 2000 by students from the Goleta Family School under the supervision of the Reserve Director. Students removed the iceplant by hand and hauled it off-site. They collected seeds of native plants on the Reserve and cultivated them in the Reserve's greenhouse. The plants were transferred to the site during the winter. Restoration on this site is ongoing; the remaining exotic trees and iceplant will be removed (see site 1, Table 3.2 and Figure 3.1).

Northern margin: (area 5 in Figure 7). The ongoing project to restore the northern margin of the slough is funded with a grant from the Shoreline Preservation Fund. The project began in 2000 when a large *Meleleuca* removed tree from the wetland edge. This tree was the site of a homeless encampment that was a problem for the Reserve. In 2002, the Santa

Barbara Audubon Society, with the help of the Reserve Director, received a grant for $28,800 from the Wetlands Recovery Program to remove exotic species and plant native species along in a 1.25 acre area along the northern margin. The restoration project will be completed in 2004.

Vernal pool project: (area 6 in Figure 7). The vernal pool was created in 1987 as a mitigation project for the UCSB West Campus Faculty Housing project. It was the first vernal pool reconstruction project attempted by the UCSB Museum of Systematics and Ecology and was moderately successful. Currently, the deep areas of the pool function as a vernal marsh that rarely dries up, and the shallower edges as a vernal pool that dries up seasonally.

Dune pond project: (area 7 in Figure 7). The main goal of this project was to eradicate Pampas Grass from the Reserve. In 2000, COPR received a $46,000 grant from the Coastal Resource Program (Number 52-A-99). The County of Santa Barbara collaborated on the proposal and provided $500 in matching funds. An additional $10,000 in matching funds was provided by UCSB. One acre of pampas grass was removed from the dune pond margin using a backhoe and disposed off-site. Isolated clumps of pampas grass were sprayed with glyphosate and left on-site to decompose. Small plants were removed by hand. Volunteers also removed curly dock and cockle burr by hand. Other tasks in this grant included installation of 6 interpretive signs and benches.

Soil remediation site: (area 8 in Figure 7). This project is located on the west boundary of the Reserve in the 40 acres that were added to the Reserve in 1998. The area was replanted in the 1980's after a remediation project to clean up the soil. The origin of the plants used to replant the area is unknown, but it is clear that they came from a variety of locations. For example, the *Lupine arboreus* has a yellow-flower and is native to Monterey. The coastal golden bush is much taller than the variety native to the Reserve and has a different leaf shape. These plants that originated from non-local populations can hybridize with the Reserve's natural populations and alter the local gene pool. Ideally the vegetation in this area should be removed and the site restored with local genotypes.

Existing Policies. Large-scale management actions may be required to restore natural areas. Removal of exotic trees will be timed to limit disturbance to nesting birds. Wetlands will be restored consistent with the Wetlands Restoration and Management Plan for Devereux Slough developed by the campus in the late 1980's (Ferren et. al, 1986, 1990).

New policies. Exotic plants and non-local native species will be eradicated or controlled except when: (a) they provide desired visual screening or landscaping for buildings, (b) they provide irreplaceable resources for sensitive animal species (native plants may be planted to replace this function), for example nesting sites for Black-shouldered kites, and (c) they have scenic value as long as they do not conflict with the primary function of the preservation or restoration of native species. To the extent possible, COPR will avoid using herbicides. To enhance the Reserve's grassland, the Reserve will work with grassland experts and the Santa Barbara County Fire Department to evaluate the feasibility of various grass management methods. Mowing of grasslands and controlled burns may be used to manage grasslands. Revegetation with native species will be used to restore degraded habitats. Local seed sources will be used for revegetation unless local populations are eradicated and reintroduction using off-site sources is desired

Goals and Actions. To restore habitats (Figure 7) to a natural state, the Reserve has developed a habitat management plan (Appendix 3) and will seek extramural funds to implement the plan. To reduce unauthorized access to the Reserve and thus limit habitat degradation, the Reserve will close and restore unauthorized trails (Access Plan, Appendix 1). To develop awareness of habitat restoration, the Reserve will involve community volunteers and students from UCSB. To protect the integrity of the Reserve's genetic stocks, the Reserve will use, and encourage neighboring restoration projects to use, local sources of plants and avoid replanting in areas where natural reseeding is sufficient to restore the habitat after weed removal. To avoid impacts to research projects, the Reserve will provide maps of restored sites to researchers.

3. Endangered and Threatened Species Protection and Recovery Program

Status. The Endangered Species Act requires the development and implementation of recovery plans for listed species. For the purposes of the COPR Management Plan, the Endangered and Threatened Species Protection and Recovery Program includes various sensitive plant and animal species within the Reserve that may have federal or state protection as endangered, threatened, or special-status species. It also includes those that are listed as endangered or possessing special status by the California Natural Diversity Database, the California Native Plant Society, and/or the Audubon Society. The diverse habitats at COPR (Figure 4) provide homes for several rare or endangered plants (Figure 8, Table 3) and animals (Tables 4 and 5). COPR has compiled a list of species deserving special protection including plants, vertebrates, and invertebrates. The listed species at COPR that needs immediate protection is the Snowy Plover because of recreation on the beach. COPR has been designated a critical habitat for this species by the US Fish and Wildlife Service (USFWS). The Reserve has prepared and implemented a Snowy Plover Management Plan (Appendix 2). The California Least Terns were former breeders at Sands beach before 1970. After the protection of the beach for the Snowy Plovers, the terns used the beach as a post-breeding site (feeding and training fledged chicks) and in 2004 they started breeding within the plover breeding area. The Reserve is also actively involved in research to promote the recovery of the Ventura Salt-Marsh Milkvetch, a plant that has less than 100 individuals left in the wild. There is no record that this species is native to the Reserve. Its known distribution is south of the mouth of the Ventura river where it occurs on the edges of coastal wetlands. The Reserve was chosen as a research site because even though it is north of the normal distribution, it has the required habitat.

Existing Policies. Activities that may harm, harass, pursue, hunt, shoot, wound, kill, trap, capture or collect endangered or threatened species are prohibited as per the Endangered Species Act.

New policies. The Reserve will contribute to the recovery of rare and endangered species to the extent that funds are available.

Goals and Actions. To protect, enhance, and recover sensitive species (e.g., Ventura Salt-Marsh Milkvetch, Globose Dune Beetle, Western Snowy Plover, Belding's Savanna Sparrow, and White-tailed Kite), the Reserve will monitor sensitive species, reduce impacts on them, develop and implement recovery plans, and, where appropriate, enhance habitats and reduce disturbance.

4. Animal Damage Control Program

Status. Ground-nesting birds in estuaries, beaches and dunes are vulnerable to predation because of the openness of the habitat. Natural predation is part of a functioning ecosystem but, in many urban areas, the natural ecosystem has been altered by changes in the types and number of predators. For example, coyotes can maintain a rich bird community by preying on mid-level predators that prey on birds, but coyotes are vulnerable to urban development and habitat fragmentation. Pets (dogs, domestic and feral cats), native urban predators (raccoons, skunks, crows) and exotic animals (opossums and red foxes) can increase predation, causing the decline of native animals. No animal damage control program exists at COPR at this time. The UCSB LRDP does not permit dogs in the Reserve but routine enforcement is not available unless the Reserve makes a special request to the campus police. The SB County has an ordinance that requires dogs be kept on a leash.

Existing Policies. Whether leashed or not, dogs shall not be permitted in the Reserve (including Sands Beach) (1990 LRDP). Dogs must be on leash in public areas (SB County ordinance). The campus will collect trash from the beach, which should help reduce the presence of predatory species, especially crows.

Goals and Actions. To reduce the population of urban, exotic and domestic predators, the Reserve will investigate and implement methods to discourage their presence in sensitive habitats. For example, crows will be frightened away from the Snowy Plover area during breeding season. To reduce disturbance from dogs, the Reserve will post leash policies and work with the UCSB Police Department to enforce the SB County leash ordinance. If pet disturbances continue to conflict with the COPR research and preservation programs, the Reserve will coordinate with the appropriate County officials to develop an enforceable County ordinance prohibiting pets on Reserve property.

C. STEWARDSHIP PROGRAMS

1. Public Access Program

Status. The beach area of the Reserve is open to the public, except above the mean high tide line in the fenced Snowy Plover roost area. The Reserve provides a brochure with a map that guides the public around the perimeter of the Reserve and on the Dune Pond trail. The brochures are available at the Reserve office. Other trails or access points are not officially recognized. Attempts to discourage the development of new trails through mild natural barriers (logs, plants) have failed. The University provides parking at the north entrance of West Campus (Parking lot 41). Daily or monthly permits for lot 41 must be obtained from self-pay machines or the parking kiosks on campus. The Reserve provides parking permits to the Cliff House Parking lot by application to use the Reserve for research, classes, or field trips. This parking lot is also reserved for Cliff House users. The 50 spaces provided in the Cliff House parking lot are used to capacity by the academic users of the Cliff House and the Reserve. On November 16, 2001, the California Coastal Commission approved the Snowy Plover Management Plan, which included the permanent closure of the Delta path and the installation of a post and rope fence along a 400 m section of the beach to protect the threatened snowy plovers.

Existing Policies. The Reserve manages internal trails and access within its boundaries. Passive recreation in a few limited areas is allowed only if the Reserve determines it will not harm natural resources or affect research and teaching. Access to Sands Beach from adjoining beaches and via a passage near the Cliff House will remain open for pedestrian access and appropriate recreational uses, except when there is a need for the protection of fragile coastal resources. Limited public parking will be provided at the North entrance of West Campus (Lot 41) and, by special permit, at Coal Oil Point.

New policy. The Reserve has developed an Access Plan (Appendix 1) that balances the goals and actions of the Public Access Program with the goals and actions of the other programs in the COPR Management Plan. The Access Plan will be incorporated into the

UCSB Long Range Development Plan (LRDP). Following approval of the UCSB LRDP by the UC Regents and Coastal Commission, the Reserve will implement the Access Plan, which will be considered consistent with CEQA and California Coastal Commission requirements. The Reserve manages internal trails and access within the Reserve boundaries.

Goals and Actions. To permit public access consistent with the above policies and other programs in this document, the Reserve will continue to provide access to some beach areas of the Reserve for passive recreation that does not affect sensitive habitats or species. These access points are (1) from West Campus Beach, (2) from the bluff at the Sands Beach entrance near the Cliff House (East Entrance), (3) from the south terminus of the Dune Pond Trail (Appendix 1), (4) from the bluff between the Reserve and Ellwood Bluffs (West Entrance), and (5) from Ellwood Beach.

To improve the public's educational experience on the Reserve, the public will have access to the interpretive Dune Pond trail, which will be (1) realigned to take advantage of the Reserve's diverse habitats, (2) diverted around sensitive areas so that pedestrians can view the habitats of the Reserve without affecting those habitats, (3) routed onto a boardwalk over the wetland and dune swale areas near the Dune Pond, and (4) enhanced with interpretive signs and benches. A low fence will delineate the edges of the trail and "no trespass" signs placed along the route to keep users from straying off the trail and into the Reserve.

The trail through the north-east corner of the Reserve that connects Slough Rd and the Venoco access road will be upgraded with a boardwalk over the wet areas and the surface will be improved by adding natural materials like wood chips or decomposed granite where needed to reduce erosion. This connecting trail is open to pedestrians and their leashed dogs, equestrians, and cyclists. The perimeter trails along Slough Rd and the Venoco access road are open to the public and will be maintained to prevent erosion, control exotic vegetation and enhance safety.

To clearly delineate the boundaries of the Reserve, the entire north and western boundaries will be fenced and the existing fences along the eastern boundary and the southern boundary at the edge of the dunes will be maintained. To discourage unauthorized access by visitors and pets, a 3-5 meter buffer zone along the northern and western perimeter fences will be restored with native vegetation. The resulting dense band of shrubs will act as a living barrier. This ambitious restoration project will take several years to accomplish and the Reserve must seek supporting funds from federal, state and private agencies. No trespass signs will be posted and maintained along the entire perimeter of the Reserve.

2. Inventory and Monitoring Program

Status: Over the past 15 years, researchers have intermittently monitored the occurrence of animal species, particularly birds (Tables 4, 6 and 7), intertidal invertebrates, and water quality. There are also lists of exotic and native plants (Tables 2 and 3) and some insects (Table 4) on the Reserve. Venoco collects long-term air quality data on the Reserve as a mitigation project. Although these monitoring projects are valuable, they are of short duration (1 to 3 years), and are unlikely to provide information on long-term changes.

Existing Policies. Natural areas will be identified and mapped. Wetlands will be monitored by UCSB in concordance with the approved UCSB Wetlands Restoration and Management Plan that includes Devereux Slough.

Goals and Actions. The Reserve will establish a long-term program to monitor the abundance and diversity of species and habitat types. Funding to support the monitoring program will be identified.

3. Vector Control Program

Status. Many species of mosquitoes are native to COPR and have an important function as food for a variety of other insects, birds and amphibians. Because of the possibility of

public health problems and nuisance, the Santa Barbara County Vector Control District monitors Devereux Slough, Devereux Creek, and other bodies of water and treats various sites to reduce or eliminate mosquitoes. Vector Control District personnel have agreed to treat the areas of standing water on the Reserve with a biological control agent, Vecto-Bac, (active ingredient is *Bacillus thuringensis*). In general, vector control practices in wetlands are viewed as a negative impact on wetland resources. The Reserve staff is working with the Santa Barbara Coastal Vector Control District to use practices that reduce impacts to wetland resources and to research projects that use the wetlands. However, the public health threat of mosquito-borne diseases like West Nile Virus makes active control a necessity.

Existing Policies. UCSB shall use mosquito control methods with the least harmful effect upon non-target organisms. Wetlands shall not be drained for this purpose, nor shall non-native larval predators be introduced to control mosquitoes.

Goals and Actions. To maintain wetlands in natural conditions and increase their value for research, the Reserve will work closely with the UCSB Integrated Pest Management Committee and the Santa Barbara Coastal Vector Control District to ensure that the vector control methods used in the wetland areas have minimum impacts on non-target organisms while safeguarding public health.

4. Watershed Management Program

Status. COPR is in the lower part of the Devereux Watershed and activities that take place on adjacent properties and surrounding properties within the watershed can affect the Reserve ecosystem. For example, sedimentation has accelerated in the slough as a result of poor land-use practices in the watershed (Davis et al. 1990, Ferren and Thomas, 1995). Recreational activities on the UCSB South Parcel (of North Campus) cause significant erosion and sedimentation in the northern portion of the slough (the sedimentation delta is visible from aerial photographs, Figure 16-D). The Santa Barbara County has detected

significant levels of pollutants in the Devereux slough (2004 DEIR). Pollutants in the slough may affect endangered species such as the California Least Tern that feeds on the estuary fishes to raise the young. The UCSB Horse Stable, at the edge of the North Finger, has contributed to erosion and degradation of the wetland where it sits, and to sedimentation in the slough. Many of the properties adjacent to the Reserve could benefit from more proactive management programs that can protect and preserve natural systems on the Reserve, as well as on the neighboring properties.

Existing Policies. Coordinate with and encourage action by the County of Santa Barbara, City of Goleta, and the Regional Water Quality Control Board to see that adjacent land uses are established and carried out in a manner that will sustain biological productivity and diversity. The campus shall support the implementation of measures to protect and promote enhancement of the biological functions of the Devereux Slough as outlined in the LRDP (Appendix 7). Sedimentation from the horse paddocks in the watershed of the North Finger of the Devereux Lagoon shall be eliminated. Fills shall not affect wetlands directly or by erosion

Goals and Actions. To provide for the long-term protection of the biological functions and values of Devereux Slough, and to protect the slough and COPR from detrimental impacts originating in the watershed, the Reserve will (a) work with the California Coastal Commission, UCSB, County of Santa Barbara, Isla Vista Recreation and Park District, Goleta Union School District, City of Goleta, and other responsible agencies to minimize degradation of the estuarine ecosystem and to improve the quality of the run-off from development in the watershed; (b) implement LRDP policies to eliminate sedimentation and nutrient enrichment from the North Finger; and (c) work with UCSB Campus Planning and Design to reduce erosion from the North Campus South Parcel.

To assess the impact of erosion and sedimentation on the biological functions of the Devereux Slough and define restoration goals and guidelines, the Reserve will appoint a committee of experts that will develop a slough restoration and enhancement plan. To

implement the plan, the Reserve will work with the campus, local agencies and grant programs to fund the restoration and monitoring activities.

5. Flood Control Program

Status. Large areas of intensively developed lands above Devereux Slough are subject to flooding, erosion, and the subsequent deposition of sediment and debris. Factors exacerbating flooding and sediment deposition in the slough and surrounding lands include large winter storm events, erosion of land in the lower watershed, fire and development in the upper watershed, and reduced drainage capacities in the slough. In addition, obstruction of the estuary inlet by sand temporarily prevents the drainage of sediment-laden floodwaters to the Pacific Ocean. In 2002 the Santa Barbara County Flood Control District conducted the first flood control project at Devereux Creek to remove sedimentation on the creek.

Existing Policies. Campus and COPR projects shall be designed to minimize soil erosion and, where possible, to direct surface runoff away from coastal waters and wetlands. Sediment removal will minimize disturbance to wildlife and wetland habitats.

Goals and Actions. To reduce sedimentation in the wetland caused by land uses in the watershed, the Reserve will work with responsible public agencies that manage floodwaters and erosion. To reduce the cumulative effects of sedimentation and flood control activities, the Reserve will seek funds to restore degraded habitats.

D. ADMINISTRATIVE PROGRAMS

Status. Active management of the Reserve requires coordination between the Reserve Director and the UCSB NRS administration, management of budgets, maintenance of infrastructure, and attention to health and safety issues. The UC NRS Office provides support and coordination of (a) real estate, environmental, legal, and business matters as they affect any or all of UC NRS reserves; (b) acquisition of new reserves; (c) periodic reserve reviews; and (d) development of system-wide Reserve policies and practices; and (e) provides publications.

1. Reserve Administration Program

Status. The UCSB Natural Reserve System is administered by the campus NRS office located in the Marine Science Institute, an Organized Research Unit under the Office of Research. The Director of the UCSB NRS is advised by the NRS Advisory Committee, which consists of faculty, staff, and students from many departments, as well as community members with shared interests. All Reserves managed by UCSB have Faculty Advisors and Reserve Directors and some have Reserve Stewards. The NRS administrative staff, which includes a Management Services Officer, an Administrative Assistant and the Associate Director, also assists the UCSB NRS Director.

Existing Policies. The Reserve Director has primary responsibility for approving applications, and will coordinate management and all other uses of the Reserve. In consultation with the campus NRS Director, the NRS Assoc. Director, the Faculty Advisor, and the COPR Advisory Committee, the Reserve Director will address use conflicts and Reserve policy.

Goals and Actions. To provide strong leadership for the management, protection, restoration, and use of COPR, the Reserve will maintain the existing or an equivalent administrative structure.

2. Fiscal Program

Status. COPR has a full-time Reserve Director position and a small recurring annual budget annually for maintenance (supplies and expenses) provided by the UCSB Office of Research and the UC Office of the President. The recurring budget is augmented by extramural grants and donations acquired by the Reserve Director.

Existing Policies. The Reserves may establish an appropriate fee structure for use of the Reserve's facilities by users for research, instruction and public outreach (NRS Use Guidelines).

Goals and Actions. To fund programs, maintain the Reserve's infrastructure and resources, and respond to current and future needs associated with restoration activities and public use, the Reserve will seek a larger recurring budget for maintenance and staff.

3. Infrastructure, Facilities and Equipment Programs

Status. Existing infrastructure includes buildings, utility lines, culverts, and roads. There are six University buildings managed by the Reserve, all on West Campus, just east of the Reserve: a residence for the Reserve Director, an office, a plover education center, two storage sheds, and one greenhouse. There are no on-site facilities to house researchers or students. The Reserve has a satellite internet connection and phone lines at the Reserve Office.

Existing Policies. The management plan will identify the optimum allowable facilities for resident staff, researchers, classes, and public outreach programs. In general, existing and new infrastructure will be minimal, consolidated, and adjacent to the Reserve at Coal Oil Point. In order to protect habitats of the Reserve the total square footage of current and replacement Coal Oil Point structures shall not exceed the total square footage of current Coal Oil Point structures (UCSB 1990 LRDP 30240(b).6). New structures will be consistent with the UCSB 1990 LRDP.

New policy. Improve the quality of infrastructure and facilities for users.

Goals and Actions. To better assist Reserve users, the Reserve will seek funds to restore or create a building for classroom and research functions. COPR will seek to acquire access to a classroom facility near the north-eastern boundary of the Reserve, which will help to focus public outreach activities away from the sensitive beach area of the Reserve. All proposed projects will be evaluated for CEQA compliance and the Reserve will seek California Coastal Commission approval.

4. Health and Safety Program

Status. Owing to the formal nature of the Natural Reserve System application process used for access to COPR and other UC Reserves, it is essential that a health and safety program informs, protects, and assists Reserve users. The release form signed by formally-authorized Reserve users protects the University from various liabilities and serves as a means to inform users of potential hazards. The Cliff House, adjacent to the Reserve, has a public telephone. One of the largest public safety problems is high-speed traffic along Slough Rd. The Reserve removed iceplant along Slough Road to provide a 1,500 ft long pedestrian trail adjacent to the road (previously pedestrians walked in the roadway) and to restore habitat. Historically, no public restrooms have been available at Coal Oil Point and the public frequently used the vegetated areas as bathrooms. A portable public restroom facility (funded by the Shoreline Preservation fund) was placed at the Coal Oil

Point parking lot. Beach parties and alcohol use can result in broken glass, public intoxication and underage drinking; this can be dangerous to the public and to Reserve staff.

Existing Policies. Applications to use the Reserve will be evaluated for safety. Noise will be kept below 60 db. Fires and barbecues are not permitted anywhere within the Reserve boundaries outside of buildings, including the beach.

Goals and Actions. To continue to provide appropriate health and safety procedures for COPR and maintain reasonable physical conditions of safety, the Reserve will (a) make emergency kits available to users, (b) inform COPR staff of possible hazards associated with working at the Reserve and, when applicable, train them in safety procedures, (c) develop and post the COPR Reserve Emergency Operations Plan, (d) provide necessary safety equipment to workers and volunteers where needed, (e) support efforts to improve speed control along Slough Rd, (f) support other efforts to divert traffic from Slough Rd, (g) post fire policies at beach entrances, and (h) work with the campus police to improve compliance with the Santa Barbara County leash ordinance.

5. Catastrophic Event Response Program

Status. COPR is potentially subject to catastrophic pollution events from flooding, oil spills, tide waves, and toxic gases associated with adjacent oil operations. The site is within an active tectonic zone, where a strong earthquake could cause serious damage to oil facilities.

Existing Policies. The Reserve will be consistent with the Campus Catastrophic Event Response Program. Permanent structures will not be placed on faults or bluffs.

Goals and Actions. To contribute to the Campus catastrophic event response program, the Reserve will develop a rapid response protocol for potential catastrophic events that could affect COPR and Devereux Slough.

6. Cooperative Management Program

Status. Most university-owned properties adjacent to the Reserve have no specific management structure and could benefit from active management. In addition, degradation to some of these areas affects the Devereux Slough drainage. Contiguous properties identified so far as containing significant biological value and in need of management are (Figure 9): the North Finger of Devereux Slough, UCSB-owned parts of the South Finger of Devereux Slough, and the West Campus Bluffs from Isla Vista to the Coal Oil Point boundary.

Existing Policies. Human activity is to be limited and/or carefully controlled in environmentally sensitive habitat areas (ESHAs).

Goals and Actions. To improve preservation of ESHA in the Devereux Slough ecosystem, the Reserve will assist UCSB and neighboring property owners in creating a watershed-based management program. The Reserve will consider the campus requests for COPR to manage the north and south fingers of the slough and to cooperate with management efforts in other sensitive areas adjacent to the Reserve (see buffer zones in Figure 9). The Reserve will work with the University Center to develop a cooperative agreement for common use of Cliff House to accommodate the Reserve's needs for access to a meeting facility and restrooms. The Reserve will work with the City of Goleta, UCSB and the Museum of Systematics and Ecology to coordinate protection efforts in the Devereux/Ellwood area.

Summary of Program Goals and Actions

A. USER PROGRAMS
1. Research Program
Goal: 1. Increase research activity at COPR *Actions*: Actively recruit researchers (e.g., through lectures, field trips, brochures, personal contacts, and publications), update resource inventories and monitoring databases which will be available to Reserve users *Goal*: 2. Minimize the impact of vandalism on research *Action*: Protect research areas from trespassing
2. Education Program
Goal: 1. Facilitate the use of COPR for class use *Actions*: Encourage faculty to use the Reserve in their classes, offer field trips and lectures, and build or restore a classroom/lab facility
3. Public Service Program
Goal: 1. Improve the educational content of self-guided tours *Actions*: Update the self-guided tour brochure, post information on the web and provide interpretive signs along the official trail *Goal*: 2. Enhance environmental education opportunities for the community *Actions*: develop a weekly docent-led tour and public lectures.
B. HABITAT CONSERVATION PROGRAMS
1. Habitat Preservation Program
Goal: 1. Provide for the protection of native ecosystems *Actions*: Control the invasion of exotic plants, divert public access away from sensitive habitats, control erosion, remove trash and debris

Goal: 2. Reduce the impacts of unauthorized parking

Action: Work with UCSB Parking Services to reduce unauthorized use

Goal: 3. Reduce impact from recreation and public access

Actions: Work with the University to patrol the public areas, enhance compliance with existing laws, and maintain public areas

Goal: 4. Reduce unauthorized collection of marine organisms in the intertidal zone

Action: Work with the California Department of Fish and Game to post state regulations

2. Restoration and Enhancement Program

Goal: 1. Restore habitats to a natural state

Action: Seek extramural funds to implement the Habitat Management Plan (Appendix 3)

Goal: 2. Limit unauthorized access and habitat degradation

Action: Close and revegetate unauthorized trails

Goal: 3. Develop awareness of habitat restoration

Action: Involve community volunteers and students from UCSB in restoration projects

Goal: 4. Protect the integrity of the Reserve's genetic stocks

Action: Use, and encourage neighboring restoration projects to use, local sources of plants and avoid replanting in areas where natural reseeding is sufficient to restore the habitat after weed removal

Goal: 4. Avoid impacts to research projects

Action: Provide maps of restored sites to researchers

3. Endangered and Threatened Species Protection and Recovery Program

Goal: 1. Protect, enhance, and recover sensitive species

Actions: Monitor sensitive species, reduce impacts on them, develop and implement recovery plans, and, where appropriate, enhance habitats and reduce disturbance

4. Animal Damage Control Program

Goal: 1. Reduce the population of urban, exotic and domestic predators

Actions: (a) discourage the presence of exotic and urban predators, and (b) encourage beach clean-ups

Goal: 2. Reduce disturbance from dogs

Actions: Post signs about the SB County leash ordinance and work with the UCSB Police Department to enforce it. If pet disturbances continue to conflict with the COPR research and preservation programs, the Reserve will coordinate with the appropriate County officials to develop an enforceable County ordinance prohibiting pets on Reserve property.

C. STEWARDSHIP PROGRAMS

1. Public Access Program

Goal: 1. Permit public access consistent with the above policies and the other programs in this document

Actions: Provide access into beach areas of the Reserve for passive beach recreation activities that do not affect sensitive habitats or species. These access points are: (a) from West Campus Beach, (b) from the bluff at the Sands Beach entrance near the Cliff House, (c) from the south terminus of the Dune Pond trail, (d) from the bluff between the Reserve and Monarch Point, and (e) from Ellwood Beach

Goal: 2. Improve the public's educational experience on the Reserve

Actions: Enhance an interpretive trail that is (1) realigned to take advantage of the Reserve's expanded size, (2) diverted around sensitive areas so that pedestrians can view the habitats of the Reserve without affecting those habitats, (3) enhanced with a low fences, interpretive signs and benches. The perimeter trail along Slough Rd. will be maintained with respect to safety

2. Inventory and Monitoring Program

Goal: 1. Establish a long-term program to monitor the abundance and diversity of species and habitat types

Action: Seek funds for research projects to inventory and monitor Reserve resources

3. Vector Control Program

Goal: 1. Use mosquito control methods that will have the least effects on non-target organisms and will maintain wetlands in natural conditions

Action: Work closely with the UCSB Integrated Pest Management Committee and the Santa Barbara Coastal Vector Control District to ensure that the vector control methods used in the wetland areas have minimum impacts on non-target organisms while

safeguarding public health.

4. Watershed Management Program

Goal: 1. Provide for the long-term protection of the biological functions and values of Devereux Slough, and to protect the slough and COPR from detrimental impacts originating in the watershed

Actions: Work with the California Coastal Commission, University of California, County of Santa Barbara, Isla Vista Recreation and Park District, Goleta Union School District, City of Goleta, and other responsible agencies to minimize degradation of the estuarine ecosystem and to improve the quality of the run-off from development in the watershed. Implement LRDP policies to eliminate sedimentation and nutrient enrichment from the North Finger and work with UCSB Budget and Planning and the South Parcel's management authority to reduce erosion from the North Campus South Parcel. Form a committee of experts to assess the current condition of the slough and develop a restoration plan.

5. Flood Control Program

Goal: 1. Reduce sedimentation in the wetland caused by land uses in the watershed.

Action: Work with responsible public agencies to manage flood waters and erosion.

Goal: 2. Reduce the cumulative effects of sedimentation and flood control activities.

Action: Seek funds to restore degraded habitats.

D. ADMINISTRATIVE PROGRAMS

1. Reserve Administration Program

Goal: 1. Provide strong leadership for the management, protection, restoration, and use of COPR.

Action: Maintain the existing administrative structure.

2. Fiscal Program

Goal: 1. Fund programs and maintain the Reserve's infrastructure and resources.

Actions: Seek a larger recurrent budget to support current and future maintenance and staffing needs.

3. Infrastructure, Facilities and Equipment Programs

Goal: 1. Improve the quality of infrastructure and facilities for users. *Action*: Seek funds to restore or create a building for classroom and research functions.
4. Health and Safety Program
Goal: 1. Provide appropriate health and safety procedures for COPR and maintain reasonable physical conditions of safety. *Actions*: Make emergency kits available to users. Inform COPR staff and volunteers of possible hazards on the Reserve and provide training and safety equipment when needed. Post the Emergency Operations Plan in the Reserve office. Support efforts to improve speed control along Slough Rd and divert traffic from the road. Post fire policies at beach entrances, and work with the campus police to improve compliance with the Santa Barbara County leash law.
5. Catastrophic Event Response Program
Goal: 1. Contribute to the Campus catastrophic event response program. *Action*: Develop a rapid response protocol for potential catastrophic events that could affect COPR and Devereux Slough.
6. Cooperative Management Program
Goal: 1. Improve preservation of ESHA in the Devereux Slough Ecosystem Area *Action*s: Assist neighboring property owners, including UCSB in creating a watershed-based management program. Consider the campus requests to manage the north and south fingers of the slough and cooperate with management efforts in other sensitive areas adjacent to the Reserve (see buffer zones in Figure 9). Work with the City of Goleta and UCSB to coordinate protection efforts in the Devereux/Ellwood area.

Appendices

Appendix 1. Coal Oil Point Reserve Access Plan

The Coal Oil Point Reserve recognizes the value of the public experiencing and appreciating the Reserve's unique habitats. Its relatively liberal access policies are an exception to general Natural Reserve System policy and represent an opportunity for the Reserve to promote its education and outreach missions. Implementation of the Access Plan will provide appropriate forms of public access while protecting sensitive habitats. For example, in 2000, the Reserve created 1,500 ft of new interpretive trails along the Devereux Slough margin to promote environmental education and increase pedestrian safety while planting the margin of the slough with native vegetation. Benches and interpretive signs have enhanced the public's experience and their understanding of the Reserve's fragile ecosystems.

The Access Plan proposed here was created according to the following principles: (1) map, set priorities, and protect sensitive habitats, (2) protect research areas from vandalism, (3) maintain historical human use of the area if appropriate, and (4) maximize public education along trails. This balanced approach will help maintain appropriate public access and fulfill the Reserve's mission of providing protected natural areas for research, education, and public outreach.

Status. Access to fenced areas can be obtained by a formal application through the Natural Reserve System if the intended use is consistent with the NRS Use Policies. In addition, unlike most UC NRS Reserves, COPR allows the public to access the perimeter of the Reserve, the Dune Pond trail, and the beach (except the plover area) without requiring a formal use application.

The northern and western boundaries of the Reserve are not fenced. As a result, public access is not effectively restricted although the LRDP requires access to be limited to designated trails. Unauthorized public use of the internal trails by pedestrians, bicyclists, and equestrians is increasing with development of the Goleta Valley. Some of these trails

were created informally by unauthorized use (e.g., bike and horses). They are eroded and a focal point for the invasion of introduced species. Additional impacts of unauthorized public use include disturbance of sensitive plant and animal resources by users and their pets, vandalism, and the accumulation of trash, which attracts scavengers that also prey on sensitive animal species like juvenile snowy plovers.

Although NRS policy generally disallows recreational use of its reserves, recreation is permitted along the beach area of the Coal Oil Point Reserve. Seventy percent of the beach users are UCSB students and most come to walk, jog, or surf. Others come for birding, painting and nature study, which are activities that the Reserve facilitates.

The Cliff House and Reserve share the use of the parking lot at Coal Oil Point which is limited to 50 spaces. Only Cliff House users and participants in Reserve field trips or classes can be issued special permits to park in this lot. Restricting the use of the parking lot has helped limit inappropriate recreational use of sensitive habitats on the Reserve, a need heightened by the 1993 listing of Western snowy plovers that roost on the adjacent beach. Presently, the Sands Beach area adjacent to the plover roost, is the most heavily used section of beach. There is public parking on the west end of Isla Vista and at the north entrance to West Campus (Lot 41). Both areas are a 10-minute walk from Coal Oil Point.

Goals and Actions. Allow public access within guidelines established by the policies of the User and Habitat Conservation programs. In summary, these are:

1. Permit appropriate forms of public access along the beach, along the Reserve perimeter, on the connecting trail between Slough Rd. and the Venoco access road, and on the interpretive Dune Pond trail (see Access Plan and Figure 6 for details),
2. Protect research and university class projects and educational activities from disturbance by visitors (User programs),
3. Protect sensitive habitats and species from disturbance by visitors (Habitat Conservation Program, also see Snowy Plover Management Plan).

New policies. Public access is permitted on the beach except in the designated snowy plover roost and nesting areas delineated by a post and rope fence. Public access is also permitted through the north-east corner of the Reserve on a trail connecting Slough Rd. and the Venoco access road. Pedestrian access through the upland areas of the COPR is permitted on a re-routed, internal Dune Pond trail (Figure 6) as described below, as well as several trails on the Reserve's boundary. When there is a conflict between conservation of natural habitats (or research areas) and access, access will be modified to accommodate the conservation priorities. The Reserve will manage internal trails and access within the Reserve boundaries to protect natural resources and research projects. The Reserve retains the right to request termination of an activity that harms natural resources, including wildlife. Surf contests and try-outs and launching of kite surfing from the beach are not allowed because of the great disturbance they cause to wildlife.

The trail through the north-east corner of the Reserve that connects Slough Rd and the Venoco access road will be upgraded with a boardwalk over the wet areas and the surface will be improved by adding natural materials like wood chips or decomposed granite where needed to control erosion. This connecting trail is open to pedestrians and their leashed dogs, equestrians and bicyclists. The perimeter trails along Slough Rd and the Venoco access road are open to the public and will be maintained to prevent erosion, control exotic vegetation and enhance safety.

To clearly delineate the boundaries of the Reserve, the entire north and western boundaries will be fenced and the fences along the eastern boundary and the southern boundary at the edge of the dunes will be maintained. To discourage unauthorized access by visitors and pets, a 3-5 meter buffer zone along the northern and western perimeter fences will be restored with native vegetation. The resulting dense band of shrubs will act as a living barrier. No trespass signs will be posted and maintained along the entire perimeter of the Reserve.

<u>Beach area access and restrictions associated with the Snowy Plover Management Plan</u>

The public can access the beach from West Campus Beach and Ellwood Beach and from 3 access points on the bluffs, at the eastern boundary of the Reserve near the Cliff House, at the southern terminus of the Dune Pond trail, and at the western boundary of the Reserve adjacent to Ellwood Bluffs. The eastern bluff access point near the Cliff house is currently unimproved. There is a control gate that restricts access to pedestrians and inhibits access by motorized vehicles, bicyclists and equestrians. Visitors proceed down the cliff along a trail that follows the edge of the foredunes and reaches the beach near the plover area. To improve access, the Reserve will seek financial support to replace the trail with a stairway down the cliff that directs visitors onto the beach away from the plover area. The terminus of the Dune Pond trail will also be upgraded as detailed below.

Foot traffic and leashed dogs are allowed on the beach except within the dry sand areas of the plover roost and nesting areas, which are designated by a post and rope fence and signs (see Snowy Plover Management Plan). The post and rope fence surrounding the roost area in winter will be extended during the breeding season to also protect nesting birds. Horses are not allowed on the beach to avoid disturbance to plovers and other shorebirds. A beach corridor will be provided so that lateral movement of people along Sands Beach is not impaired. Docents will staff the beach area and provide information to the public about plover protection measures. The Delta path has been permanently closed to reduce foot traffic through the plover roost as per the Coastal Commission decision of November 16, 2001. Group recreational activities, such as Frisbee, football, kite flying, and surf contests, will be not allowed on the beach. The reserve will work with the campus police to achieve compliance with restrictions on alcohol intoxication and prohibitions of fires and camping in the Reserve (including the beach area), and to reduce vandalism, litter and trespassing. The Reserve will also work with campus police to achieve compliance with the Santa Barbara County leash ordinance. Lack of compliance with beach regulations that the Reserve's resources, including snowy plovers, will cause access on Sands Beach to be re-evaluated to ensure protection of the Reserve and the plovers.

<u>Fence the Reserve boundary and post information on public access and sensitive natural resources.</u>

To clearly delineate the boundaries of the Reserve, the entire north and western boundaries will be fenced and the existing fences along the eastern boundary and the southern boundary at the edge of the dunes will be maintained. To discourage unauthorized access by visitors and pets, a 3-5 meter buffer zone along the northern and western perimeter fences will be restored with native vegetation. The resulting dense band of shrubs will act as a living barrier. This ambitious restoration project will take several years to accomplish and the Reserve must seek supporting funds from federal, state and private agencies.

Signs will be posted along the perimeter fence to further identify the Reserve boundaries and help prevent impacts from trespass. Additional signs along the boundaries and trails will also help the public identify sensitive habitats and species and use the area in a manner that protects natural resources. Maps of trails and sensitive areas will be posted and signs will identify beach access points. The Reserve will work with the California Department of Fish and Game to protect marine organisms by posting state regulations regarding collecting marine organisms that inhabit the intertidal zone adjacent to the Reserve.

Parking

Public parking for visitors is permitted at the north entrance to West Campus (Lot 41). The Reserve also grants permits for users, subject to an approved application, to park at the Coal Oil Point parking lot (which is shared by the Cliff House and the Reserve). The Reserve has recently formalized two public vehicle-stopping areas along Slough Road to accommodate bird watching, nature viewing, and painting. These parking areas do not require a permit, but the user must be within sight of his/her vehicle.

Internal Interpretive Dune Pond Trail

The existing internal trail (Dune Pond trail, Figure 6) has a deleterious effect on adjacent habitats. It bisects two sensitive habitats, a coastal wetland area and a dune swale. Erosion along its steep slope causes sediment input to the Dune Pond. The southern portion of the

trail floods in the winter, forcing pedestrians to walk on the sensitive wetland. Finally, the trail's southern terminus places visitors within the snowy plover nesting area.

To solve these problems, the trail (Figure 6) would be re-routed to reduce erosion and improved with a boardwalk over wetland and dune swale areas. When the boardwalk is constructed, an existing low berm will be removed to restore water flow between the dune swale and wetland areas during the rainy months. Instead of cutting straight across the grassland area, the proposed trail would wind along the slough margin giving visitors views a variety of habitats including the slough, a vernal pool, a pond, grasslands, scrub and wetlands. The Sands Beach terminus will have signs warning visitors to avoid the snowy plover fenced areas. To keep pedestrians on the trail, the edges will be delineated by an unimposing (2 ft. high) rustic rail or rope fence. The trail will have interpretive signs and wildlife viewing areas with benches. The grasslands near the trail will be restored. To maintain the quality of the habitats and wildlife within the Reserve, bikes, horses, dogs and all motorized vehicles will be prohibited on the Dune Pond trail. A self-guided tour map and brochure of the Reserve will be made available to the public at the Reserve office, over the internet and at the Dune Pond trail head. There are numerous unauthorized trail segments in the Reserve; they will be closed and revegetated. The Reserve will seek funds to implement these improvements. When trails are closed, signs will be posted at closure points explaining the need for closure and redirecting visitors to alternate routes.

Perimeter and connecting trails

The trail through the north-east corner of the Reserve that connects Slough Rd and the Venoco access road will be upgraded with a boardwalk over the wet areas or moved and the surface will be improved by adding natural materials like wood chips or decomposed granite where needed to reduce erosion. This connecting trail is open to pedestrians and their leashed dogs, equestrians and cyclists.

The Reserve will improve and maintain a trail around the Reserve's perimeter that will be accessible to pedestrians, equestrians and cyclists. Trail upgrades will enhance user safety

and resource protection. Where appropriate, natural materials will be used to increase the dryness of trail surfaces. The perimeter trail will lead visitors to an eastern beach access point and a western beach access point and will connect visitors to other regional trails. Interpretive signs and benches will be installed along the trail to enrich the visitor's experience.

Appendix 2. Snowy Plover Management Plan (SPMP)

Summary.

The Coal Oil Point Reserve manages 170 acres of coastal habitats including the beach to the mean high tide. Sands Beach near the Devereux Slough mouth is a wintering site for approximately 400 western snowy plovers (SP), a threatened shorebird. Breeding of WSP occurred at the Reserve until the beach was open to the public in the late 1960s. Evidence suggests that increased public use caused intense disturbance to wintering plovers and may have contributed to the cessation of breeding. The goal of the 2001 Snowy Plover Management Plan (SPMP) was to reduce disturbance of wintering plovers. The plan was approved by the California Coastal Commission on November 16, 2001. The SPMP includes the following actions that were implemented starting in December 2001: (1) installation of educational and regulatory signs, (2) closure of the Delta path that terminated in the plover roost area, (3) installation of a post and rope fence along a 400 meter. stretch of beach above the mean high tide, (4) creation of a program to enlist docents to monitor plovers on the beach and educate the public about plovers, and (5) implementation of actions to reduce disturbance by official Reserve users, the public (e.g. direct public activities away from the roost area), domestic animals (e.g. increase compliance with leash rules and ordinances), and predators (e.g. reduce crow activity by cleaning up trash). Additional actions outlined in the 2001 SPMP have not been implemented because they were not authorized by existing regulations or were not feasible. These include banning alcohol on the beach, closing the beach to the public at night and re-directing the terminus of the Dune Pond trail to the western boundary of the Reserve. Plovers began breeding at Sands Beach after the SPMP was implemented, and the number of breeding pairs has increased each year (1 breeding pair in 2001, 5 in 2002, and 12 in 2003). As a result, the number of fledged chicks increased from 1 in 2001, to 14 in 2002 and 39 in 2003. The fledging rate (number of chicks per males) has been high at COPR when compared to other beaches along the Pacific coast of the US.

The 2001 SPMP was designed to protect the wintering plover population. Additional actions are necessary to protect breeding plovers because breeding pairs have a broader

distribution along the beach than wintering plovers, and nests and chicks require special protection measures. The revised plan, as proposed herein, is intended to amend the 2001 SPMP with the added goal of protecting breeding plovers while maintaining public access. The 2001 SPMP mandates that the main wintering roost area is fenced to protect the wintering population. The post-and-rope fence starts just east of the enchanted forest and extending 400m to the west, which takes beyond the slough mouth. The 2004 revision to the SPMP proposes a new action for protecting wintering birds on the few winter days, during storms and high tides, when roosting plovers occupy the area to the east of the permanent fence. During these times, the reserve will use additional docents and take temporary measures to delineate the roosting birds and minimize disturbance from beach users.

A new action in the 2004 SPMP for protecting breeding birds is to (1) extend the rope and post fence along the dry sandy beach to the western boundary of the Reserve during breeding season (March 15 through Sept 15) to protect plovers nesting outside the main wintering roost. The boundary of the existing fence that protects the roosting area (established under the 2001 SPMP) will be extended to the west to the beach entrance of the Dune Pond trail. Beach access to the Dune Pond trail will remain open during plover breeding season. A second fenced area will start on the western edge of the Dune Pond trail and extend westward to the Reserve boundary, but will be positioned to allow public beach access for recreational activities such as jogging, sunbathing, and fishing. The breeding season boundaries of the fenced area will be established as soon as possible after the beach stabilizes in the spring and once established they will not be moved until the end of the breeding season.

Other new actions for plover protection during breeding season are (2) to maintain the closure of the Delta path but allow beach access by way of the re-routed Dune Pond trail that ends in the less-used western portion of the breeding habitat, (3) to post signs at the western boundary of the Reserve to encourage equestrians to limit their activities to the beach west of the plover breeding area during the breeding season, (4) to patrol the beach more often at night to reduce nocturnal disturbances of breeding plovers and chicks, (5) to

remove individual crows that persistently threaten plover eggs or chicks, (6) to expand the docent monitoring program to include all daylight hours in the breeding season, (7) to monitor plover nests and chicks, and (8) to enforce existing restrictions on underage alcohol consumption and public intoxication in both breeding and non-breeding seasons.

The 2004 SPMP will be submitted to the California Coastal Commission for approval.

Rationale

The Pacific population of WSP is listed as threatened by the US Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA). The beach that extends from the western edge of Isla Vista to the middle of the Ellwood Mesa area, including Sands Beach at UCSB Coal Oil Point Reserve (COPR), has been designated as critical habitat by the USFWS. Protective management of plovers at Sands Beach is necessary because the beach is open to the public. Public recreation has been one of the main causes of breeding site degradation and plover decline (USFWS 2001, page 51-55) along the Pacific Coast. People unknowingly disturb wintering plovers and may trample eggs or chicks during the breeding season. Because the UC Natural Reserve System's mission is to protect natural areas for research, education, and public outreach, COPR has the opportunity and responsibility to be engaged in an active and creative plover management plan. Active protection of plovers, as outlined in the SPMP, is consistent with the UC NRS mission, the USFWS WSP recovery plan, the Coastal Act, and UCSB's intention to provide low-impact public access to the beach area of the Reserve.

History

Lafferty (2000) reviewed the status of snowy plovers at Coal Oil Point in an effort to aid management decisions by the Reserve. A study of the types of disturbances experienced by snowy plovers and other shorebirds at the Reserve also was undertaken (Lafferty 2001a,b). This review suggested several actions for managing snowy plovers and shorebirds at Coal Oil Point. Waldo Abbott, a long-time natural historian and former curator of the Santa Barbara Natural History Museum has watched snowy plovers (and other wildlife) disappear from Goleta beaches. In a 1972 interview, he reflected on the link between increased public access and losses of sensitive wildlife and, in particular, the

importance of prohibiting dogs on the beach at Coal Oil Point (Kellogg and Yokota 1972). In "Recommendations for the Future Management of Environmental Lands: West Campus", ornithologist Paul Lehman recommended a leash enforcement plan to reduce disturbance. The 1990 LRDP requires that the campus prohibit pets and restrict parking at COPR, although in the past, the campus did not enforce the prohibition of pets in the area. Fahy and Holmgren (1993) proposed fencing potential nesting areas, beach closure between March and June, a public education campaign, enforcement of pet restrictions, habitat restoration and, if plovers were to breed, predator exclosures around nests and predator removal. They also suggested considering the reintroduction of large predators such as coyotes and bobcats to control the introduced red fox. Meeker (1996) recommended greater restrictions on access (especially for pets) to the area of beach used by plovers. De Chant (S.B. Audubon, in. litt. 1997) asked that the University prohibit pets, provide public education, and minimize access points near the roost. Coon (letter, 1997) acknowledged the willingness of the Reserve to experimentally close the beach, use volunteers to reduce disturbance, enforce existing pet restrictions, provide public education, restrict equestrian and motor vehicle access, and investigate other access controls. There is a current Santa Barbara County ordinance that requires dogs to be on leash on all public lands, but this law is rarely enforced in the county.

In 1997, and again in 2001, the Santa Barbara Chapter of the Audubon Society requested that UCSB develop a management strategy for snowy plovers (e.g., De Chant letter, 1997). The USFWS expects local management entities, such as COPR, to develop successful management plans and in 1997 asked for the Reserve's participation in the recovery plan process (Coon letter, 1997). In 1999, biologists from the Ventura Field Office of the USFWS visited the Reserve and determined that recreation was leading to "take" (i.e. harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species) of plovers as defined by the Endangered Species Act (D. Noda letter, 1999). Instances of take are in potential violation of Section 9 of the ESA, particularly if the property owner does not make satisfactory efforts to minimize them and can result in a $200,000 fine for each infraction. An estimate of the rate of "take" of snowy plovers at the

Reserve was around 150,000 incidents per year in 1999 before management began (Lafferty 2001).

The USFWS requested that the University apply for an incidental “take” permit, pursuant to section 10(a)(1)(b) of the ESA (Noda letter, 1999). An incidental take permit allows a landowner to legally proceed with activities that would otherwise result in an illegal "take" of a listed species. An incidental “take” permit is legal protection for a landowner in case a listed species is "taken" despite the owner's best efforts. The necessary components of a completed permit application are a standard application form and a low-effect Habitat Conservation Plan (HCP).

Subsequently, in lieu of an incidental “take” permit, the USFWS suggested that UCSB develop a management plan to reduce disturbance. The Reserve has taken the lead in developing a management strategy for plovers and has management authority within its boundaries. The campus assists the Reserve in limiting impacts from recreational activities by providing police and parking services enforcement of beach and parking regulations.

In 2001, the USFWS released the draft Western Snowy Plover Recovery Plan, providing goals and management guidelines. Goals set for COPR are four breeding adults (with a five-year average of one fledged chick per breeding male) and protection of the wintering population from disturbance. The Reserve’s SPMP was written to be consistent with the USFWS recovery plan. The Service reviewed the COPR draft SPMP and provided a comment letter in October, 2001. In this letter, the Service suggested additional efforts to reduce trash and crows and more restrictive actions if goals were not met.

In November 16, 2001, the California Coastal Commission approved the actions associated with the Reserve’s SPMP. These were: (1) permanent closure of the Delta path, (2) interim 2-year approval for a rope fence on the beach around the plover roost, and (3) posting of regulatory and educational signs.

Authority

As a threatened species, snowy plovers are protected by the USFWS, which can prosecute individuals or organizations that contribute to, or permit, the take of a listed species under the Endangered Species Act (ESA). The ESA allows land managers, such as the Reserve, to close the beach area or otherwise manage public access. Via the Coastal Act, the California Coastal Commission acts to ensure that coastal development has minimal impacts on the environment and coastal access. It requires coastal communities to produce planning documents. In this context, access and preservation issues related to the Reserve are covered in the UCSB 1990 Long Range Development Plan (LRDP) that specifies that the Reserve can restrict access within its boundaries to protect fragile coastal resources such as dunes (this is derived from a CCC policy). Because the 1990 LRDP was finalized before snowy plovers were listed as a threatened species, it does not consider their management specifically and, therefore, is somewhat dated with respect to the Coastal Zone Management Act. The planned amendment of the 1990 LRDP will include management of snowy plovers.

The University owns the Reserve property including the beach down to the mean high tide level. City of Goleta has jurisdiction over the beach west of the Reserve. The California State Lands Commission has authority over the intertidal area below the mean high tide line. When queried, the California State Lands Commission asserted no claim that the Reserve's SPMP intrudes onto sovereign lands or that it lies in an area that is subject to the public easement in navigable waters (R. Lynch, letter. 2001)..

2004 Snowy Plover Management Plan

Introduction. The 2001 SPMP has been revised to include actions to protect breeding plovers. The overall management approach (below) is intended to reduce disturbance to wintering and breeding birds by minimizing the overlap between plovers and human activity. If target goals are not met, actions will be intensified and new actions may be incorporated.

The Reserve will manage its official users (classes, researchers, and participants in public outreach programs), coordinate public education, design signs, configure access ways, restore habitat, and monitor the snowy plovers. The University will enforce rules for recreational users including pet owners.

Implementation of the SPMP will require permanent recurring funds. The Reserve has obtained some one-time funds through grants (Shoreline Preservation Fund), private donations and the University. The Santa Barbara Chapter of the Audubon Society has been a primary supporter of the docent program and has contributed one-time funds particularly to sustain the docent coordinator position. UCSB has also assisted with plover management on the Reserve and to date has allocated $15,000 per year for 2003, 2004, and 2005 to help support the snowy plover docent program. UCSB also helps support the overall plover plan by providing funding for the Reserve Director's position. The Reserve will seek recurring funding for the long-term implementation of this management effort from the campus administration and other sources such as grants and donations.

If a Section 9 permit is determined to be necessary by USFWS, it will require additional funding to be approved. A Section 9 permit allows "take" but would require UCSB to develop a Habitat Conservation Plan that would mitigate for the impact of any "take".

Goals and Actions. The goals of this SPMP are to maintain an undisturbed wintering and breeding population of snowy plovers and to provide protected habitat for breeding in the summer while continuing to allow compatible public access on Sands Beach. An "undisturbed population", in this case, means one in which there are no preventable disturbances caused by unleashed dogs or trespass by people into protected areas used by plovers. Some disturbances will still occur when plovers feed outside of the fenced area. The specific measurable goal is to reduce disturbances that cause a plover to fly from 30 disturbances/plover/week (pre-management level) to below 5 disturbances/plover/week and to provide protected habitat for nests and chicks. On beaches without public access plovers are disturbed approximately 2 times/week (Lafferty, K. D. 2001a, 2001b). It will be impossible to lower disturbances to this level on Sands Beach where some public access

will be allowed, but it is expected that a disturbance rate of 5 times/week/plover can be achieved with implementation of the proposed actions to increase protection.

The actions and policies proposed to achieve these goals are as follows:

Proposed actions

1. Public education. The Reserve will continue to work with the Audubon Society to expand the docent program. The Reserve will provide tours, presentations to interested groups, and information for the press, informational signs, and opportunities to view shorebirds.
2. Fence the main plover roost throughout the year. The Reserve will continue to protect the plover roost area with a post-and-rope fence. The fence starts 95 meters east of the entrance gate to Sand's Beach on the bluff near the Cliff House, and extends 400 meters to the west, which takes it just beyond the slough mouth. At either end of the 400-meter stretch, the fence will extend shoreward into the dunes to meet the existing beach fence (Figure 10a). There will be signs printed with "No Trespassing, Plover Habitat" along the entire fence line. The fence will allow pedestrians to pass in front of the roost area below the high tide line.

   Experience has indicated that the exact location of the roost fence will vary depending on the beach profile, storm conditions, and whether the slough mouth is open to the ocean. During stormy months, the beach erodes, high surf knocks down the fence, and it must be moved shoreward and away from the slough mouth. Under these conditions, plover distribution also contracts and shifts eastward. The fence will be necessarily shortened during these periods. On those few winter days when the beach is highly eroded and the area of dry sand is at a minimum during high tide, the roosting plovers may occupy the area to the east of the permanent fence. During these times, the Reserve will use additional docents and take temporary measures to delineate the roosting birds and minimize disturbance from beach users.

3. Expand year-round fence to include breeding habitat during breeding season (March 15 – September 15) to protect nesting snowy plovers. Although the 400-meter fence shown in Figure 10a protects the plover winter roosting area and most wintering birds,

it will not protect all nests and chicks. In addition to roping off the 400-meter roost area, during breeding season, the Reserve will also rope off the dry sandy beach west of the winter roost to reduce the risk of trampling plover nests (Figure 10b). The rope fence will be established along the border of the main roost, with the ocean boundary as specified in the 2001 SPMP. The fence will be extended maintaining that ocean boundary past the western boundary shown in the 2001 SPMP until it nears the Dune Pond trail. The fence will then angle up the beach and end at eastern edge of the head of the Dune Pond trail. Beach access to the Reserve's interpretive Dune Pond trail will be maintained during plover breeding season. A second fenced area (Figure 10b) will start on the western edge of the Dune Pond trail and extend westward to the Reserve boundary. This second fenced area will be narrower than the fenced area to the east. The ocean boundary of the second fence will be positioned to maintain a moderate corridor of dry sand during high tide and the public will be allowed to use the area for passive recreational activities such as jogging, sunbathing, and fishing. The breeding season boundaries of the fenced area will be established as soon as possible after the beach stabilizes in the spring. Once the boundaries are established in spring they will not be moved until the end of the breeding season.

4. Keep the Delta path closed. This path ended in the center of the plover roost, which is highly-used by nesting plovers. Devereux Santa Barbara had an informal easement to use the path, but agreed with the University's request to close the path and no longer use it (G. Cummins letter, 1997). The path was closed in 2002 and will remain closed.

5. Change beach entrance of Dune Pond trail. The 2001 plan proposed to move the beach entrance of the Dune Pond trail to the western boundary of the Reserve and eliminate beach access by the Dune Pond to reduce disturbance to wintering plovers. However, the beach entrance to the Dune Pond trail was not changed because re-routing the trail to the west would have caused significant negative impacts to rare native coastal scrub. In 2003, two nests west of the trail bred successfully within a roped area or behind the dune fence. Visitors used the Dune Pond trail during the breeding season and did not disturb the breeding birds. This indicates that the entrance to the Dune Pond trail from

the beach can remain in its present location without harming plovers if the dry sandy beach west of the trail is protected with a rope fence during the breeding season. Therefore the beach entrance to the Dune Pond Trail will remain in its current location (Figure 6).

6. Reduce impacts from domestic animals. The docents will continue to educate dog owners about the necessity of keeping dogs on leash and will request the help of law enforcement if dog owners are not willing to comply with leash regulations. The leash law will need to be routinely enforced.

7. Reduce impact from official Reserve users. To avoid disturbance to plovers from students and researchers, the Reserve screens applications and prohibits use in the protected plover area. The Reserve will also restrict K-12 access to the beach area in front of the plover roost to non-breeding season (September 1 – March 31)

8. Night patrol of the beach area. In the 2001 SPMP, the Reserve proposed closing the beach to the public at night. This is not feasible because the beach has many access points and so the beach will not be closed at night. Instead, to reduce the level of disturbance to plovers at night, the Reserve will work with the UCSB police to explore the feasibility of night-time beach patrols to reduce trespass, bonfires, camping and fireworks. Campus police have agreed to respond to calls when enforcement is needed.

9. Reduce alcohol on beach. There is currently no legal basis for prohibiting alcohol use on the beach by persons of legal drinking age. To reduce problems with intoxicated persons on Sands Beach in front of the plover roost, the campus police will enforce existing underage drinking and public intoxication laws.

10. Post beach rules. To improve compliance and facilitate enforcement, the Reserve will clearly post beach rules.

11. Reduce disturbance by crows and predators. The Reserve will continue its program to remove trash from the beach and surrounding area that has helped reduce the number of crows in the plover area. Also, trash receptacles at the Reserve will be kept closed to prevent access by crows. The Reserve will remove individual crows that persistently threaten plovers.

12. Restore dune habitat near roost. The Reserve will continue to remove exotic shrubs on the dunes to reduce cover for predatory mammals.

13. Monitor effectiveness of actions. The Reserve will continue the Snowy Plover Monitoring Plan to measure plover population status and trends, plover spatial and temporal distribution, breeding activity, patterns of use by people and pets, and levels of disturbance.

14. Monitor compliance. The USFWS requested that the Reserve monitor compliance with restrictions. The docents record the number of trespassers and leashed and unleashed dogs during the day. The Reserve will continue to evaluate whether compliance is sufficient to achieve the programmatic goals. If not, the Reserve will increase education and request additional enforcement if needed.

Status of implementation of the 2001 SPMP

1. Public Education

The Reserve provides each official Reserve user with an information sheet about the plovers and instructs the users to avoid the roost. Public education is provided through monthly field trips, slide shows, and a new docent program that started in June 2001. In 2002/2003, the Reserve staff and the Audubon Society presented more than 20 slide shows to local groups such as The Surfrider Foundation, The League of Women Voters, Santa Barbara Yacht Club, Fly Fishermen of Santa Barbara, Girl Scouts, Val Verde retirement Community, and UCSB Horse Boarder's Association. Until recently, the docent program has been primarily funded and organized by the Santa Barbara Audubon Society. In 2003, UCSB provided additional one-time funds for the program

for 3 years. Volunteer docents monitor and protect the roost area, request compliance by the public with beach regulations, and educate the public about the need to protect snowy plovers. The Reserve posted three informational displays on snowy plovers at the main entrances to Sands Beach with funds from the Shoreline Preservation Fund. The Reserve held open houses in 1998 and 2000 and led local residents on tours where guides showed and discussed the plan. At the open houses, the Santa Barbara Audubon Society presented a poster about the snowy plover. In 2001, the Reserve had a meeting at the Cliff House to receive public input on the SPMP. Beach surveys show that awareness of plovers increased by 87% over pre-management levels.

2. Fencing of the main roost area

In November of 2001, 400m of the dry sandy beach was fenced to protect wintering plovers. The fence successfully separated people and plovers. After the first winter storm, the fence had to be removed from most of the west portion of the roost area. As the beach continued to erode though the winter, the fenced area continued to be reduced. In December of 2002, when erosion was severe, plovers roosted east of the fence boundary on the small area of beach not disturbed by waves. The fence was temporarily moved 15m to the east to protect the wintering plovers. As sand started to be deposited on the beach after March, the fence was again slowly extended to the west. The fence was effective in reducing the number of people walking through the main roost area (Figure 2.1). The high number of intruders into the roost area between December and March, 2002, occurred because the fence was removed when the beach was eroded by winter storms.

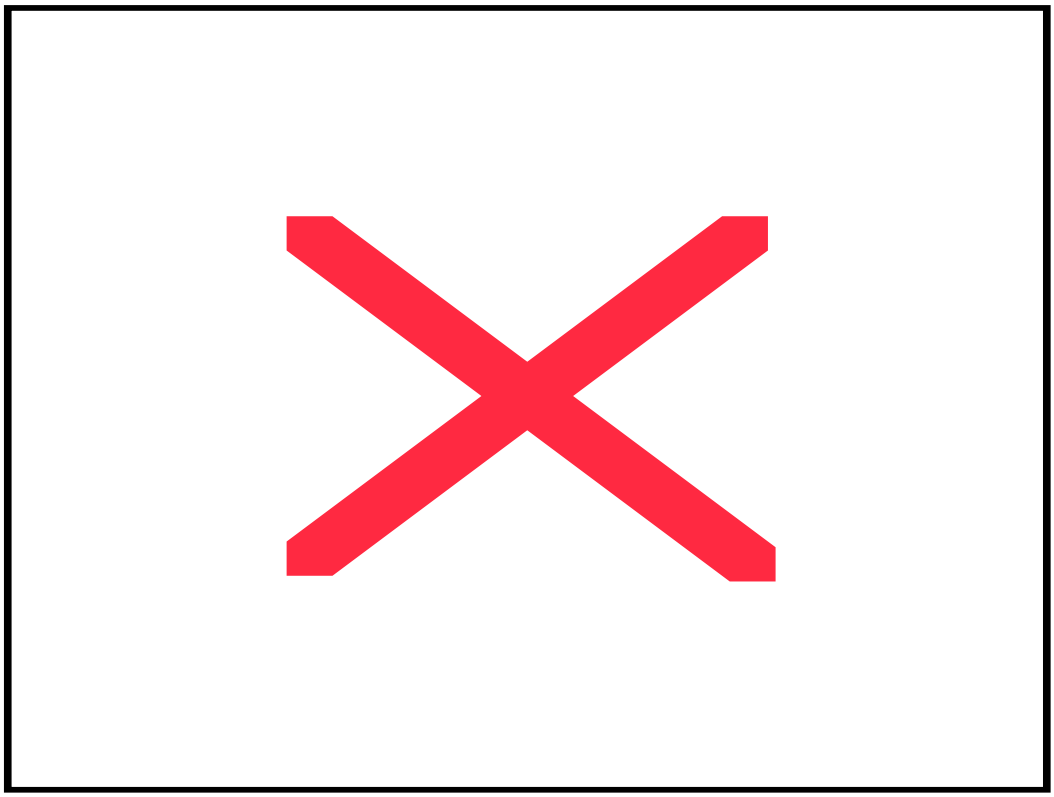

Figure 2.1. Number of intruders in to the plover roost area in 2001, 2002, and 2003.

3. Fencing of the breeding habitat.

In 2002, all breeding occurred within the area fenced to protect wintering plovers, east of the slough mouth. When the plover breeding population increased in 2003, 6 plover pairs scraped and defended territories in the unprotected area west of the fence, but only 2 pairs successfully nested, both west of the Dune Pond trail entrance. One pair nested just east of the trail entrance but the eggs were destroyed during a storm. Once eggs were laid, the western boundary of the wintering fence was moved west to the Dune Pond trail entrance and a separate rope fence was erected around one of the nests west of the trail. (The second nest was not located but is assumed to have been in the fenced foredune area; the chicks were observed when they were feeding.) The separate western fence was initially 20m in diameter. When the eggs in this nest failed to hatch, the diameter of the fenced area was increased to 75m. The breeding pair nested again within the fenced area and laid 2 more eggs. These eggs successfully hatched.

Repeated observations by Reserve biologists revealed that when the fenced area was only 20m in diameter, the female plover fled her nest when a person stood by the fence, but she did not flee the nest when beach goers were at the fence of the much larger enclosure. These observations suggest that plovers will use the beach west of the Dune Pond trail entrance to nest and that a fence will be necessary to protect nests and chicks.

4. Delta Path

The Delta path led visitors into the center of the Snowy Plover roost. This path was closed and restored with native vegetation in 2002. Several plovers have nested at the former terminus of this path.

5. Dune Pond trail

The 2001 SPMP proposed to change the terminus of the Dune Pond trail away from the beach to the western boundary of the Reserve. The trail was not altered as this action was not planned to be implemented until after the approval of the Devereux/Ellwood Regional Plan. During the 2003 breeding season plovers bred near the trail terminus and Reserve biologists observed that pedestrians using the trail to access the beach sometimes disturbed the adult and chicks feeding or resting outside the fenced area. These birds moved into the fenced area and the disturbance was minimized. If breeding near the Dune Pond trail and disturbance from pedestriuans intensify in the future, the relocation of the terminus of this trail will be re-examined.

6. Dogs

To increase compliance with the SB County ordinance that dogs must be leashed on the beach, the following actions were implemented. The Reserve posted the leash regulation on signs at all entrances of the Reserve. The docents talk to pet owners and request compliance with the leash law. Docents carry leashes to distribute to pet owners who do not have leashes. The docents also restrain dogs without owners and, if they cannot find the owner, they call County Animal Control to remove the dog from the beach. Docents call campus police if dog owners refuse to comply with the leash regulations. Figure 2.2 shows that the number of unleashed dogs on the beach has

declined since these measures have been implemented. Yet 40% of dogs arriving at the beach are unleashed and this poses a risk to plover nests and chicks.

7. Equestrian Use

Equestrian use along the protected area is of particular concern during the breeding season because young chicks forage outside the fenced area and could be trampled or trapped in the depressions made by horses hooves (USFWS 2001). Docents and Reserve staff fill hoof prints to reduce this risk but this is time consuming. In an effort to engage riders in the plover protection program, the Reserve gave a presentation of the Snowy Plover Management Plan to the UCSB Horse Boarders Association. As a result, these local riders no longer use the beach in front of the plover area and are helping to educate riders from other areas. The Reserve also requested that horse tours from Arriba Adventures use the beach west of the Reserve and they have largely complied. Equestrians less familiar with the Reserve park trailers at Hollister Avenue and ride through the Reserve on the Dune Pond trail or through Ellwood to access the beach. Signs were posted at the Reserve's western boundary, where horses access the beach, requesting that horse riders stay to the west. In the near future, the Dune Pond trail will be closed to equestrians.

8. Night Patrol

In the 2001 SPMP the Reserve proposed closing the beach at night. Closure of the beach at night was not feasible because there are many routes leading to the beach. To date, night patrols on the beach are not conducted regularly. Night use continues to contribute disproportionately to litter, which attracts crows, vandalism, and trespassing into the plover nesting area.

9. Alcohol ban

Several instances of trespassing, disturbance to plovers from active games, or harassment to docents resulted from the activities of intoxicated beach users. The University does not, at present, have the legal authority to ban alcohol consumption at the beach. The campus police do enforce the regulations prohibiting alcohol

consumption by minors. The docents call the campus police to request enforcement when intoxicated users do not comply with beach regulations and cause disturbances.

10. Post beach rules

Signs showing a map of the plover roosting area and the beach regulations were posted at all entrances of the Reserve. Along the plover fence, additional signs request that users stay along the ocean's edge. At the western boundary of the Reserve where equestrians enter the beach, signs request that equestrians ride west of the sign during the breeding season.

11. Crow control

To control crows, the Reserve replaced all trash cans with ones having secured lids and replaced an open dumpster with one that can be closed. The Surfrider Foundation received funding from the Shoreline Preservation Fund to remove trash from the beach. Also, the docents scare off crows that approach the protected area. Crow use of the beach has declined but constant vigilance and removal of individual crows that prey on nests is still required to protect plover eggs and chicks.

12. Restoration

Six acres of *Acacia* were removed from the dunes and the area was restored with dune vegetation from 1999 to 2003. It is possible that the *Acacia* removal contributed to the nesting observed in 2001 because the nesting female was observed in dunes that were formerly overgrown by *Acacia*. The dunes are monitored regularly to remove new seedlings of invasive plants.

13. Monitoring of plovers

The UCSB Museum of Systematics and Ecology has been recording regular counts of plovers made by volunteers (Bob Hansen, Mark Holmgren, Dave Hubbard) for many years. Dave Hubbard and Jennifer Dugan began a four-year monthly monitoring effort to count shore birds along the Reserve and other local beaches in 1998. The UCSB Natural Reserve System authorized $4,000 for the first year's monitoring effort of

plovers and, in January 1999, the Reserve implemented a monitoring plan based, in part, on the Golden Gate National Recreation Area Monitoring Plan (Stenzel et al. 1995).

Kevin Lafferty from USGS continues to monitor plover disturbance levels (Figure 2.2). The results of this study were used to assist in the design of the COPR Plover Management Plan. A summary of this research is described section 15 below. The Reserve Director monitors plover nests and chicks a minimum of 3 times per week during the breeding season. Although chicks are not banded at the Reserve, the small area makes it possible to determine the fate of each brood until the chicks fledged.

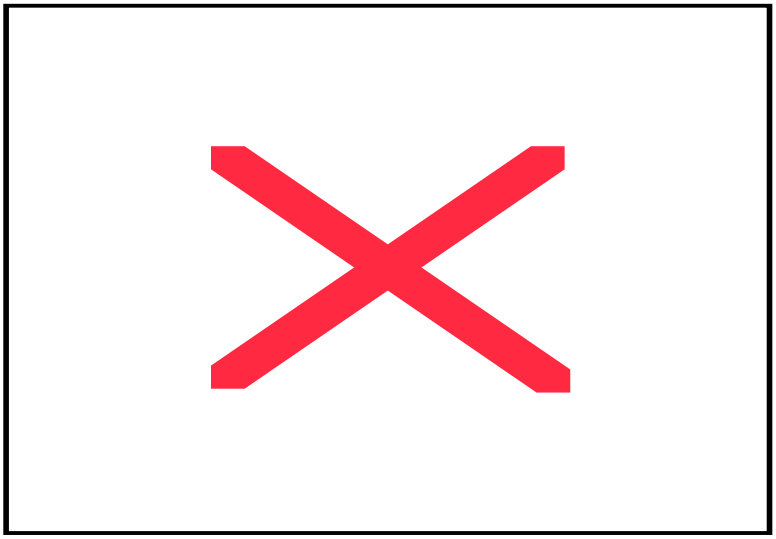

Figure 2.2. Changes in awareness of beach users before and after the on-going docent program was implemented. The percent of people able to identify a photograph of a snowy plover was used as the single best measure of awareness.

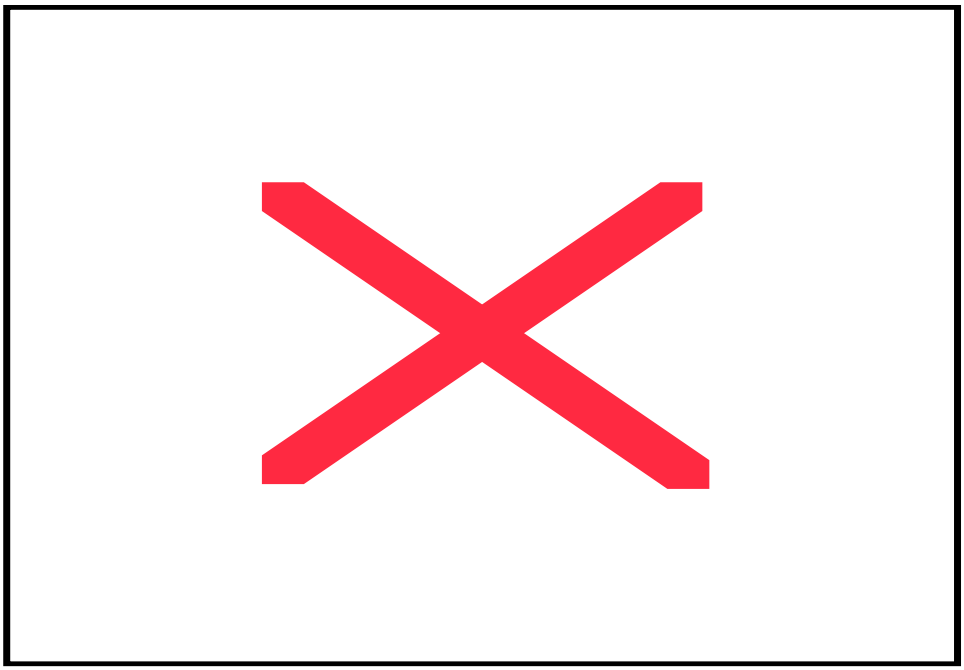

Figure 2.3. Change in disturbance rate before and after active management of plovers at COPR. There are 2 types of responses to disturbance(1) moving from source of disturbance by walking or running and (2) flying away. Disturbance rates are number of incidents per hour. Error bars are 95% confidence intervals of the means.

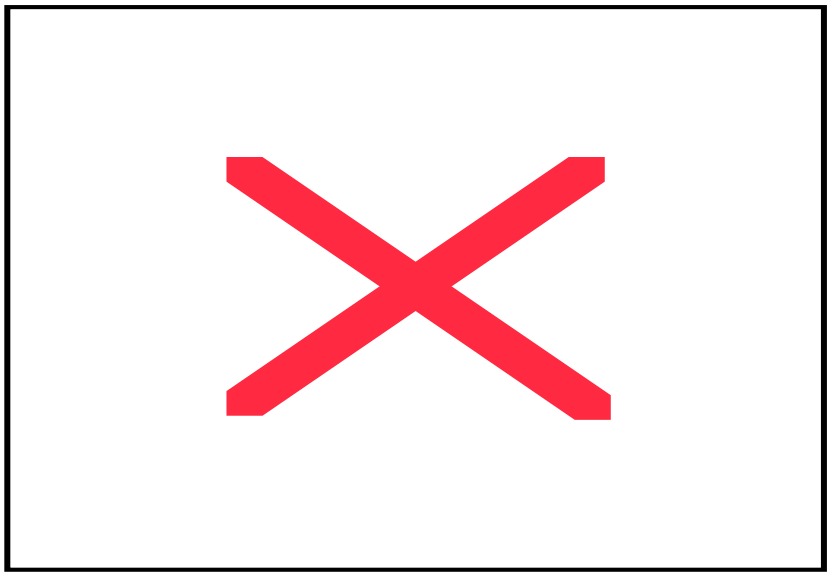

Figure 2.4. Change in compliance to the leash law before and after management of snowy plovers at COPR. Management began in the breeding season of 2001. The open bars are the number of unleashed dogs per hour within 60 meters of the plover area. (Error bars are 95% confidence intervals of the means.) The solid line is the percent of dogs within 60 m of the plover area that are on leash.

14. Monitoring of compliance

The docents record the numbers of leashed and unleashed dogs on the beach and the number of trespassers. They also note whether the interaction with the dog owner or trespasser is positive and compliant.

Summary of Research

Before active plover management, Lafferty (2001b) estimated that public access to Sands Beach resulted in a 16-fold increase in the rate of disturbance to snowy plovers compared to other currently protected beaches (Point Mugu and Santa Rosa Island). At Sands Beach, each plover was disturbed an average of once every 30 minutes. Seventy-five percent of the disturbances were caused by people and their pets. The remaining disturbances were caused by crows. These estimates suggest that plover disturbance rates at Sands Beach increased when it was opened to recreation in 1967. This increase in disturbance may have been a major contributor to the cessation in breeding at Sands Beach (Lafferty 2001). After the Plover Plan was implemented in 2001, total disturbances decreased by 65% and disturbances that caused plovers to fly, which has the highest energetic cost, decreased by 90%. Observations also suggest that, once the symbolic fence was in place, snowy plovers contracted their use of the beach to within the fenced area. Other shorebirds also increased after protection. Plovers started breeding successfully at the Reserve after the protection plan was implemented. The number of fledged chicks grew from 0 before management to 39 in 2003 (Table 2.1).

In 2004 nest locations have expanded to utilize all suitable breeding habitat from near the entrance to Sands beach to the western boundary of the Reserve (Figure 2.5)

Figure 2.5. Location of Snowy Plover nests in 2004.

Table 2.1. The number of breeding pairs, nests, eggs and fledged chicks at COPR. Active protection of the plover area began in the breeding season of 2001.

	Before 2001	**2001**	**2002**	**2003**
Pairs	**0**	**1**	**5**	**12**
Nests	**0**	**1**	**9**	**24**
Eggs	**0**	**2**	**21**	**63**
Fledged chicks	**0**	**1**	**14**	**39**

Funding needs

The docent program requires a full time employee position for a coordinator who will recruit, train, schedule, and supervise the volunteer docents and develop outreach and education activities. The Reserve also needs funds to employ students for 20 hours per week to work during periods when student volunteers are scarce, particularly during summer. Funds acquired to date are from grants, donations and the UCSB administration, and are not permanent.

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Appendix 3. Habitat Management Plan

The Habitat Management Plan (HMP) has two components. The first is a restoration plan for much of the grassland and scrub areas on the Reserve. The second is a list of planned actions to enhance the other areas of the Reserve that include many different habitat types. The HMP describes specific actions necessary to fulfill two goals of the Restoration and Enhancement Program, (1) restore and enhance the Reserve's natural habitats, and (2) provide researchers with information regarding the history of restoration at the Reserve.

1. Restoration plan for the grassland and coastal scrub areas at Coal Oil Point

In spring 2003, the Director of the UCSB NRS, Bill Murdoch, invited a panel of grassland experts to review the condition of grassland and coastal scrub areas at Coal Oil Point Reserve (COPR) and evaluate current plans and the potential for future restoration of degraded grassland areas. This restoration and research plan is intended to stimulate research on grassland restoration at COPR and provide restoration goals for management of these habitats.

The panel included Carla D'Antonio, professor, UC Berkeley and scientist with USDA, Mark Stromberg, Resident Director, Hastings Reserve, and Eric Seabloom, post-doctoral fellow at NCEAS, Sue Swarbrick, Assoc. Director, UCSB NRS, and Cris Sandoval, Director of COPR. On June 4 and 5 the group met for a site visit at the reserve along with Bill Murdoch.. The Panel's full report (Report of the Coal Oil Point Restoration Review Panel, Swarbrick et al., 2003, available on the COPR website, http://coaloilpoint.ucnrs.org) on restoration at the reserve can be accessed through the COPR website (http://coaloilpoint.ucnrs.org).

<u>Coal Oil Point Grassland/Coastal Scrub Restoration Plan</u>

The purpose of the restoration review was to evaluate the restoration of degraded grassland and coastal scrub areas at COPR (Figure 7). The goals were to:

1. Characterize the current condition of the grassland/coastal scrub areas at COPR
2. Define restoration goals for these areas.
3. Suggest types of pre- and post-restoration monitoring that can be used to establish the effectiveness of restoration projects
4. Determine if restoration can be done in an experimental context.
5. If so, suggest critical elements of an experimental design.

1. Current condition of grassland and coastal scrub areas

The studied sites (Figure 7) were divided into 3 main habitats: (A) grassland , (B) scrubland , and (C) native grassland/scrubland mix. Table 3.1 below shows the dominant exotic species and the native species present in each site.

A. Grassland

Most of the grassland habitat (A1 and A2 in Figure 7) was used as a horse pasture and perhaps tilled for lima bean production in the past (pre-1945), as were most of Goleta's coastal mesas. The land was acquired by UCSB in 1967 and designated as a "Natural Resources" area in 1970. No management was undertaken until exotic species such as acacia, myoporum and fennel were removed in 1996.

This habitat is dominated by European annual and perennial grasses. The native grassland/scrub community has not returned to its pre-disturbance conditions even though the area has not been cultivated for more than 40 years. Wild oat is the most common exotic grass in the grassland habitat. Harding grass dominates the northern most portion of the grassland. Patches of exotic forbs such as Italian thistle, fennel, and iceplant occur throughout the grassland. Native species such as *Synsyrinchium vulgare* (blue eyed grass) and *Bacharis pilularis* (coyote bush) are scattered in the grassland habitat.

The soils in this grassland area vary greatly from sandy loam to clay dominated. The soil in some areas has eroded from overuse of trails or lack of vegetation and, judging by the condition of the plants growing there, it appears that the topsoil has eroded away and poor subsoil is exposed. It is in these poor soils that some patches of native purple needle grass are found, possibly due to lack of competition with the exotic grasses.

B. Scrubland.

Native patches of scrubland occur near a ravine by the dune pond (B2, Figure 7) and in the middle of the large grassland area (B1, Figure 7) in the northern portion of the Reserve.

The ravine (area B2, Figure 7) area was not tilled in the past probably because of the steepness of the slopes and may represent what the entire upland habitats (with exception of the dunes) looked like prior to human disturbance. This site is rich in native species of forbs and native grasses with only a few exotic species present. Much of the coyote bush is senescent or dead.

The patch of scrub in the northern part of the grassland (B1, Figure 7) is dominated by coyote bush and has few other native species. The low diversity of plant species suggests that this area was tilled or grazed in the past.

C. Native grassland/scrub mix.

There is a strip of coastal scrub vegetation, approximately 5m. wide along the western margin of Devereux slough (C1, Figure 7). This area was probably not used for agriculture because it was near the slough edge. The vegetation in this area is a mix of native scrub species, with scattered patches of native grasses, and some exotic large trees (*Eucalyptus*, *Myoporum*, and *Tamarix*).

Area C2 (Figure 7) is of particular interest because it is the largest patch of purple needle grass in COPR and is a potential source of seeds for restoration of the grassland area (area B2, Figure 7).

Table 3.1. List of most common species found on the three habitat types mentioned above.

HABITAT	EXOTIC SPECIES	NATIVE SPECIES
A. Grassland	*Carduus pycnocephalus* (Italian thistle) *Foeniculum vulgare* (Fennel) *Phalaris aquatica* (Harding grass *Avena fatua* (Wild oats) *Elymus* sp.(wild rye) *Lolium multiflorum* (Italian ryegrass) other annual European grasses	*Nasella pulchra* (Purple Needle grass) *Sysirinchium bellum* (Blue eyed grass)
B. Scrubland	*Foeniculum vulgare* (fennel) *Cordateria jubata* (pampas grass) *Brachypodium* sp.(false brome)	*Baccharis pilularis* (Coyote brush) *Scrophularia californica* (Bee plant) *Hemizonia fasciculata* (Tar plant) *Artemisia californica* (Coastal sage) *Artemisia douglasiana* (Mugwort) *Verbena lasiostachys var lasyostachys* (Western vervain) *Nasella pulcra* (Purple needle grass *Hordeum bracheantemum* (Meadow barley) *Centaurium muhlenbergii* (Monterey Centaury) *Gnaphalium californicum* (Green Everlasting)
C. Native grassland/scrubland mix	*Carduus pycnocephala* (Italian thistle) *Tamarix* sp.(Salt cedar) Rubus sp. (Blackberry) *Myroporum lateum*,	*Baccharis pilularis*(Coyote brush) *Scrophularia californica*(Bee plant) *Nasella pulcra* (Purple needle grass) *Bromus carinatus* *Hemizonia fasciculata* (Tar plant) *Artemisia californica* (coastal sage) *Artemisia douglasiana* *Verbena lasiostachys var lasyostachys* (Western vervain) *Centaurium muhlenbergii*

		(Monterey Centaury) *Gnaphalium californicum* (Green Everlasting)

2. Restoration Goals:

The overall goal of restoration efforts at COPR is to improve the biological value of degraded habitats both for their intrinsic value and as a research, education and outreach tool.

A. Grassland:

This area will require extensive restoration because the vegetation is primarily invasive exotic and the soils are degraded in some areas. The scrubland (B1 and B2, Figure 7) and the native grassland/scrubland mix areas (C1 and C2, Figure 7) provide one model for restoration of the grassland. These scrubland areas soils are similar to the grassland area and support native vegetation. A second restoration model is native grassland without scrub species, like area B2 (Figure 7).

The soils in the area should be cored to determine the level of disturbance to the soil profile. If the soil has been tilled, then it is likely the microbial fungal community has been disrupted. Studies of old fields show that microrhyzal fungi are absent and don't return. If this is the case in the tilled grassland area, some nearby intact soil with fungi present could potentially be used as an inoculum.

B. Scrubland:

The restoration goal in this site is to enhance the existing native vegetation by removing the exotic species. The senescent *Baccharis* is a fire hazard and the dead wood should be removed manually or by a controlled burn. Controlled burning has the advantage of adding nutrients to the soil, stimulating the germination of fire-dependent species, and causes less trampling on native vegetation during the work. In area B1, near the slough edge, exotic

plants such as blackberry bushes, cypress, black cottonwood, eucalyptus and London plantain trees should be removed.

C. Native grassland/scrubland mix:

The restoration goal in this site is also to enhance the existing native vegetation by removing the exotic species. Exotic species such as fennel, pampas grass, myoporum, Italian thistle, etc will be removed manually or with local application of a low toxicity herbicide to avoid impact to the native vegetation. Sprouts of eucalyptus trees will be removed and the larger trees will be pruned up to 4m from the ground to encourage growth of native grasses. Eventually the *Myoporum*, *Tamarix* and smaller *Eucalyptu*s trees must also be removed.

3. Pre-restoration monitoring:

Before any restoration activities commence, baseline data must be collected to characterize the disturbed communities. These "before" data will be crucial for decisions about restoration activities and are needed to evaluate the success in achieving the restoration goals.

Baseline data needed include the following:

A. The vegetation on the 3 sites should be mapped. The map should delineate subtle differences in the distribution of weed populations as well as important native species.

B. As many of the following variables should be measured as possible with the limited resources available to the reserve. Measurements will be made in carefully selected plots, some in areas where restoration will occur and others in areas that will not be restored (controls). Measurements in plots in adjacent areas that are not restored must be continued during and after restoration treatments because these unrestored plots will demonstrate the changes in vegetation that occur in the absence of restoration. These data are needed to assess the effectiveness of restoration activities. Standard protocols will be developed to ensure consistency in measurements among sites and years.

i. Diversity of native and exotic plant species: The number of species would be the easiest diversity measure to obtain. .
ii. Abundance (density, cover, or biomass) of the common native and exotic plant species.
iii. Species and abundance of insects
iv. Species and abundance of small mammals. v. Species and abundance of birds using the sites.
vi. Litter abundance (area covered and litter depth).
vii. Soil characteristics (moisture, infiltration rates, C:N ratio, respiration and "counts" of microbes and fungi if possible).
viii. Temperature, humidity and rainfall.

It may not be possible to collect data on all of the above variables. At a minimum, the following will be measured: diversity of exotic and native species, percent cover of each species, vegetation height, litter cover and biomass, and abiotic variables. Soil cores should be taken and, if they cannot be analyzed immediately, they should be archived for future reference.

4. Research and Monitoring Plan:

The panel agrees that pursuant to the research mission of the NRS, restoration activities on the Reserve should occur in an experimental context whenever possible. On the other hand, because research takes time and resources, control of exotics and some restoration is necessary on a regular basis and should occur when weed management is necessary. Restoration activities that are not done in the context of formal research studies, should still include a monitoring plan for the affected sites to assess the outcome of the restoration. Potential experimental designs to investigate methods of attaining restoration goals in the grassland site are outlined in the Report of the Coal Oil Point Restoration Review Panel (available on the COPR website, http://coaloilpoint.ucnrs.org). The results of these studies will be useful not only for COPR, but also in a wider context of restoration

at other grassland sites. Sufficient data should be collected both before and after restoration activities at all sites to determine if the restoration targets have been met. The "after" data may have to be collected for a number of years to determine the long-term effectiveness of restoration activities.

2. Specific actions to enhance the remaining areas on the Reserve

For planning purposes, the Reserve was divided into units that are loosely defined as project areas requiring specific actions for management. Different units can be combined for a larger grant proposal or a single unit can be the basis for a small grant proposal. A GIS map showing these areas can be seen in Figure 3.1 of Appendix 3. Table 3.2 lists habitat management actions to be taken for each area. Cost figures are estimates based on the cost of previous projects; actual costs may be higher. Removal of large exotic trees will be assessed on a case-by-case basis that includes an assessment of negative and positive impacts of individual trees on the native habitat. Over the long-term the Reserve will replace individual exotic trees, as they die naturally, with native tree species.

Table 3.2. List of habitat management actions and their estimated cost.

Site	Habitat	Area m^2	Actions	Cost $
1	wetland	1,100	Remove trees: 1 cypress, 3 acacia, and 1 large eucalyptus	1300
2	scrub	3,666	Remove iceplant and control thistle Remove 1 tamarix and 3 cypress trees Plant scrub vegetation, wetland edge plants	8200 1000 5000
3	wetland	4,800	Dredge sedimentation from south parcel	?
4	wetland	3,270	Remove blackberry shrubs	1000
5	dune	3,655	Remove iceplant Broadcast dune seeds collected on neighboring dunes	5000 1000
6	wetland	3,225	Remove treated lumber washed into slough finger by tides	1000
7	dune scrub	28,298	Remove star thistle and tecolote Burn senescent scrub	100 2000
8	scrub	16,550	Remove scrub (non-native genotypes) Re-plant with local scrub native species	4000 4000

9	dune	40,020	Remove sprouts of acacia and Myoporum	200
10	scrub	2,608	Remove eucalyptus tree in the wetland	1000
11	scrub	6,337	Prune eucalyptus trees to 6ft above ground and remove dead branches	8000
12	foredune	19,460	Remove small patches of iceplant	2000
13	scrub	1,365	Remove iceplant Remove 2 small eucalyptus	2000 1000
14	wetland	8,350	Remove curly dock	3000
15	grassland	12,380	Remove exotic grasses Restore to scrub and grassland mix	3000 3000
16	dune scrub	10,650	Remove myoporum sprouts and 3 young cypress Remove iceplant	700 2000
17	wetland	25,565	Remove curly dock and pampas grass seedlings	400
18	dune	3,680	Remove poplar Broadcast dune seeds from neighboring dunes	4000 1000
19	scrub	1,082	Remove eucalyptus	1000
20	scrub	1,200	Remove iceplant Plant poppy	1000 500
21	grassland	12,130	Remove exotic grasses Restore to scrub and grassland mix	3000 2000
22	scrub	1,100	Remove blackberry bushes and London plantain and black cottonwood trees Plant wetland species	1800 3000

Appendix 4. Approval and Amendment Process

Status. UCSB together with the UCSB NRS serve as management authority for the Reserve's 165.3 acres. UCSB planning documents need to be updated to be consistent with this. For example, COPR was comprised of 117 acres when the 1990 LRDP was written. This 1990 acreage has recently been amended to 125.3 acres based on more accurate survey data. Forty additional acres (along the western boundary) were approved in 1998 by the UC Regents to be added to COPR. The LRDP amendment containing this and other changes has not yet been submitted to the Coastal Commission for approval. The 1990 LRDP contains some environmental protection and access policies that support the Reserve's mission but as a land use plan, not a resource management plan, the LRDP was never meant to cover the breadth of activities and functions of the Reserve. COPR presently prepares Notices of Impending Development for activities on the Reserve that require CCC approval. Activities proposed in the COPR Access Plan that will support management actions to control public access and thus protect the Reserve's natural resources will be incorporated into the LRDP amendment that will be submitted for Coastal Commission approval.

Goal. Work with the UC NRS, the UCSB NRS and the campus to adopt and implement the COPR MP. Work with the UCSB Office of Planning and Design to include activities proposed in the COPR Access Plan in the campus LRDP amendment that will be submitted for Coastal Commission approval. There are several steps that must be taken to adopt the COPR MP and begin its implementation. These steps include:

1) Review, revision, and endorsement of the Draft Management Plan by the UCSB Natural Reserve System Advisory Committee, System-wide office of the UC NRS, and UCSB Office of Planning and Design.
2) Review, revision, and adoption and approval of the Final Management Plan by the UCSB NRS Director.

3) Review and approval of portions of the Final Management Plan as necessary by the California Coastal Commission as an amendment to the 1990 LRDP (including the required opportunity for public review).

4) Publication of the final Management Plan.

Appendix 5. University of California Natural Reserve System Reserve Use Guidelines.

Introduction

The Natural Reserve System (NRS) is a unique assemblage of protected wildland sites throughout California. Its Reserves encompass nearly all of the state's major ecosystems preserved in as undisturbed a condition as possible to support University-level research and teaching programs. The ecosystems and facilities offered by each Reserve are available to faculty and students from all University of California campuses, and to users from other institutions, public or private, throughout the world.

The NRS is an intercampus program through the Office of the President, Division of Agriculture and Natural Resources. The NRS Director provides leadership and coordination for the Reserves, and an NRS University-wide Advisory Committee, composed of representatives from each campus, meets biannually to provide broad input on the activities, policies and priorities of the NRS. Each Reserve is assigned to a particular UC campus for day-to-day administration, and is managed by a resident or non-resident Reserve director, with oversight provided by a campus NRS administrative structure and, at most campuses, by a faculty Reserve director with advice from a campus advisory committee.

1. **GENERAL GUIDELINES**. Each Reserve has been established to support the University of California's research and teaching mission and, where appropriate, public service programs. Use of a Reserve will be allowed if the proposed activity and level of use, after careful review by the Reserve director (or other designated University official), are deemed to be consistent with the NRS Reserve Use Guidelines and with regulations and management plans for that particular Reserve. General Systemwide guidelines are set by the NRS Director in consultation with the Systemwide NRS Advisory Committee, and more Reserve specific guidelines emerge from discussions among campus NRS

administrators, Reserve directors, and the campus NRS advisory committee. Activities that will or are highly likely to irrevocably harm the natural values, ecosystem functions and native biodiversity of the Reserve, or preclude its possible future use for University-level research or instruction, will not be allowed. Thus, the number and duration of stays by visiting researchers, classes, and members of the public will necessarily be limited at each Reserve. Similarly, facility development at each Reserve may be allowed only in designated areas, and may be limited in size so that natural and cultural values are not adversely affected.

2. **PROCESS**. The Reserve director has primary responsibility for approving proposed uses under the NRS Use Guidelines and applicable Reserve guidelines, and will coordinate management and all other uses of the Reserve. In difficult cases, the Reserve director will consult the faculty Reserve director or other faculty with appropriate areas of expertise before approving or rejecting an application. If a user fails to comply with any of the requirements, the Reserve director, after proper consultation, could restrict or terminate on-going Reserve use, and the user's subsequent use applications may be rejected. Each campus will establish an appeals process to deal with disputes between potential or current users and Reserve directors regarding Reserve use. This appeals process may consist of dispute resolution by an informed, ad hoc board consisting of faculty members with appropriate areas of expertise.

3. **MANAGEMENT PLANS**. Each Reserve has or is developing a management plan to ensure that the intrinsic ecosystem functions of the Reserve are maintained, and where needed, manipulated to achieve desired ecosystem functions. These plans (which include specific Reserve regulations) guide resource management decisions, identify areas suitable (in some instances, exclusively) for certain uses. Some plans may zone certain areas that contain fragile resources "off-limits" to most users. All activities (e.g., management, facilities construction) must comply with applicable federal, state, and local regulations.

3.1 **Research Areas**. Many research protocols require that the research area, including its biological resources and any equipment, be minimally disturbed by humans. Thus,

some areas of each Reserve may be set aside permanently or temporarily for research use only.

3.2 **Instructional Areas**. Areas designated for class use (e.g., for observing wildlife and plants) may also be used by researchers if their research will not be adversely affected by instructional use.

3.3 **Natural Areas**. Reserves often include areas that have been relatively undisturbed by agriculture, grazing, logging or other consumptive land use history. Such natural areas will be identified and mapped. Based on the best available scientific evidence, management of such natural areas may require occasional large-scale management actions such as controlled burning or flooding.

3.4 **Disturbed Areas**. Reserves frequently include former agricultural fields and other areas degraded by past intensive land uses. Management of these disturbed areas may involve manipulative measures (e.g., the use of herbicides, fire, and cultivation). Where needed, these areas should be restored or enhanced when funds for such restoration and/or other resources become available. Restoration projects will only be implemented if the best available knowledge or scientific evidence indicates that the proposed restoration activity will not harm the natural values of the Reserve or preclude the present or future long-term use of the natural area for research or instruction.

3.5 **Administrative Areas**. Each Reserve management plan will identify a projected "build-out" location that specifies the optimum allowable facilities for resident staff, researchers, classes, and public outreach programs to ensure minimal impacts on the natural systems (e.g., carrying capacity based on the ecosystem responses or biodiversity). These locations may in some cases overlap with disturbed areas.

4. **RESEARCH USE**. All researchers using NRS Reserves must have valid academic qualifications. Research in any subject area may be allowed if the researcher can demonstrate that the resources and/or facilities available at the Reserve are reasonably necessary for the proposed research project.

4.1 **Research Application**. All researchers should discuss their proposed research project with the Reserve director before formally applying for permission to conduct their studies. All researchers must complete an NRS Research Application (Exhibit A) and agree to comply with all Reserve specific regulations. The applicant must specify the proposed project duration, dates of Reserve use, contract and grant information, and provide a statement of purpose describing prospective research site(s), animal and plant populations that may be affected by the proposed research, as well as housing and other resources needed during their research. Applicants desiring the use of housing or facilities must include estimated arrival and departure dates, whereas day-use applicants should provide approximate dates of use and should sign in at entrance kiosks where required. Any potential disturbances to the Reserve's ecosystem or cultural resources must be clearly described.

4.2 **Evaluation**. The Reserve director will use the following to evaluate each application for research use:

(a) **Impacts on Natural Systems**. Potential positive and negative impacts on natural systems (e.g., significant new research, extensive collections, habitat alterations, introductions of species or genes);

(b) **Impacts on Present or Long-term Use**. Potential positive and negative impacts on present or future long-term use of Reserve for research orinstructional purposes;

(c) **Laws and Policies**. Compliance with applicable state and federal laws, and with any established research guidelines of the Reserve;

(d) **Feasibility**. Feasibility and scientific merit of proposed project;

(e) **Academic Credentials**. Researcher's academic credentials and affiliation to institution of higher education or governmental agency or research institute. University of California researchers will generally be given priority, but every effort will be made to accommodate other users;

(f) **Funding**. Certification of grant approval by the applicant's funding source;

(g) **Alternative Sites**. Availability and proximity of alternative sites;

(h) **Safety**. Ability of researcher to conduct research in a safe manner.

4.3 **Decision**. The Reserve director will inform the applicant that his/her request has been approved, denied, or approved with conditions. If an application is approved, the researcher must comply with all applicable University regulations, including those that are Reserve specific, and provide all required state and federal permits. Reserve directors and potential users will discuss appropriate restrictions on research projects involving experimental manipulations. For highly manipulative research that may irrevocably harm the natural values of the Reserve or preclude its future use for University-level research or instruction, the prospective researcher may be directed to areas outside the Reserve if such areas are available, or the application may be denied. If an application is rejected and the applicant disagrees with this decision, the applicant may appeal this decision to an ad hoc board of experts in that particular field appointed by the campus NRS administration or by the campus advisory committee.

4.4 **Data**. All researchers are strongly encouraged to annually provide at a minimum, a text file that describes each data set derived from their work on the Reserve and a summary of research results. Minimum required metadata include the title of each data set, the investigator's name, mailing address, e-mail address, and an abstract. All researchers are strongly encouraged to provide copies of mature data sets derived from work on the Reserve, which will be archived at the Reserve.

4.5 **Publications and Reports**. All researchers must identify the University of California and the specific Reserve where the research was completed in any publications or reports that result from use of the Reserve. Two copies of each publication resulting from work done at a Reserve shall be provided to the Reserve director as soon as they become available. One copy of each thesis, preferably bound, shall be provided to the Reserve director.

5. **INSTRUCTIONAL USE**. Reserves may be available for classes offered for credit by state or nationally accredited colleges or universities. Classes in any subject may be

allowed on-site if the instructor can adequately demonstrate that unique resources at a Reserve are reasonably necessary for the class.

5.1 **Class Use Application**. All instructors should discuss their proposed class visit with the Reserve director before formally applying for permission to visit the Reserve. All instructors must complete an NRS Class Use Application (Exhibit B) and agree to comply with all Reserve specific regulations. The instructor must specify the requested arrival and departure dates, the number of class participants, and a statement of purpose describing prospective teaching site(s), animal and plant populations that may be affected by the proposed class visit, and housing and other resources that will be needed during the visit. Any potential disturbances to the Reserve's ecosystem or cultural resources must be clearly described. If applicable, the instructor must provide an approved animal care and use protocol from his/her home institution and all required state and federal permits.

5.2 **Evaluation**. The Reserve director will use the following to evaluate each application for instructional use:

(a) **Impacts on Natural Systems**. Potential positive and negative impacts on natural systems (e.g., significant new research, extensive collections, significant habitat alterations, introductions of species or genes);

(b) **Impacts on Present or Long-term Use**. Potential positive and negative impacts on present or future long-term use of Reserve for research or instructional purposes;

(c) **Academic Credentials**. Instructor's academic credentials and affiliation to institution of higher education. University of California instructors will generally be given priority, but every effort will be made to accommodate other users;

(d) **Alternative Sites**. Availability and proximity of alternative sites.

5.3 **Decision**. The Reserve director will inform the applicant that his/her request has been approved, denied, or approved with conditions. If an application is approved, the instructor must comply with all applicable University regulations, including those that

are Reserve specific, and provide all required state and federal permits. If an application is rejected and the applicant disagrees with this decision, the applicant may appeal this decision to an ad hoc board of experts in that particular field appointed by the campus NRS administration or by the campus advisory committee.

5.4 **Publications and Reports**. All instructors should acknowledge the University of California and the specific Reserve where the instruction was completed in any publications or reports that result from use of the Reserve. Two copies of each publication resulting from work done at a Reserve shall be provided to the Reserve director as soon as they become available.

6. **PUBLIC OUTREACH USE**. Where appropriate, Reserves may be used to support research and education activities by K-12 classes, community groups, and qualified non-profit organizations. Except as specifically allowed, recreational use is expressly prohibited to protect sensitive habitats, on-going research, and instructional programs.

6.1 **Public Outreach Use Application**. All group leaders should discuss their proposed Reserve visit with the Reserve director before formally applying for permission to visit the Reserve. All group leaders must complete an NRS Public Outreach Use Application (Exhibit C) and agree to comply with all Reserve specific regulations. The group leader must specify the requested arrival and departure dates, the number of group participants, and a statement of purpose describing prospective teaching site(s), animal and plant populations that may be affected by the proposed group visit, and housing and other resources that will be needed during the visit. Any potential disturbances to the Reserve's ecosystem or cultural resources must be clearly described and discussed in advance with the Reserve director.

6.2 **Evaluation**. The Reserve director will use the following to evaluate each application for public outreach use:

(a) **Impacts on Natural Systems**. Potential positive and negative impacts on natural systems (e.g., significant new research, extensive collections, significant habitat alterations, introductions of species or genes);

(b) **Impacts on Present or Long-term Use**. Potential positive and negative impacts on present or future long-term use of Reserve for research or instructional purposes;

(c) **Alternative Sites**. Availability and proximity of alternative sites.

6.3 **Decision**. The Reserve director will inform the applicant that his/her request has been approved, denied, or approved with conditions. If an application is approved, the group leader must comply with all applicable University regulations, including those that are Reserve specific, and provide all required state and federal permits. If an application is rejected and the applicant disagrees with this decision, the applicant may appeal this decision to an ad hoc board of experts in that particular field appointed by the campus NRS administration or by the campus advisory committee.

7. **OTHER USES**. NRS Reserves may occasionally be available for purposes other than research or education activities (e.g., reasonably passive activities such as nature film production, non-educational conferences), but only if there is a clear benefit to the research and teaching mission of the Reserve, and if such use will not conflict with other uses of the Reserve. Special permission must be obtained for these activities and will be granted only if, based on best available knowledge or scientific evidence, such proposed activities will not harm the natural values of the Reserve or preclude the present or future long-term use of the natural area for research or instruction.

7.1 **Application Process**. Applicants proposing non-educational or non-research use of the Reserve must apply to the Reserve director, who will determine if such use is appropriate. In most instances, a formal license agreement with the University will be required and applicants will need to meet University contracting requirements (e.g., insurance, bonding, indemnity). If a formal agreement is not required, the applicant must, at a minimum, sign a release agreement.

7.2 **Evaluation**. The Reserve director will use the following to evaluate the application:

(a) **Impacts on Natural Systems**. Potential positive and negative impacts on natural systems (e.g., significant new research, extensive collections, significant habitat alterations, introductions of species or genes);

(b) **Impacts on Present or Long-term Use**. Potential positive and negative impacts on present or future long-term use of Reserve for research orinstructional purposes;

(c) **Alternative Sites**. Availability and proximity of alternative sites.

7.3 **Decision**. The Reserve director will inform the applicant that his/her request has been approved, denied, or approved with conditions. If an application is approved, the applicant must comply with all applicable University regulations, including those that are Reserve specific, and provide all required state and federal permits. If an application is rejected and the applicant disagrees with this decision, the applicant may appeal this decision to an ad hoc board of experts in that particular field appointed by the campus NRS administration or by the campus advisory committee.

7.4 **Non-educational/research Fees**. Applicants for non-educational or non-research use will be charged reasonable rates based on prevailing rates for similar situations. An appropriate in-kind fee or service, such as artwork relating to Reserve use, may be considered on a case-by-case basis in lieu of a fee. These fees and materials will be used to support the research and educational programs of the Reserve.

7.5 **Non-Disclosure**. Unless specifically agreed to in writing, neither University of California nor the name and location of the Reserve shall be disclosed in any materials or publications that result from use of the Reserve by these non-education or non-research users.

8. **SCHEDULING**. Priority for Reserve use will be determined at each Reserve based on its particular resources, facilities and programs, and generally will be given to research and University-level educational uses.

9. **USER FEES**. Each campus has established a fee structure for research and instructional use and public outreach programs that is appropriate to the particular situation at each Reserve. User fees are available on the Coal Oil Point Reserve website.

Appendix 6. 1990 LRDP Policies and NRS Guidelines Relevant to the COPR Draft MP.

Existing UCSB 1990 LRDP	***Existing guidelines NRS***	***New policies COPR Draft Management Plan***
RESEARCH, EDUCATION AND PUBLIC SERVICE PROGRAMS		
	Use of a Reserve will be allowed if the proposed activity and level of use, after careful review by the Reserve director (or other designated University official), are deemed to be consistent with the NRS Reserve Use Guidelines and with regulations and management plans for that particular Reserve.	Adopted
	All researchers using NRS Reserves must have valid academic qualifications. Research in any subject area may be allowed if the researcher can demonstrate that the resources and/or facilities available at the Reserve are reasonably necessary for the proposed research project.	Adopted
	Many research protocols require that the research area, including its biological resources and any equipment, be minimally disturbed by humans. Thus, some areas of each Reserve may be set aside permanently or temporarily for research use only.	Adopted
	Reserves may be available for classes offered for credit by state or nationally accredited colleges or universities. Classes in any subject may be allowed on-site if the instructor can adequately demonstrate that unique resources at a Reserve are reasonably necessary for the class.	Adopted
	Areas designated for class use (e.g., for observing wildlife and plants) may also be used by researchers if their research will not be adversely affected by instructional use.	Adopted
	Activities that will or are highly likely to irrevocably harm the natural values, ecosystem functions and native biodiversity of the Reserve, or preclude its possible future use for University-level research or instruction, will not be allowed.	Adopted

	Based on the best available scientific evidence, management of such natural areas may require occasional large-scale management actions such as controlled burning or flooding.	The Reserve will work with work with grassland experts and the Santa Barbara County Fire Department to evaluate the feasibility of various grass management methods such as mowing, controlled burns, and grazer re-introduction.
STEWARDSHIP PROGRAMS		
LRDP EIR COPR will be fenced to adequately protect 1990 LRDP EIR sensitive habitat. This includes commonly used or convenient access to the northern and western sides of COPR and the dune area of COPR. Should development occur along the northwestern border of COPR, or if damage from off-road bicycles or other vehicles entering this side continues to occur, then a fence will also be constructed along this border.		Adopted
LRDP 4.4-30 **a.** All fences shall be adequate to prevent access by dogs and high enough to inhibit human access.		Adopted
b. Low posts or similar control structures, which prove necessary, shall be installed to prevent motor vehicle access.		Adopted
c. All fences shall be periodically examined and repaired at least annually if breached.		Adopted
d. Signs explaining the necessity of limitations on access to protected natural areas shall be posted at all points of permitted or previous access to all fenced areas. The signs shall be of uniform design, visually pleasing, and harmonious with the surrounding natural environment.		Adopted
e. in areas where public access will be permitted, approved trails will be identified or constructed and signs requesting visitors to remain on these trails shall be posted.		Adopted
30210.10 The University will, subject to the availability of funding from the State Coastal Conservancy, provide interpretive signs on West Campus, to highlight environmentally sensitive		Adopted

areas which could be damaged by excessive or unauthorized access.		
30240(a).6 Signs prohibiting unauthorized vehicles (except service and emergency vehicles), pedestrians and domestic pets from entering the Reserve shall be posted along its eastern boundary.		Adopted
30210.19 Trail access upcoast along the west campus bluff top should be marked with appropriate directional information and cautions against intrusion into the fenced Reserve		Adopted
30240(a).2 Existing fences, signs and information maps around the perimeter of the Reserve shall be maintained to restrict unauthorized access by pedestrians, dogs, motor vehicles and off-road bicycles		Adopted
30235.2 No permanent above-ground structures permitted on dry sand		To protect the snowy plovers, the Reserve will: fence the main plover roost to reduce recreation in the plover roost.
30240 a.3 Mowing of the grassland in the Reserve is prohibited except for fire protection, and shall be avoided prior to the time plants go to seed. Mowing shall not exceed the minimum necessary for adequate fire protection		Mowing or controlled burns may be used to manage the grasslands.
30240(a).4 To preserve roosting habitat for birds, eucalyptus, pine and other trees and brush located on the bluff east of Coal Oil Point Natural Reserve outside of the Coal Oil Point development will not be removed except where necessary to accommodate new structures or infrastructure.		Exotic plants and non-local native species will be eradicated or controlled except when: (a) visual screening or landscape of buildings is desired, or (b) they provide irreplaceable function to sensitive animal species (native plants may be planted to replace this function)
4.4-21 Trash receptacles shall be placed on campus beaches and the campus shall continue to remove litter, especially plastic materials posting particular dangers to wildlife.		Adopted
30240(b).17 At Coal Oil Point, the maximum allowable sound level shall not exceed		Adopted

60 decibels on the A-weighted scale (1980 LRDP Development Standard, as amended).		
4.4-45 Whether leashed or not, dogs shall not be permitted in the Reserve. **30240** Unleashed dogs and motor vehicles shall be prohibited on campus beaches		Adopted
2.III.14 The supply of parking spaces on the West Campus is expressly controlled to minimize impacts of overuse on the sensitive environment of the Coal Oil Point Natural Reserve and adjacent areas. **30210.7** To provide parking for a potential seminar facility at Coal Oil Point, while protecting the area from overuse, parking for no more than 50 cars shall be provided at Coal Oil point, subject to special permit.		Adopted
30233(b)1 Any dredging of the marsh area or Devereux Slough to remove sediment shall be planned and carried out to avoid significant disruption to the marine and wildlife habitat of the Coal Oil Point Natural Reserve.		Adopted
30210.2 Public access to Sands Beach from adjoining beaches and via a passage near the Cliff House 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 when there is a need for the protection of fragile coastal resources or there is adequate nearby access.	Where appropriate, Reserves may be used to support research and education activities by K-12 classes, community groups, and qualified non-profit organizations. Except as specifically allowed, recreational use is expressly prohibited to protect sensitive habitats, on-going research, and instructional programs.	Adopted
30210.6 The Campus shall allow coastal access permit parking at the north entrance to West Campus		Adopted
30210.19 Pedestrian access to the sandy beaches upcoast shall be provided by the Campus from Camino Majorca at the end of Del Playa Drive in Isla Vista.		Adopted
Public access is permitted to all parts of the Campus except for the Coal Oil Point Reserve where a special permit is required.		Adopted

Campus Wetland Management Plan To reduce the damaging effects of uncontrolled access to the Reserve, the west and north sides of the Reserve should have a barrier fence with periodic posting of signs with prohibitory, explanatory and perhaps interpretive information. Fences should be designed so as not to be visually intrusive, and to allow visual access to these wetlands. Fences should be signed at regular intervals to explain the purpose of the fence and the nature of the resources being protected.		Adopted
30210.17 Public access policies under this section shall be subject to restriction, as determined by the campus, only when is inconsistent with the following: **d**. Protection of fragile coastal resources		Adopted
30210.15 The Campus shall continue to maintain and improve bicycle and pedestrian access ways to the beach as necessary to protect sensitive habitat areas and public safety		Adopted
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.		Adopted
30210.6 The Campus shall allow coastal access permit parking at the north entrance to West Campus. **2.III.15** Up to ten spaces will be provided near the entrance to West Campus, for visitors to the Coal Oil Point Natural Reserve—a minimum number consistent with the Campus' intent to protect the Reserve environment from overuse.		Adopted
30210.7 To provide parking for a potential seminar facility at Coal Oil Point, while protecting the area from overuse, parking for no more than fifty cars shall be provided at Coal Oil Point, subject to special permit (1990).		Adopted
30210.11 In order to prevent adverse effects to the Coal Oil Point Natural Reserve, the following measures will be taken: b. The existing Devereux Road		

running alongside Devereux Sough will be used as primary access to Devereux School. c. As part of the student housing project, reconfigure the intersection of West Campus Point Lane and the entrance road into the West Campus to direct southbound traffic onto West Campus Point Lane instead of the existing Devereux Road. The new intersection will be appropriately signed to direct drivers to Coal Oil Point along West Campus Point Lane. d. In order to reduce traffic on the slough road between the intersections of Dividing Road and West Campus Point Lane, Devereux School traffic will be encouraged to use Dividing Road instead of the slough road. Dividing Road, the existing narrow road connecting Devereux Road and West Campus Point Lane, west of the stables, shall be widened to approximately 24 feet and/ or realigned to carry two-way traffic safely. It will be designed to a rural standard, with soft four-foot gravel shoulders, maintaining as much open space on each side as possible, and avoiding any fill of wetland areas.		
	Restoration projects will only be implemented if the best available knowledge or scientific evidence indicates that the proposed restoration activity will not harm the natural values of the Reserve or preclude the present or future long-term use of the natural area for research or instruction.	Revegetation with native species will be conducted to restore degraded habitats. Local seed sources will be used for revegetation unless local populations are eradicated and reintroduction is desired. Following UC Regent and Coastal Commission approval of this plan as incorporated into an LRDP amendment, restoration projects that do not involve grading or are found consistent with this plan by the Reserve will be consistent with CEQA and California Coastal Commission requirements.
The following facilities are allowed subject to the policies of the Coastal Act Element, including but not limited to habitat		Adopted

creation and restoration: a. Pedestrian paths, boardwalks and stairways, restricted to particular alignments and areas. The potential stairway to the West Campus beach is located east of Coal Oil Point in Figure 26 of the Campus Plan. b. Placement of fences and signs. c. Other activities established for the Coal Oil Point Natural Reserve by the University of California's Natural Reserve System.		
ECOSYSTEM MONITORING PROGRAMS		
	Natural areas will be identified and mapped	Adopted
30240(A).17 The horse paddocks in the watershed of the North Finger of the Devereux Lagoon shall be removed as part of the restoration plan for this wetland before the beginning of the 1992-1993 academic year.		Adopted
30240(a).1: The Campus shall implement the Wetlands Restoration and Management Plan for Storke Wetlands and Devereux Slough as approved by the Campus Wetlands Management Committee and UCSB.		Adopted
30231.2 Projects shall be designed to minimize soil erosion and, where possible, to direct surface runoff away from coastal waters and wetlands. a. West and Storke Campus site development is to be accomplished, wherever feasible, in a manner that will maximize percolation and infiltration of precipitation into the ground. b. During Campus development, sediment shall be retained on the site. c. The University shall work with property owners adjacent to the West Campus, and Santa Barbara County to insure that development of such properties does not introduce sedimentation into the Devereux Slough. d. Projects shall be designed to conduct storm water drainage away from Devereux Slough. e. If storm water can only be feasibly discharged into Campus wetlands it		Adopted

shall comply in all respects to all applicable standards of the Regional Water Quality Control Board. f. At Coal Oil Point, if percolation is determined through tests to be inadequate, to prevent bluff top erosion, storm waters will be collected and drained directly to the ocean by means of pipes discharging at the base of the bluffs. g. Runoff from new development and the planned parking lot at Coal Oil Point shall be directed to the east-facing bluff on the Point, and the drainage structures integrated with the planned stairway to the beach, if feasible. Traps and filters for roadway contaminants shall be provided as part of the drainage structures.		
30233(A)1 Fills shall not encroach on Devereux Slough, Storke Campus Wetlands, Campus Lagoon or any other natural watercourses or constructed channels on Campus (1980 LRDP Development Standards, as amended). **30233(a)2** Fills shall have suitable protection against erosion (1980 LRDP Development Standard, as amended).		Adopted
30240 (a).16 The Campus shall use mosquito control methods with the least effects upon non-target organisms. Wetlands shall not be drained for this purpose, nor shall non-native larval predators be introduced.		Adopted
ADMINISTRATIVE PROGRAMS		
	The Reserve Director has primary responsibility for approving proposed uses under the NRS Use Guidelines and applicable Reserve guidelines, and will coordinate management and all other uses of the Reserve.	Adopted
	Each Reserve management plan will identify a projected "build-out" location that specifies the optimum allowable facilities for resident staff, researchers, classes, and public outreach programs to ensure minimal impacts on the natural systems (e.g., carrying capacity based on the ecosystem responses or biodiversity).	Adopted
30240(b).6		Provide better facilities

In order to protect habitats of the Reserve: a. The total square footage of current and replacement Coal Oil Point structures shall not exceed the total square footage of current Coal Oil Point structures. b. New structures that are constructed as part of the Coal Oil Point project shall be setback a minimum of 50 feet from the bluff edge (1980 LRDP policy). c. Trees on Coal Oil Point will not be removed except where necessary to accommodate new structures and infrastructure.		for classroom and research functions. Exotic plants and non-local native species will be eradicated or controlled except when: (a) visual screening of buildings is desired, (b) used for landscaping around existing buildings, or (c) provide irreplaceable function to sensitive animal species (native plants may be planted to allow future removal of plants).
30230.1 Development in Coal Oil Point Reserve will be kept to a minimum. Only structures that would be used in conjunction with research in the Reserve, or that would enhance the area's usefulness as a natural study area will be allowed, such as weather stations, observation blinds and small storage structures (1980 LRDP policy, as amended).		See above
PRC § 30211: development not to interfere with access.		Adopted
30253.1, 2 Buildings shall not be placed astride any faults.		Adopted
30353.3 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-oriented use.		Adopted
30230.2 The University shall coordinate with and encourage action by the County of Santa Barbara, City of Santa Barbara, and the Regional Water Quality Control Board to see that adjacent land uses are established and carried out in a manner which will sustain the biological productivity of campus marine resources		Adopted
1.II.12 Campus Environmentally sensitive habitat areas (ESHA) are established where human activity is to be limited and/or carefully controlled		Adopted

Appendix 7. Agency Summary.

Introduction:

Although the current boundaries of COPR occur entirely within UCSB, other areas of the watershed include urbanized land, lands proposed for development, agricultural lands, and open space. The creation and implementation of a successful management plan for COPR will depend in part on the sensitive and wise use of non-Reserve lands within this watershed. In addition to the University, a number of Federal, state, county, city, and private entities have jurisdiction over various aspects of development and management of natural resources, and activities that affect these resources, in the Devereux watershed. Effective management of Devereux Slough and COPR, and of additional adjacent undeveloped lands, depends upon the coordination of all responsible regulatory and advisory agencies. The following is a brief overview of some of the most relevant authorities and a summary of their major areas of responsibility and basic policies.

Federal Agencies

Army Corps of Engineers. The U. S. Army Corps of Engineers (Corps) is the Federal agency that regulates activities in "waters of the United States" pursuant to Section 404 of the Clean Water Act and Section 10 of the River and Harbors Act. These acts relate to the filling of wetlands and the dredging or discharge of materials into rivers, streams, and near shore coastal waters, on both public and private land. Activities that typically trigger Section 404 include clearing or draining of most wetlands, planting seedlings in wetlands to convert them to a new use and improving ditches in wetlands.

If a proposed project or activity is not exempt or covered by one of the Nationwide Permits, an Individual Permit must be acquired. The Corps uses the Section 404 (b) (1) guidelines to evaluate permit applications. These guidelines prohibit the discharge of dredged or fill material "if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic environment."

Within the Devereux Creek Watershed, the Corps of Engineers could require permits and related mitigations for major restoration projects involving the estuary and various tributaries of Devereux Creek, as well as for the potential filling of tributaries or other wetlands to accommodate proposed urban development.

Department of Agriculture. The Department of Agriculture was created by act in 1862 (7 USC 2201) as the 8th executive department in the Federal government. The department now includes farm service agencies; food, nutrition and consumer services; agriculture research, education and economics; and grain inspection, packers and stockyard administration.

Animal Damage Control. Animal Damage Control (ADC) is part of the Animal and Plant Health Inspection Service of the Department of Agriculture. This agency works with the U. S. Fish and Wildlife Service of the US Department of the Interior and other agencies on predator management programs, particularly relating to predators of endangered species of animals.

Department of Interior. The Department of Interior was created by act in 1849 (43 USC 1451) and reorganized most recently in 1950. Over the years the Department's role has changed from that of a general "housekeeper" for the Federal Government to that of custodian of the Nation's natural resources.

U. S. Fish and Wildlife Service. The U. S. Fish and Wildlife Service (USFWS) is responsible for the management of fish and wildlife resources on Federal lands, the regulation of migratory species, and the management of Federally listed endangered and threatened species or special status species. The USFWS is also engaged in the process of wildlife protection through the U. S. Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.). This Act requires that a lead Federal agency consults with the USFWS relating to wildlife conservation and development, damage to wildlife as a result of a proposed project and measures to mitigate or compensate for proposed actions. The

USFWS comments on proposed projects that are subject to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. In addition to these regulatory activities, the USFWS participates in the local regulatory process through comments on CEQA and NEPA documents, and provides technical services on a case by case basis.

The Service also is responsible for administering the Endangered Species Act (ESA, 16 USC 1531 et seq.). Section 7 of the Act requires each Federal agency to consult with the Service to ensure that proposed actions do not jeopardize the continued existence of any endangered or threatened species. The USFWS has commented on the Snowy Plover Management Plan of COPR (Appendix 2)

Department of Transportation. This department was established by act in 1966 (49 USC 102 and 102 note). Its purpose is "to assure the coordinated, effective administration of the transportation programs of the Federal Government" and to develop "national transportation policies and programs conducive to the provision of fast, safe, efficient and convenient transportation at the lowest cost therewith." .

U. S. Coast Guard. Responding to oil spills that could threaten Devereux Slough, and the adjacent marine intertidal resources, is the responsibility of the U. S. Coast Guard. Most oil spills have been from offshore oil platforms, such as the major spill in 1969. Section 4202 of the Oil Pollution Act of 1990 amended the Federal Water Pollution Control Act (FWPCA) to address the development of a National Planning and Response System for oil spills (U. S. Coast Guard 1993). As part of this system, Area Committees have been established by the President of the United States. These area committees are comprised of qualified personnel from Federal, State, and local agencies. Each Area Committee, under the direction of the Federal On-scene Coordinator for the area, is responsible for developing an Area Contingency Plan (ACP). For the region that includes COPR, this plan is entitled: Marine Safety Office/Group Los Angeles - Long Beach Oil and Hazardous Substance Area Contingency Plan (U. S. Coast Guard 1993).

Environmental Protection Agency. The Environmental Protection Agency (EPA) is the principal Federal agency responsible for managing environmental quality, including air and water quality. It receives its authority from the National Environmental Policy Act. The EPA is the agency chiefly responsible for the administration of the water quality provisions of the Clean Water Act (33 USC 1251 et seq.). The objective of this Act is to restore and maintain the chemical, physical and biological integrity of the nation's waters. Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into waters of the U. S., as discussed under Army Corps of Engineers above (See 10.1). Because there are various concerns (e.g., see Davis et al. 1990) regarding water pollution, such as the effects of nutrient enrichment on the water quality of Devereux Slough, the EPA might play a role in evaluating and improving water quality within the Devereux Creek Watershed.

National Marine Fisheries Service. The National Marine Fisheries Service (NMFS) has responsibility for managing ocean fishes such as halibut and migratory fishes such as salmon and Steelhead Trout. Compared to many estuaries of the region such as Carpinteria Salt Marsh, Devereux Slough is not a major fish habitat. It is not a habitat for endangered fish species and it is not a nursery for marine fish such as halibut. This is due in part to the lack of tidal circulation because the estuary mouth is closed most of the year as well as to the shallowness and hypersalinity of the estuary.

State Agencies

California Coastal Commission. The California Coastal Commission (CCC) is governed by a 12 member Commission appointed by the Governor and the California Legislature. The Commission is the primary land use regulatory authority within the Coastal Zone. The Commission certifies Local Coastal Programs, which authorize local governments to issue Coastal Development Permits, and acts as an appeal body. The Commission also has permit jurisdiction on State Tideland, or Public Trust lands, and all lands seaward of the mean high tide lines out to three miles. The Commission has the responsibility to review

Federal projects through the Federal consistency review authority granted by the Department of Commerce.

In addition to its regulatory responsibilities, the Commission also engages in long range planning for the protection and restoration of coastal resources, including wetlands, beaches, and other coastal habitats. The portion of the study area below the mean high tide line falls within the Commission's original permit jurisdiction. The standard for review of projects proposed in this area is the California Coastal Act. Decisions relating to the portion of the Reserve that is above the mean high tide line may be appealed to the Commission. The standard for review of local appealed projects is the 1990 UCSB Long Range Development Plan (LRDP).

Department of Fish and Game. The California Department of Fish and Game's (DFG) mission is to manage California's diverse fish, wildlife and plant resources and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has primary responsibility for regulating the taking of all species of animals and enforcement of the Department's program for rare and/or endangered species of plants and animals. Under the Native Plant Protection Act, DFG requires permits for the collection, transport or sale of State-designated native plants. Under the California Endangered Species Act, the State Fish and Game Commission is petitioned to add, delete or change the listing status of plants and animals. Under Section 2081, the "taking" of a state-listed endangered species or its critical habitat requires a permit issued by the Department, with criminal penalties and personal liability for non-compliance.

Alterations to Devereux Creek and its tributaries, including flood control and utility line construction and maintenance and marsh enhancement activities, would require Stream Alteration Agreements.

Office of Oil Spill Prevention and Response. The State of California's lead agency in responding to oil spills in marine waters is the Department of Fish and Game's Office of Oil Spill Prevention and Response (OSPR). OSPR can provide to other State agencies and

local governments information relating to the administration of the Oil Spill Response Trust Fund and cost recovery. The Fund can be used to cover promptly the cost of response, containment, and cleanup of oil spilled into marine waters. In addition, the OSPR can recover response costs or damages from responsible parties with the Attorney General's assistance. Refer to additional information in this chapter under the U. S. Coast Guard, the County Energy Division, and Clean Seas, a private corporation.

Regional Water Quality Control Board. The Regional Water Quality Control Board - Central Coast Region (RWQCB) is governed by a nine member board that is appointed by the Governor. The Regional Board develops region-specific water quality guidelines and policies that are reviewed by the State Water Resources Control Board (SWRCB). The State Board has the primary responsibility for maintaining water quality in the State through authority of the Porter Cologne Water Quality Control Act. The Board accomplishes this through planning, research and monitoring programs as well as regulatory oversight for the State's surface, ground and coastal waters.

RWQCB has the primary responsibility for setting waste discharge requirements for both point and non-point sources. The RWQCB has been authorized to act on behalf of the Environmental Protection Agency in the issuance of National Pollution Discharge Elimination System (NPDES) discharge permits for point discharges. The Board also issues non-point discharge permits under the authority of the Porter Cologne Act. Pursuant to Section 401 of the Federal Clean Water Act, RWQCB certifies that a proposed project complies with State water quality standards. The RWQCB has authority over the discharge of any agricultural effluent in the upper watershed of Devereux Creek or other potential discharges from operations such as golf courses and other commercial developments.

Resources Agency. The Resources Agency includes several agencies that have a direct role in managing the Coal Oil Point Reserve. These include the Coastal Commission, Department of Fish and Game, State Coastal Conservancy, and State Lands Commission. The Resources Secretary is appointed by the Governor, who is directly responsible to the

Governor for operations in each department and unit within the agency. The Secretary develops and reports to the Governor on legislative, budgetary, and administrative programs to accomplish comprehensive long-range, coordinated planning and policy formulation in matters of public interest related to the Resources Agency.

State Coastal Conservancy. The State Coastal Conservancy (SCC) is governed by a seven member Board appointed by the Governor and the California Legislature. The SCC was created in 1976 to help protect and restore the State's resources in the Coastal Zone. The responsibilities of the Conservancy fall into seven categories: preservation of agricultural land; coastal restoration; coastal resource enhancement; urban waterfront restoration; preservation of coastal resource areas; public access to the coast; and assistance to nonprofit organizations and land trusts in coastal resource protection. The Coastal Conservancy has the authority to fund development and restoration projects within the Coastal Zone consistent with applicable Coastal Act policies. In addition to administering a grant program for local governments and non-profit groups, the SCC also engages in long range planning for coastal access and the protection and restoration of unique coastal resources. In 1987, the SCC funded the development of the UCSB Campus Wetlands Management Plan, which included the wetlands at COPR.

State Lands Commission. The State Lands Commission is governed by a three member Board. The State Lands Commission has the responsibility of managing State tidelands and Public Trust lands, i.e., those lands that were not in private ownership or Pueblo lands at the time the State was established. The State Lands Commission issues permits and makes determinations regarding the location of the mean high tide line, and the extent of historic Public Trust lands. The Commission’s decisions are based on basic policies intended to protect the public's interest in State-owned lands, to ensure the right of public access, and to guarantee the preservation of natural resources. The State Lands Commission also oversees the leasing of State tidelands for oil and gas development, issues dredging permits and carries out various programs such as the removal of artificial hazards and debris from the intertidal zone and other state tidelands.

Some coastal wetlands in southern California are considered Public Trust lands and are regulated directly by the State Lands Commission. Devereux Slough, however, was included in Pueblo lands at the time California received statehood, therefore the tidelands of the estuary were not deeded to the State of California and are not subject to State Lands Commission jurisdiction. The intertidal marine wetlands associated with COPR, however, are regulated directly by the Commission.

University of California

UC Natural Reserve System. As a Trustee Agency under the California Environmental Quality Act, the University of California also manages the resources of its lands in the Public Trust. The mission of the Natural Reserve System is to "contribute to the understanding and wise management of the earth and its natural systems by supporting university-level teaching, research, and public service at protected natural areas throughout California." (UC NRS 1991).

University of California, Santa Barbara. COPR is managed by the UC NRS through UCSB (see Reserve Administration program). The UCSB NRS also manages 6 other reserves that are part of the UC NRS. The UCSB NRS is administered by the campus NRS office, which is affiliated with the Marine Science Institute (MSI), an Organized Research Unit under the Office of Research. COPR receives administrative support from MSI and a number of campus administrative offices including the campus Police Department, Design and Planning, Business Services, Accounting Services, Human Resources, Environmental Health and Safety, and Design, Construction and Physical Facilities. Financial support for salaries for reserve directors and UCSB NRS administrative staff, plus a small recurring annual budget for supplies, is provided by the UCSB Office of Research.

Office of Design and Planning. The Office of Design and Planning is responsible for long-range planning for UCSB and develops the campus Long Range Development Plan (LRDP). As a part of UCSB, management of COPR is directed somewhat by elements of

the campus 1990 LRDP, which has a number of specific applicable policies. Design and Planning is also responsible for acquiring the appropriate agency approvals (e.g. CCC and CEQA) for campus projects. COPR works through the Office of Design and Planning to fulfill applicable agency requirements for projects on the Reserve.

County Agencies and Programs

Santa Barbara County plays a role in the management of lands within the Devereux Creek Watershed because some of the lands adjacent to COPR are unincorporated and fall under the jurisdiction of the County Management of the Devereux Creek also falls under the authority of several County agencies including Flood Control, Air Pollution Control and the Santa Barbara Coastal Vector Control District.

Public Works Department. The Santa Barbara County Public Works Department is involved in most construction projects that involve public property including roads and drainage and flood control facilities, that could impact COPR. The Santa Barbara County Flood Control and Water Resources District is in the Public Works Department.

Flood Control District. The mission of the Flood Control and Water Resources District is to provide flood protection and water conservation to County citizens. Flood Control is responsible for the maintenance of Devereux Creek with respect to protection of life and property from flood hazard, and protection of the riparian habitat, watershed and creek and other wetland resources. Flood control projects undertaken in Devereux creek and the Devereux watershed can directly impact the Devereux slough which is in the COPR.

Santa Barbara Coastal Vector Control District. Vector Control has regulatory authority in the region and has a regular program to sample for and abate mosquitoes in the wetlands areas of the coastal regions of the County. The campus has entered into an MOU agreement with Vector Control for the monitoring and control of mosquitoes on UCSB lands including COPR and the Carpinteria Salt Marsh Reserve.

Planning and Development Department. Santa Barbara County Planning and Development (P&D) has broad responsibilities for the preservation, management, and development of natural resources under County jurisdiction.

Local Coastal Program. Portions of the Devereux Creek Watershed and the 40 acres of COPR that was added to the Reserve by the UC Regents in 1998, occur within the Santa Barbara County Coastal Plan (County of Santa Barbara 1982). The amendments to the 1990 UCSB LRDP will include the additional 40 acre parcel added to COPR. Thus, when the LRDP amendment is approved, this 40 acres will no longer be in the Santa Barbara Coastal Plan. In the Coastal Plan, the slough was given the status of an "environmentally sensitive habitat area", defined in the California Coastal Act (State of California 1976) as "...any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments." The County concluded that this designation was adequate to protect the estuary from the direct threat of development, but indirect impacts from sedimentation, toxic runoff, and land use practices in the watershed could threaten the wetlands' biological productivity (County of Santa Barbara 1982).

City of Goleta

The City of Goleta incorporated in 2002 and assumed jurisdiction over the lands known as Ellwood Mesa to the west of COPR. Activities on these City lands have potential impacts on COPR since the lands are adjacent to the western border of the Reserve. The public may access the area by passing along the northern border of the Reserve or along Sands Beach. The City is in an organizational phase and some of the regulations and policies that will impact the management of City lands are in development. The City has not yet appointed an individual or department to oversee the area. In particular, City regulations governing access to and use of the lands by the public for recreation, by dogs and their owners, and by equestrians, both on the mesa and on the beach, may affect the types of actions that will need to be taken by the COPR to protect its natural resources from disturbance.

Organizations, Trusts and Associations

Devereux Santa Barbara. Devereux Santa Barbara is a unit of the nation's largest independent non-profit provider of treatment services for individuals with emotional, behavioral and developmental disabilities. Devereux staff and clients are the immediate neighbors of the Coal Oil Point Reserve, and the eastern portions of the reserve and beach are regularly used as part of the residential experience and certain classes at Devereux.

Santa Barbara Chapter of the National Audubon Society. The National Audubon Society has over half a million members that work on behalf of the environment in over 500 communities in the United States. The Society was founded in 1886 to prevent the extinction of birds, particularly the slaughter of birds for plumes used in fashionable hats. The mission of the Audubon Society is to "conserve and restore natural ecosystems, focusing on birds and other wildlife for the benefit of humanity and the earth's biological diversity." The Society works to minimize threats to birds from habitat loss, pollution, population increases, water policies and pesticide use. They educate the public and their members about birds, and work with the scientific community, legislators, litigators and others towards the acquisition and management of plant and animal sanctuaries, protection and enhancement of habitats, etc. The Santa Barbara Chapter of the Audubon Society sponsors field trips to COPR and sponsors other activities that provide education about, and protection for, birds and their habitats.

Interagency Organizations and Authorities

Beach Erosion Authority for Central Operations and Nourishment (BEACON). This authority includes members from the coastal cities of Santa Barbara, Port Hueneme, Oxnard and Ventura as well as representatives from Santa Barbara and Ventura counties. BEACON was formed in recognition that beach nourishment and dredging issues are related and are better addressed in a comprehensive manner by several jurisdictions working together. The general goal of BEACON is to provide for beach nourishment projects in a coordinated fashion, including the pursuit of grants and other funds for pilot programs that will increase the downcoast movement of sand.

PART II: BIOLOGICAL AND CULTURAL RESOURCES

I. Environmental Setting

Coal Oil Point Natural Reserve [i.e., Coal Oil Point Reserve (COPR)] presently covers 117 acres (47 hectares) and is located along the South Coast of Santa Barbara County (Figures 1 and 2), in the lower drainage area of the Devereux Creek Watershed (Figure 11), on the West Campus of the University of California, Santa Barbara (UCSB) (Figure 2). The Latitude and Longitude are: 34° 25' 00" N and 119° 52' 30" W, and elevations (Figure 12) range from extreme low water along the coast to approximately 30 feet (10 meters) on marine terraces. COPR is characterized by many coastal natural resources that are recognized for their ecological importance as well as for their beauty.

Because coastal wetlands are located in one of the most desirable parts of the state in which to live, an estimated 90% have been developed and the remainder have been degraded (Ferren et al, 1996). Only 15% of the land in the Devereux watershed remains undeveloped and COPR is the largest parcel within this undeveloped land. The Reserve contains more than 10 different habitats such as a coastal lagoon-type estuary with seasonally inundated and irregularly tidally flushed salt flats and salt marsh; sandy beach; rocky intertidal zone; coastal foredunes; dune scrub; dune swale; grassland, and vernal pools. The dunes are an especially important feature of the Reserve because they have been protected from severe disturbance and are the last remnant dunes in southern Santa Barbara County. The Reserve's rich and accessible rocky intertidal areas provide educational opportunities to many students. The coastal wetlands at COPR support a multitude of marine, estuarine, and freshwater species that interact in complex food webs. Devereux Slough is characterized by closure to tidal circulation most of the time. When freshwater runoff is sufficient to breach the sand berm at the mouth of the estuary, the slough moves into a period of days to weeks of tidal circulation until the sand berm rebuilds. This variability adds to the spatial and temporal complexity of the habitat, which is reflected in the highly diverse bird communities that use the area. The beach between

the slough and ocean is an important roosting site for the Snowy Plover and supports a Snowy Plover and California Least Tern breeding population.

The environmental setting of COPR has a profound influence on the complexity of the landscape and the richness of the biological resources. Analysis of borings, seismic surveys, and field observations (Stone Geologic Services, Inc. 1965) revealed that the area is characterized by a complex geologic structure, involving Miocene and Pliocene bedrock, Pleistocene channel deposits, Pleistocene marine terrace deposits, Holocene estuarine deposits, dune sand, beach sand, and top soil (Figures 13 and 14). A complex interplay between the erosion of uplifted mountains and changing sea level, has characterized the regional coastline into the Holocene. Complex structural geology , including two systems of intersecting faults (the east-west trending More Ranch Fault system and southeast-northwest trending Coal Oil Point Fault system, Figure 15) has profoundly influenced the formation of habitats such as riparian corridors, the shape of the Devereux Slough, the location of seeps and springs and the development of fault sag ponds and vernal pools).

The geographic location of COPR also is of great importance to the biologic richness of the area. The Reserve occurs in the transition between the cool, moist Mediterranean climate that characterizes central California north of the Santa Ynez Mountains, and the warm, dry Mediterranean climate that characterizes southern California south of the Santa Ynez Mountains. In this transition region, many plants and animals reach northern or southern limits of their geographic ranges. This results in unique plant and animal associations and rich biological diversity.

The sand dunes and coastal marsh of COPR are remnants of habitats that were once more widely distributed along the California Coast (Figure 16A) before European settlement (Figures 16B, 16C, and 16D). The dunes are an especially important feature of the Reserve because they have generally been protected from severe disturbance. Thus the plant communities are representative of natural coastal dune vegetation. In contrast, surrounding dunes outside the Reserve have not been protected from human disturbance and have been severely affected by human activity.

Coastal wetlands (Figure 17) are important because they support a multitude of marine, estuarine, and freshwater species that interact in complex food webs. In addition, animal and plant species living in coastal wetlands are often highly adapted to this environment and are not found in other habitats. Because coastal wetlands are located in one of the most desirable parts of the state in which to live, an estimated 90 percent of these important habitats have been lost to development (Ferren et al, 1996). The continued encroachment of urban development is threatening and degrading those coastal wetlands that remain.

The COPR wetlands of the estuary known as Devereux Slough are characterized by a complex pattern of inundation. The wetlands are influenced strongly by freshwater runoff and have only occasional tidal circulation. The basic pattern is one of closure to tidal circulation most of the time. When freshwater runoff is sufficient to breach the sand berm at the mouth of the estuary, the whole slough empties rapidly. The slough then moves into a period of days to weeks of tidal circulation through the entry channel until the sand berm rebuilds and seals the mouth. Thus, the salinity and inundation regimes vary within a period of days and are quite different from nearby Goleta Slough that is fully tidal and, therefore, more marine influenced. This variability adds to the spatial and temporal complexity of the habitat, which is reflected in the highly diverse bird communities that use the area. The Reserve and adjacent areas are the home or resting stops for several rare and endangered bird species, including the Black-shouldered Kite, California Least Tern, Snowy Plover, and the Belding's Savannah Sparrow. The area is used by large numbers of migrating and wintering shorebirds including Snowy Egrets, Great Egrets, Great Blue Herons and Black-Crowned Night Herons. Kites and hawks roost in the trees year round, using the grassland areas as hunting grounds. Along the coast at the Reserve, regionally uncommon rocky-intertidal areas are present and are used by many educational groups.

Overall, the Reserve is a unique and excellent natural study area, particularly because of its proximity to the University. It is used regularly for undergraduate classes from UCSB and other institutions, is visited by community schools and educational groups, and is the site

of graduate and faculty research projects. The Reserve is very intensively used for education, research, and community activity, especially when the numbers of users per acre are considered. It also is a site of great natural beauty, and an important visual and aesthetic amenity for the campus and community.

II. History of the Coal Oil Point Reserve Area

The area now known as Coal Oil Point was first identified as Punta de Tobax on a map produced as part of the log of the frigate Princessa recorded by Juan Pantoja y Arrellaga on a voyage in 1782. In 1842, Nicholas Den became owner of a large area including Coal Oil Point as part of a Land Grant from the Mexican government. At this time, some of the area was heavily wooded with oaks at points along the mesa which presently contains UCSB, Isla Vista, and the Coal Oil Point area. Den called the entire grant area "El Rancho De Los Pueblos". Coal Oil Point later became part of Rincon Ranch, named for a sharp corner in the ranch road (now the junction of Storke and El Colegio) and belonged to two of Nicholas Den's sons, August and Alphonse Den. Alphonse owned the western portion of the ranch that included the present Coal Oil Point and Devereux Slough area. A Coast and Geodetic survey conducted in 1871 labeled the location Oak Point and identified a number of major features still present today (Coast and Geodetic Survey Map 3700s bar. 445 T-1267). At some point, the property was purchased by Joseph Archambault, a speculator, and then later sold in 1912 to Jack Cavalletto for farming.

In 1919, the property was sold to retired British officer Col. Colin Campbell who planned to develop a major estate on the property. The Campbell estate eventually included many structures and features still present today, including the access road, mansion (now Devereux Santa Barbara's main building), barn, etc. The Devereux Foundation, which is now named Devereux Santa Barbara, purchased the 500-acre Campbell Ranch and opened Devereux School in 1945.

In November 1967, the Regents of the University of California purchased 236 acres from Devereux Santa Barbara. This area included dunes, an estuary, and coastal terraces. During the negotiations to acquire this property, Dr. Kenneth Norris, the UC Systemwide Natural Land and Water Reserve Committee, and UCSB faculty, emphasized to the UCSB Chancellor that portions of the property had natural Reserve value. During the development of the UCSB Long Range Development Plan of 1968, the dunes on the current "West Campus" property were designated a "Natural Resources" Reserve.

In late 1969, the UCSB Natural Land and Water Reserves (NLWRS) Committee which was chaired by Dr. J. R. Haller, and the campus Physical Planning Committee, recommended that the dunes, slough, and beach be included as part of a campus ecological Reserve. The University-wide Committee for NLWRS recommended that funds be allocated from its "Establishment Funds" for fencing and to provide housing for a caretaker at the proposed Reserve. Dr. Bruce Wales of the Biological Sciences Department was instrumental in supporting the formation of the Reserve and served as the first chairman of a campus management committee for the area.

Chancellor Vernon Cheadle concurred with these recommendations and requested that the identified areas be managed under the supervision of the campus Natural Land and Water Reserves Committee. The Reserve at this point was called the Devereux Natural Reserve. The Chancellor also agreed to put forward a recommendation to the Regents to include a specific number of acres at this site in the UC wide Natural Land and Water Reserve System as a new systemwide Reserve - Coal Oil Point Reserve. Considerable discussion took place about the size of the Reserve, with dimensions of 42, 70, and 91 acres considered. On the one hand there was concern about the minimum size for an effective ecological Reserve; on the other, there was concern for the value of the land that the Regents had purchased with no deed restrictions.

The Regents took official action on the incorporation of the Coal Oil Point Reserve into the University-wide NLWRS at their meeting on July 17, 1970. As incorporated, the Reserve consisted of 49 acres. Four specific habitats were recognized, including the rocky reef at

the Point, the slough outlet, the shoreward dunes and beach, and the stable interior dunes. Although campus personnel acknowledged that the slough would logically be a part of the Reserve at some point in time, the smaller initial size was deemed best for approval by the Regents. In 1976, the campus NLWRS Faculty Advisory Committee and the UCSB Environmental Quality Committee both endorsed a proposed expansion of the Reserve. In September of 1979, the Reserve was officially expanded to include an additional 68 acres of the West Campus property, including all of Devereux Slough and the grasslands to the west, for a total area of 117 acres. Subsequent, more accurate surveys of the area amended the total acreage to 130 acres. In 1998 an additional 40 acres to the west was incorporated into the COPR by action of the UC regents (Letter to the Members of the Committee on Grounds and Buildings from the Office of the President dated January 7/1998, certifying the amendment of the 1990 UCSB LRDP which includes a 40-acre addition to the COPR.)

Significant changes have occurred to the natural landscape in and around the Reserve over the past 100 years (Figure 16 A-D). Activities have included episodes of agricultural, military, private estate, institutional, residential, and commercial development affecting the lands and the watershed of Devereux Slough.

III. Inventory and Description

- **Facilities**

  Coal Oil Point Reserve has one residence for the resident Reserve Director, an office, three storage sheds, a small greenhouse, and a small storage cement block building totaling approximately 3,000 square feet.

- **Equipment**

  Existing equipment includes 4 computers, 2 printers, 2 chain-saws, 2 weed-wackers, a webcam, miscellaneous hand and power-tools, 2 pick-up trucks, a water tank, a water-level station and shared use of a wood-chipper.

- **Maps, Aerial Photos, Photographic Resources**

  Several GIS maps were created for this plan and are available upon request. The earliest aerial photo is 1929. Selected photographs are shown here (Figure 16 A-D).

- **Biological Resources**

  Species lists are available in the web (http://coaloilpoint.ucnrs.org) for vertebrates, birds, intertidal organisms, fish, and plants. Land invertebrate is the least known taxon. A collection of invertebrates exists at COPR but identification is only to the family level for most species.

IV. List of Research Projects activities at COPR from 1997 – 2003 and Bibliography of Research

(see http://coaloilpoint.ucnrs.org for updated project list and bibliography)

A. Research activities from 1997 – 2003

Weathering of aromatic compounds in the coastal marine environment: quantifying rates of microbial metabolism, G. Wardlaw, UCSB.

Fingerprinting of tar on the beach, I. Leifer, UCSB, MMS.

Food preference of *Tegula funebralis*, J. Bean, UCSB.

Historicizing ecological restoration, A. Guerrini, UCSB.

Influence of eutrofication on growth and spread of the parasitic salt marsh dodder, *Cuscuta salina*, J. Simpson, UCSB.

Latitudinal variation in the life history of *Lottia gigantean* (owl limpet) along the coast of California. A study of geographic range limits, P. Fenberg, UCSD.

Assessment of soil properties and environmental conditions related to the successful propagation of the Ventura Salt Marsh Milkvetch, UCSB.

Initial survey of coastal geological processes. G. Dunne, Cal. State Northridge

Hermit crab shell usage, A. Basolo, Univ. Nebraska.

The evolutionary response of plants to the presence or absence of root herbivores, S. Watts, UCSB

The evolution of species geographical range limit: an experimental system with *Camissonia cherianthfloria* and *Abronia umbellata*, K. Samis, Queen's University, Ont. Canada.

Relating structure to function: the physiological and ecological role of plant structure in coastal species, S. Cole, UCSB

Root responses of coastal shrubs to resource patchiness. How do roots forage? S. Cole, UCSB

Experimental recovery of Ventura Marsh Milkvetch, W. Ferren, C. Sandoval, UCSB, W. Dieter, SBBG

Seed dormancy in the Ventura Salt Marsh Milkvetch, E. Smith, UCSB

Effect of a parasitic rust fungus on fitness/distribution of coyote bush, R. Eckard, UCSB

A comparison of vegetation structure of restored and natural vernal pools, E. Young, UCSB

Studies on the colonization of aquatic invertebrates and plants into vernal pool habitats, R. Bolser, UCSB

The effects of tidal prism history on the composition of the high marsh vegetation of southern California's salt marshes, D. Hughes, SDSU

Dune Beetle Survey, B. Flaim, UCSB

Genetic variability and fitness in the spider genus *Lutica* (Araneae, Zodariidae), M. Ramirez, Loyola Marymount University

The influence of seasonality on parasitoid coexistence and host abundance, C. Briggs, UCB

Behavior modification of second-intermediate host by trematode parasites, J. Shaw, UCSB

Systematics and diversity of free-living nematodes in the family Caphalobidae, J. Baldwin, S. Nadler, D. Bumbarger, UCR

Shell choice and parasitism in hermit crabs, A. Basolo, Univ. Nebraska

Variable parasitism in *Mytilus californianus* as a bioindicator, J. Blyte, UCSB

The Leptostraca of Coastal California, T. Haney, UCLA

Culturing of non-spinose foraminifora and observations using confocal microscopy, P. Von Langen, UCSB

Rocky intertidal resources in central and southern California, J. Engle, UCSB, P Raimondi, UCSC

Inventory of rocky intertidal resources in Santa Barbara, Ventura and Orange counties, R. Ambrose, UCLA

Long-term changes and variation in the geographic distribution of a highly diverse and productive ecosystem in the wave-exposed rocky intertidal, J. Smith, UCLA

Temporal variability in mussel larval condition at settlement, N. Phillips, UCSB

Safeguarding intertidal biodiversity: removal of an invasive seaweed, J. Goddard, C. Blanchette, C. Thornberg, UCSB

An experimental evaluation of methods of surfgrass restoration, D. Reed, S. Holbrook, UCSB

Development of methods for surfgrass restoration using early life history stages, D. Reed, S. Holbrook, S. Worcester, UCSB

Settlement, growth, and survival of marine intertidal organisms across a biogeographic gradient, C. Blanchette, S. Gaines, UCSB

Vertebrate monitoring, M. Holmgren, UCSB

Preliminary assessment of *Anniella pulchra*, J. Applelbaum, UCSB

The role of phylogeny and selection in the evolution of egg recognition behavior in Mockingbirds and Thrashers, A. Musante, UCSB

Development of stable isotope analyses for use in studies of the population dynamics and ecology of current and historic avian populations, M. Ball, R. Stendell, W. Iko, M. Holmgren, USGS / UCSB

Disturbance of wintering snowy plovers at COPR and other Pacific coast populations, K. Lafferty, USGS

Disturbance factors for snowy plovers, M. Meeker, UCSB

Factors affecting sandy beach use by shorebirds, J. Dugan, UCSB

Development of a marine metazoan physiological bioassay for heavy metal contamination, M. Latz, UCSD

Toxic substances monitoring program sampling, K. Worchester, CCCRWQCB

Devereux Slough pilot water quality study, J. Dugan, UCSB

Comparison of grain size with wave disturbance, M. Cowell, UCSB

Extent and Nature of Oil seeps at Coal Oil Point, J. Estes, UCSB

The Southern California Integrated GPS Network: Coal Oil Point Continuous GPS Station, J. Galetzka, USGS

Application of coastal ocean dynamics radars for observation of near-surface currents off the south-central California coast, L. Washburn, S. Gaines, B. Emery, UCSB

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Southern California Aerial Mapping Project, K. Kellog, USGS

Science, spirituality, and the secular in the 21st century, M. Arntz, UCSB

Painting local flora in its habitat, H. Pitcher, UCSB

Landscape images of the NRS, M. Arntz, UCSB

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Species surveys of Coal Oil Point Reserve

Table 1. List of most common invasive exotic plant species.

- *Acacia longifolia* Golden Wattle (Mimosaceae)
- *Arundo donax* Giant Reed (Poaceae)
- *Myoporum laetum* Myporum (Myoporaceae)
- *Carpobrotus edulis* Hottentot Fig [iceplant] (Aizoaceae)
- *Cortaderia jubata* Pampas Grass (Poaceae)
- *Eucalyptus globulus* Blue Gum Eucalyptus (Mystaceae)
- *Foeniculum vulgare* Sweet Fennel (Apiaceae)
- *Tamarix aphyla* Tamarisk (Tamaricaceae)
- *Carduus pycnocephalus* Italian Thistle (Asteraceae)
- *Tetragonia tetragonioides* New Zealand Spinach (Aizoaceae)
- *Pennisetum clandestinum* Kikuyu Grass (Poaceae)
- *Phalaris aquatica* Harding Grass (Poaceae)
- *Piptatherum miliaceum* Smilo Grass (Poaceae)
- *Populus alba* White Poplar (Salicaceae)
- *Raphanus sativus* Wild Radish (Brassicaceae)
- *Atriplex semibaccata* Australian Salt Bush (Chenopodiaceae)
- *Brassica nigra* Black Mustard (Brassicaceae)
- *Conium maculatum* Poison Hemlock (Apiaceae)
- *Bassia hyssopifolia* Five-hook (Chenopodiaceae)
- *Centaurea melitensis* Tecolote, Napa Thistle (Asteraceae)

- *Cynodon dactylon* Bermuda Grass (Poaceae)
- *Lolium multiflorum* Italian Ryegrass (Poaceae)
- *Nicotiana glauca* Tree Tobacco (Solanaceae)
- *Mesembryanthemum nodiflorum* Slender Crystalline Iceplant (Aizoaceae)
- *Opuntia ficus-indica* Indian-Fig (Cactaceae)
- *Pennisetum villosum* Feathertop (Poaceae)
- *Pittosporum undulatum* Victorian Box (Pittosporaceae)
- *Ricinus communis* Castor Bean (Euphorbiaceae)
- *Salsola tragus* Russian Thistle (Chenopodiaceae)

Table 2. Regional sensitive plants.

Prepared by Cristina Sandoval and Wayne Ferren in 1997.

SPECIES	**SITE**	**STATUS**	**HABITAT**	**REFERENCE**
Alopecurus Saccatno	Isla Vista	local concern-wetland	VP	Strong, Wiskowski
Anagalis minimus	Isla Vista, Ellwood	local concern-wetland	VP	Strong, Wiskowski
Anemopsis californica	COPR	local concern-wetland	Near SM	Cowan, Clark
Antirhinnum nuttalianum	Dos Pueblos, Carpinteria	local concern, CNPS4, C3c	Disturbed upland	CNPS, Strong, Wiskowski
Aphanisma blitoides	Point Sal, Lion's Head	CNPS 1B/C2	Coastal scrub	Wiskowski, CDFG
Arthrocnemum subterminale	Carpinteria, Goleta	local concern-wetland	SM	Wiskowski
Astragalus trichopodus ssp trichopodus	Point Sal, El Capitan, Arroyo Burro	local concern	Bluffs	Strong, Wiskowski
Atriplex coulteri	UCSB campus, lagoon, other?	northern limit CNPS 1B	Coastal scrub	CNPS
Atriplex serenana var davidsonii	UCSB campus lagoon	CNPS 1B CE/C2	Coastal scrub	CNPS
Atriplex watsonii	Goleta Carpinteria	local concern-wetland	Edge of SM, coastal bluffs	Strong, Wiskowski
Baccharis plummerae	UCSB main campus, Gaviota Pass, Refugio Rd. COPR lagoon	CNPS 4		Strong, Wiskowski
Boisduvalia glabella	Devereux, Isla Vista	local concern-wetland	VP	Strong, Wiskowski
Calandrinia breweri		CNPS 4	Coastal scrub	CNPS
Calandrinia martima	Channel Islands, Point Sal	CNPS 4	Coastal bluff, scrub	CNPS, Wiskowski
Callitriche marginata	Isla Vista, Ellwood	local concern-wetland	VP	Wiskowski
Centaurium muehlengbergii	Ellwood	southern limit		Ferren, pers. observation
Chorizanthe rectispina		CNPS 1B/C2	Coastal scrub	CNPS
Cordylanthus	Carpinteria	CNPS 1B,	SM	CNPS, Strong,

SPECIES	**SITE**	**STATUS**	**HABITAT**	**REFERENCE**
maritimus ssp maritimus		CE/CF		Wiskowski
Crassula aquatica	Isla Vista, Ellwood	local concern-wetland	VP	Wiskowski
Deschampsia danthonoides	Isla Vista	local concern-wetland		Wiskowski
Dichondra occidentalis		CNPS4/C3c`	Coastal scrub	CNPS
Elatine brachysperma	Isla Vista, Ellwood	local concern-wetland	VP	Strong, Wiskowski
Elatine californica	Goleta	restricted habitat	Pasture	Strong
Eryngium armatum	Isla Vista	local concern-wetland, s-limit	VP	Strong, Wiskowski
Eryngium vaseyi	Isla Vista, More Mesa, Ellwood	local concern-wetland	VP	Strong, Wiskowski
Hemizonia parryi ssp		CNPS 1B/C2 northern limit	VP	CNPS
Hordeum brachyantherum	Isla Vista, Elwood, West campus	local concern-wetland	VP	Strong, Wiskowski
Hordeum intercedens	Goleta?	CNPS	VP,SM	CNPS
Hutchinsinia procumbens	Carpinteria	local concern-wetland	SM	Strong, Wiskowski
Juncus acutus var leopoldii sphaerocharpus	extirpated So. Co.? Carpinteria, Goleta, Gaviota, Hollister Ranch	CNPS 4 local concern-wetland	SM, dune seeps	CNPS, Strong, Wiskowski
Lasthenia conjugens	Isla Vista	local concern-wetland CNPS 1B/C1	VP	CNPS, Strong, Wiskowski, CDFG
Lasthenia fremontii	Isla Vista	local concern-wetland	VP	Wiskowski
Lasthenia glabrata spp coulteri	Goleta, Carpinteria	CNPS 1B local concern-wetland rare	SM	CNPS, Strong, Wiskowski
Lepidium latipes	Carpinteria, Sta. Maria, Santa Cruz Island	CNPS 4	VP	Wiskowski
Limonium californicum	Goleta	local concern-wetland	Edge of SM	Wiskowski
Malacothrix incana	Goleta, Carpinteria, Sta. Maria River	CNPS 4, endemic	Dune	CNPS, Strong, Wiskowski
Malacothrix saxatalis	Bell Canyon,	CNPS 4	Bluffs	Strong,

SPECIES	**SITE**	**STATUS**	**HABITAT**	**REFERENCE**
var saxatalis	Ellwood Beach, Ellwood Pier, Arroyo Burro, Gaviota, Refugio	endemic		Wiskowski
Monanthochloe littoralis	Carpinteria, Goleta	local concern- wetland, northern limit	SM	Strong, Wiskowski
Phalaris lemmonii	Isla Vista, Ellwood, More Mesa	local concern, wetland	VP	Strong, Wiskowski
Pilularia americana	Isla Vista	local concern- wetland	VP	Strong, Wiskowski
Plagiobothrys undulatus	Isla Vista, Ellwood	CA endemic, SB rare	VP	Strong
Plantago bigelovii ssp bigelovii	West Campus	local concern- wetland	VP	Strong Wiskowski
Psilocarphas brevissimus	Isla Vista, Ellwood	restricted habitat	VP	Strong
Sanicula hoffmannii	Point Sal, Jalama, Ellwood	regional endemic	Coastal woodland	Strong
Solanum xantii var hoffmanii	Isla Vista?	endemic	Coastal scrub	Strong, Wiskowski
Suaeda esteroa	Goleta	CNPS 4, northern limit	Coastal scrub, SM	Strong, Wiskowski CNPS
Suaeda taxifolia	Ellwood mesa	CNPS 4	Bluff	CNPS
Triglochin concinna	Carpinteria, Goleta	restricted habitat	Salt marsh	Strong
Triglochin striatum	West Beach (SB)	restricted habitat	Wet bluff	Strong
Veronica peregrina ssp xalapensis	Ellwood, Isla Vista	wetland	VP	Strong, Wiskowski

References for Table 3:

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Table 3. Rare vertebrate species at COPR.

Prepared by Mark Holmgren in 1996.

Species	Scientific Name	Federal	State	Other
BIRDS				
Bank Swallow Former nester east of Goleta Slough mouth, now a rare migrant.	*Riparia riparia*		CSC	
Belding's Savannah Sparrow Territorial pairs present since spring 1990; bred in 1993 and 1996. Now the most upcoast estuary for this endangered race.	*Passerculus sandwichensis beldingi*	SC	E	
Black Swift	*Cypseloides niger*		CSC	
Brewster's Willow	*Empidonax traillii*		E	
Flycatcher Common late summer, spring, and fall migrant that regularly uses COPR.	*brewsteri*			
Brown Pelican Common mid-summer to spring immediately off-shore and occasionally on beach.	*Pelecanus occidentalis californicus*	E		
Burrowing Owl Formerly a common wintering and breeding species along the coast, now only a rare fall and early winter visitor. Suitable habitat exists south of golf course.	*Athene cunicularia*	SC	CSC	Local concern
California Least Tern Former breeder, now mid-summer and fall visitor at mouth of Devereux Slough and occasionally in interior slough mud flats.	*Sterna antillarum browni*	E	E	
California Quail Despite severe declines along the coastal plain, small flocks apparently persist in the dunes.	*Callipepla californicus*			Local concern
Light-footed Clapper Rail Former rare vagrant; not seen since 1940s.	*Rallus longirostris levipes*	E	E	
Coast Horned Lark Former common breeder now almost completely absent from	*Eremophilus alpestri actii*	SC	CSC	Local concern

Species	Scientific Name	Federal	State	Other
BIRDS				
COPR; still breeds in small numbers on Goleta Slough runway aprons and infields.				
Common Loon Common along coast in winter, occasionally in slough channel during high water periods.	*Gavia immer*		CSC	
Cooper's Hawk A few pairs breed locally and thus seen occasionally in summer, but much more common in fall to early spring as a visitor.	*Accipiter cooperii*		CSC	
Golden Eagle Rare visitor.	*Aquila chrysaetos*		CSC	
Grasshopper Sparrow Former breeder from foothills probably to coast, now an exceedingly rare breeder in southern SB Co.; rare migrant at COPR.	*Ammodramus savannarum*		CSC	Local concern
Least Bittern Rare visitor to fresh and brackish water habitats at COPR.	*Ixobrychus exilis*	SC	CSC	
Long-billed Curlew Occurs regularly from mid-summer to April on beach and slough interior.	*Numenius americanus*	SC		
Merlin Regular visitor fall to spring.	*Falco columbarius*	FP		
Northern Harrier Regular visitor fall, winter spring.	*Circus cyaneus*		CSC	
Osprey Uncommon fall and winter visitor, more frequent in recent years.	*Pandion haliaetus*		CSC	
Peregrine Falcon Sightings increasingly common; fall, winter, spring visitor.	*Falco peregrinus*	E	E	
Prairie Falcon Rare visitor.	*Falco mexicanus*	FP	CSC	
Purple Martin Rare migrant.	*Progne subis*		CSC	

Species	Scientific Name	Federal	State	Other
BIRDS				
Red-shouldered Hawk Breeds at COPR, common year-round	*Buteo lineatus*	FP		
Red-tailed Hawk Breeds at COPR, present year-round	*Buteo jamaicensis*	FP		
Rough-legged Hawk Rare winter visitor.	*Buteo lagopus*	FP		
Sharp-shinned Hawk Common visitor fall through spring	*Accipiter striatus*		CSC	
Short-eared Owl Rare fall and winter visitor to coastal grassy mesa and wetlands. Wintering population declining and absent in some years. Not recently seen at COPR, but present on Goleta Slough and More Mesa.	*Asio flammeus*	FP	CSC	Local concern
Snowy Plover Regular visitor from July through April. Principal wintering locale for southern S. B. Co.	*Charadriusalexandrinus nivosus*	T	CSC	
Southwestern Willow Flycatcher Difficult to distinguish from other races of this species and no evidence that this race migrates through this portion of the coast.	*Empidonax trailliiextimus*	E	E	
Tricolored Blackbird Formerly more common as a breeding and wintering species, now an uncommon and very local breeder in Santa Barbara County. Rare at COPR.	*Agelaius tricolor*	SC	CSC	Local concern
Virginia Rail Until recently bred in the Goleta and Devereux systems. Now a visitor late summer to spring.	*Rallus limacola*			Local concern
White-faced Ibis (rookery only) Historically bred in former freshwater marsh, now the golf course. Now rare spring, winter, fall visitor.	*Plegadis chihi*	SC	CSC	Local concern

Species	Scientific Name	Federal	State	Other
BIRDS				
White-tailed Kite Occasionally breeds, year-round occupant.	*Elanus caeruleus*	FP		Local concern
Wilson's Warbler Former breeder in coastal riparian and willow wetlands along the South Coast of S.B. Co., now very common migrant and rare wintering species.	*Wilsonia pusilla*		CSC	Local concern
Yellow Warbler Almost extirpated as a local breeder; very common migrant through COPR.	*Dendroica petechia*		CSC	Local concern
Yellow-breasted Chat Former breeder in dense coastal riparian and willow wetlands along the South Coast of S.B. Co., now very rare migrant at COPR.	*Icteria virens*		CSC	Local concern
MAMMALS				
Badger Burrows found at COPR as late as the mid-1980s. Now largely extirpated from even the foothills near Goleta and Santa Barbara.	*Taxidea taxus*		CSC	
Pallid Bat Probably present at COPR.	*Antrozeus pallidus*			
San Diego Black-tailed Jackrabbit Extirpated from the Goleta Slough system in the 1980s, COPR probably lost its population prior to that.	*Lepus californicus bennettii*	SC	CSC	Local concern
Townsend's Big-eared Bat Probably present at COPR, but never confirmed.	*Plecotus townsendi*	SC	CSC	
AMPHIBIANS AND REPTILES:				
Red-legged Frog Presence in the dune pond or dune swale (the only possible habitats in which it could occur) has never been determined.	*Rana aurora draytoni*	T	CSC	Local concern
California Legless Lizard Annedoctal record on dunes	*Anniella pulchra*	E		

Species	Scientific Name	Federal	State	Other
BIRDS				
FISH				
Tidewater Goby Extirpated for several years, but could be reintroduced.	*Eucylogobius newberryi*	E	E	

Key:

Federal	State
E=Endangered	E
T=Threatened	T
SC=Species of Concern	CSC=Calif. Species of Special Concern
FP=Federally Protected (pertains to otherwise undesignated Birds of Prey)	This list has not received sanction by the Calif. Dept. F&G

Table 4. Partial list of sensitive invertebrates of Coal Oil Point Reserve.

Prepared by Cristina Sandoval in 2000.

Common name	**Scientific name**	**Location**	**Status**	**Comments**
Wandering Skipper	*Panoquina errans*	Marsh edge	G2 (imperiled globally because of rarity)	Candidate for listing in 1974. Larvae feed on salt grass only. Have been observed at the mouth of the slough. Large population on at southern edge of dune pond
Western Pigmy Blue	*Brephidium exile*	Marsh edge	G5 (globally secure)	Larvae feed on chenopods on slough margin.
	Lutica maculata	Foredunes	rare	
Sand Tiger Beetle	*Cicindella hirticollis gravida*	Beach in front of slough mouth		Larvae burrow along wet margin of estuary. Adults feed on flies along high tide by slough mouth
Globose Dune Beetle	*Coelus globosus*	Foredunes	Category 2 FWLS	Found under sand around roots of foredunes plants.

Table 5. Observations of Coal Oil Point vertebrates.

Prepared by Mark Holmgren (1996) with updates in 2001 - 2003.

Species or Spp. Association	Dates	Source	Status	Comments
Snowy Plover	Multiple years, July-March Multiple years, March-June May 1982 15 April 1996 June 27 2001 Sept, 2002 Sept, 2003	Many observers Several observers, mostly historical references Dean Bazzi (in MSE fieldnotes) Mark Holmgren Adrian O'Loghlen Sandova Sandovall	FT, LD, SSC FT	Winter aggregations (20-167 individuals), (see 78) Pair formation, and until 1982 historical breeding habitat. Last known breeding evidence at West end of zone 2 pairs of birds acting territorial 2 chicks and parents 14 fledged chicks 39 fledged chicks
White-tailed Kite	Annual, year round May-Sept./annually	Many observers Mark Holmgren/ Others	Locally Protected, SSC SMC	Foraging area for individuals Post-breeding family group gathering area, foraging area
California Quail	17 Jan. 1987 4 Sept. 1994	Mark Holmgren Mark Holmgren	LD	Number uncertain 15 individuals in foraging group
White-tailed Kite	Prior to 1987 Year round annually	Lee Waian, (1978) Ph.D. dissertation Mark Holmgren	Locally Protected SSC, SMC	Nesting site(s) as noted by Waian; possibly other citations referring to breeding in Monterey Pines. Frequently perch on trees, foraging either N or S of this area.
Belding's Savannah Sparrow	Feb.-July, since 24 Feb. 1990, possibly year round	MAH, P.E. Lehman, J.E. Lentz, others	SE	Areas occupied during breeding season, and possibly throughout the year.
Belding's Savannah Sparrow	19 and 23 April 1993 27 June 1996	Mark Holmgren J.E. Lentz J. Hardie		First confirmed breeding documentation - juveniles under parental care. Family group of 5 with 2 juveniles and breeding documented.
Peregrine Falcon **Peregrine Falcon**	18 May 1989 Spring 1996	Mark Holmgren Mark	FE SE	Individual flew from S towards N over slough. 1 individual at mouth

Species or Spp. Association	Dates	Source	Status	Comments
		Holmgren		foraging as it moved eastwards along coast.
Brown Pelican	16 Dec. 1987	Mark Holmgren	FE	74 individuals roosting on west bank of channel, recently cut by slough draining, during storm.
Least Tern	Historical 1956-1960 15 July 1989 7 Sept. 1981 4 Sept. 1994 Summer 2002 May 2003	Abbott Nelson Metcalf Ron Hirst Hugh Ranson Mark Holmgren W. McClintock Sandoval Sandoval	FE	Former nester (Abbott, interview, Mar. 1972, see MSE notes). Nesting "50' NW Devereux" (Personal discussion w/Martin Kellogg). Photo documentation of adult and juvenile at mouth of Devereux Slough. (In MSE archives). 1 individual at beach berm. 1 juvenile at mouth. Present prior to this for one week. 17 indiv. Adults and juv. Pair on mouth for 1 week
White-tailed Kite	1995 and 1966	Mark Holmgren, Chris and Dave Lange	LP SSC	Nesting site, 3(?) juveniles fledged. Foraging among the family group observed both E and W of Euc. windrow. Date represents first observation of birds out of the nest.
California Legless Lizard	Historical	Abbott	SSC	Considered present by Abbott 1972. Nearest confirmed locality on More Mesa (UCSB MSE voucher). Little survey effort has been dedicated to this area in the last decade.
Badger	1987	Lawrence Hunt, MAH	LD	Formerly occupied burrows, and burrow entrances found; photograph appears in Holmgren, Hunt, Schulz 1988.
Sea Otter	25 Apr. 1996 30 Sept. 1996	David Revell Brian DeWeese Dave	FE	1/3-1/2 mile S. Ellwood Beach in kelp. COP Kelp bed.

Species or Spp. Association	Dates	Source	Status	Comments
		Hubbard		
Gray Fox	Prior to 1987	MAH and others	Locally extirpated	Observed using dens and in numerous parts of the Reserve until taken over by Red Fox.
Bobcat	2, 3 Jan. 1991 17 Jan. 1991 31 Jan. 1991 4 Feb. 1991 9 Mar. 1991 29 May 1993	Keith Haney Keith Haney Keith Haney Keith Haney, MAH MAH, Scott Robinson, Adrian Loghlen MAH, Gunilla Rosenqvist	LD on coastal plains	In middle of dry slough. On westside in Salicornia - et al. Attacked coots. By bridge and in dunes near bridge. One individual in dunes near bridge. We cornered it in NE portion of dunes; it walked then trotted past us heading west in dunes. 1 in dunes near bridge and tamarisk.
Raptorial birds & their prey White-tailed Kite Short-eared Owl Northern Harrier Great Horned Owl Turkey Vulture Red-tailed Hawk Red-shouldered Hawk Burrowing Owl Merlin American Kestrel Loggerhead Shrike California Vole House Mouse Western Harvest Mouse Botta's Pocket Gopher Brush Rabbit	Many Year round	Many	Federally Protected LP SSC, LD SSC, LD Extirpated SMC	In non-drought periods this extensive area, in association with adjacent areas and corridors, provides consistent support for foraging bird of prey.
Loafing and Foraging Shorebirds and Waders Black-bellied Plover Snowy Plover Semipalmated Plover Forster's Tern Common Tern Elegant Tern Caspian Tern California Gull Bonaparte's Gull Western Gull	Many June through May Annual	Many	 FT, LD, SMC SMC SCC	This habitat is the result of sediment deposition since 1964. Loafing occurs during periods of migration and during winter when the largest numbers of some of these species gather, many showing no interest in feeding. Use seems to be more intense in afternoons than mornings.

Species or Spp. Association	Dates	Source	Status	Comments
Double-crested Cormorant Great Blue Heron Snowy Egret Great Egret Least Sandpiper Western Sandpiper Dunlin Whimbrel Marbled Godwit Long-billed Curlew Willet Red-breasted Merganser Killdeer White-faced Ibis Long-billed Dowitcher Short-billed Dowitcher Mew Gull Herring Gull Glaucous-winged Gull	Fall and winter 1996-97	Many	SCC SMC,SSCLD SMC,SSC	There is no known relationship to tides.
Freshwater Seep for Passerine birds, small terrestrial herps and mammals. Most likely users include: House Finch Morning Dove California Towhee Western Fence Lizard Pacific Tree Frog Botta's Pocket Gopher California Vole House Mouse	Historic (1929 and subsequent photos) 1986	MAH		
Riparian birds and Terrestrials Herp and mammal habitat at upper end of eroded gully. White-tailed Kite Cooper's Hawk Sharp-shinned Hawk Lark Sparrow (Breeding) House Finch Mockingbird Loggerhead Shrike Merlin California Towhee Coyote Skunk California Vole Botta's Pocket Gopher Western Fence Lizard Kingsnake Gopher Snake		MAH	SSC, LP SSC SMC	This area may have been assisted by ad hoc introduction of cottonwoods. Supports extensive stand of Pampas grass. Benefits: persistently used Kite perch sites, erosion resistance, offers riparian features generally lacking in COPR, supports south-most nesting site along the S. Coast for Lark Sparrows. The development of additional riparian habitat will diversify habitats on the Reserve and can greatly curtail continuing erosion.
Baccharis scrub: nesting birds and archaeological site, and slough overlook: Northern Mockingbird		MAH and ES 13 class Many visits	SMC,SSC	High instructional value. Although no sensitive spp. regularly use this area, common birds can

Species or Spp. Association	Dates	Source	Status	Comments
Common Bushtit California Towhee House Finch Song Sparrow Bewick's Wren Bird, mammal, California Kingsnake Red-Sided Garter Snake European Starling Hooded Oriole Anna's Hummingbird Botta's Pocket Gopher	18 Apr. 1996 most recently			always be found nesting here in late March through April. During this time, up to 200 students in Environmental Studies Classes (ES13) visit the Reserve. Students are exposed to a unique array of natural history issues that are easily presented due to the proximity of this site.
Palustrine Marsh and non-breeding bird assemblages and their prey: American Bittern Least Bittern Tricolored Blackbird Red-winged Blackbird Song Sparrow Common Yellowthroat Virginia Rail Sora Mallard Bushtit Swamp Sparrow Lesser Goldfinch		MAH and others	 SSC,LD SSC,LD SSC,LD LD	Although narrow this strip of palustrine vegetation supports seldom seen and sensitive birds.
Created Vernal Pools	1985			This experimental creation has provided an important window to changes in vertebrate use as the habitat matured. Also important as an instructional tool regarding Vernal Pools - conservation, history, resource interactions, and restoration. Provides habitat not found elsewhere on COPR.
Permanent Water in Slough Channel and Fish and Birds supported therein: Pacific Anchovy California Killifish Staghorn Sculpin Arrow Goby Long-jaw mudsucker Topsmelt Diamond turbot Mullet Mosquito Fish Black-crowned Night Heron Snowy Egret	 1930's 1987 1995	 Egmont Rett (MSE, UC archives) (Holmgren et al. 1987 Schultz) (Lafferty & Altstatt, 1995) "	 Threatened	This area supports a year-round fish population that may fluctuate among years depending on chance colonization events. Apparently temperature differences in the water column buffer to some extent the high salinity levels. 5 species of herons, various shorebirds, and ducks have used this area for a long time.

Species or Spp. Association	Dates	Source	Status	Comments
Cattle Egret Great Egret Great Blue Heron Willet Greater Yellowlegs Spotted Sandpiper Least Sandpiper Common Yellowthroat Coot Mallard		" " Lafferty, pers. Obs. Rett		
Beach and Slough Mouth Migratory and wintering shorebirds (see also 1): Long-billed Curlew Marbled Godwit Sanderling Black-bellied Plover Semipalmated Plover Willet Whimbrel Ruddy and Black Turnstones Least Sandpiper Western Sandpiper 10 species of gulls 4 species of terns Snowy Plover	Late June through mid May/annually	Many	SSC,LD	The most heavily impacted habitat for the largest number of vertebrate users. Wet beaches at the mouths of estuaries are disproportionately used by shorebirds relative to other wet beaches not close to estuaries. Human activities that seriously disrupt this important feeding area include unleashed dogs, uninformed sunbathers, surfers, joggers, feral animals, horseback riders, kite flyers, nighttime party-goers.
Dune Swale and associated bird and herp faunas and Ellwood Vernal Pool basins 60 bird species recorded	Many	Many		The Dune Pond is the most intact of any coastal brackish wetland along the southcoast. Despite its small size it supports more breeding bird species and more individuals than does the entire Devereux Slough. Also this area is hydrologically connected to the vernal pools on Ellwood Mesa.

Key to Status Codes:

SE State Endangered

ST State Threatened

FE Federally Endangered

FT Federally Threatened

FP Federally Protected (as a bird of prey)

SMC Species of Management Concern, USFWS

SSC California Species of Special Concern (draft document, not final)

LP Locally Protected (Pertains to White-tailed Kites only; see SB Co. Comprehensive Plan, Conservation Element)

LD Locally sensitive and declining (MAH assessment buttressed by Lehman, 1994)

Source of Information for Table 6:

Bennet, J. 1972. Natural History Resources Survey for West Campus, 1971-72. University of California, Santa Barbara. Office of Architects and Engineers.

Coal Oil Point Field Notes. The MSE, Vertebrate Collection holds approx. 65 sets of notes pertaining to field observations at Coal Oil Point Reserve.

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Fahy, K. and M. Holmgren. 1993. Historical and current status of snowy plovers in the Coal Oil Point Reserve vicinity Goleta, California. Prepared for the UCSB Natural Reserve System. UCSB Vertebrate Museum.

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Lafferty, K. D. and J. A. Altstatt 1995. Fish communities. pp. 55-73. In R. F. Ambrose, editor, Coastal Wetland Resources: Santa Barbara County Mainland. Final Report to the County of Santa Barbara..

USFWS. 1995. Migratory Non-game Species of Management Concern in the US, the 1995 List. Office of Migratory Bird Management.

Waian, Lee 1973. The Behavioral Ecology of the North American White-tailed Kite *(Elanus leucurus majusculus)* of the Santa Barbara Coastal Plain. Ph.D. dissertation. UCSB

Additional information available at the UCSB MSE:

1. Dune Pond Bird and Mammal observations - approximately 15 separate sets of notes.

2. Created Vernal Pool bird observations that track vertebrate use since the creation of the pools.
3. This informal study examines some birds found on the Reserve make use of the habitats provided by Devereux Creek as it flows through the Ocean Meadows Golf Course. The results suggest that for some species, the proximity of (at least) two different wetland types satisfies, to some degree, the complex resource requirements of these species and, therefore, may prolong their presence on COPR.
4. Egmont Rett field notes, 1934-1941. Approx. 50 references to visits to Devereux Slough

Table 6. Birds of Coal Oil Point Reserve.

Prepared by Mark Holmgren in 2001

Red-throated Loon	Black Swift
Pacific Loon	Vaux's Swift
Common Loon	White-throated Swift
Pied-billed Grebe	Black-chinned Hummingbird
Horned Grebe	Broad-billed Hummingbird
Eared Grebe	Anna's Hummingbird
Western Grebe	Costa's Hummingbird
Clark's Grebe	Calliope Hummingbird
American White Pelican	Rufous Hummingbird
Brown Pelican	Allen's Hummingbird
Double-crested Cormorant	Belted Kingfisher
American Bittern	Acorn Woodpecker
Least Bittern	Red-breasted Sapsucker
Great Blue Heron	Nuttall's Woodpecker
Great Egret	Downy Woodpecker
Snowy Egret	Hairy Woodpecker
Little Blue Heron	Northern Flicker
Tricolored Heron	Olive-sided Flycatcher
Cattle Egret	Western Wood Pewee
Green-backed Heron	Willow Flycatcher
Black-crowned Night Heron	Least Flycatcher
White-faced Ibis	Hammond's Flycatcher
Roseate Spoonbill	Gray Flycatcher
Wood Stork	Western Flycatcher
Fulvous Whistling-Duck	Black Phoebe
Tundra Swan	Say's Phoebe
Greater White-fronted Goose	Vermilion Flycatcher
Brant	Ash-throated Flycatcher
Canada Goose	Sulphur-bellied Flycatcher

Wood Duck	Tropical Kingbird
Green-winged Teal	Cassin's Kingbird
Mallard	Western Kingbird
Northern Pintail	Eastern Kingbird
Blue-winged Teal	Scissor-tailed Flycatcher
Cinnamon Teal	Horned Lark
Northern Shoveler	Purple Martin
Gadwall	Tree Swallow
Eurasian Wigeon	Violet-green Swallow
American Wigeon	Rough-winged Swallow
Canvasback	Bank Swallow
Redhead	Cliff Swallow
Ring-necked Duck	Barn Swallow
Greater Scaup	Western Scrub-Jay
Lesser Scaup	American Crow
Oldsquaw	Plain Titmouse
Surf Scoter	Bushtit
White-winged Scoter	Red-breasted Nuthatch
Bufflehead	White-breasted Nuthatch
Hooded Merganser	Brown Creeper
Red-breasted Merganser	Rock Wren
Ruddy Duck	Bewick's Wren
Turkey Vulture	House Wren
Osprey	Winter Wren
Black-shouldered Kite	Marsh Wren
Bald Eagle	Golden-crowned Kinglet
Northern Harrier	Ruby-crowned Kinglet
Sharp-shinned Hawk	Blue-gray Gnatcatcher
Cooper's Hawk	Western Bluebird
Red-shouldered Hawk	Mountain Bluebird
Red-tailed Hawk	Hermit Thrush
Rough-legged Hawk	Swainson's Thrush
Golden Eagle	American Robin

American Kestrel	Varied Thrush
Merlin	Wrentit
Peregrine Falcon	Brown Thrasher
Prairie Falcon	Northern Mockingbird
California Quail	California Thrasher
Clapper Rail	White Wagtail or
Virginia Rail	Black-backed Wagtail
Sora	Red-throated Pipit
American Coot	American Pipit
Common Moorhen	Cedar Waxwing
Black-bellied Plover	Phainopepla
Lesser Golden-Plover	Loggerhead Shrike
Snowy Plover	European Starling
Semipalmated Plover	Solitary Vireo
Piping Plover	Yellow-throated Vireo
Killdeer	Hutton's Vireo
Mountain Plover	Warbling Vireo
Black-necked Stilt	Red-eyed Vireo
American Avocet	Tennessee Warbler
Greater Yellowlegs	Orange-crowned Warbler
Lesser Yellowlegs	Nashville Warbler
Solitary Sandpiper	Virginia's Warbler
Willet	Lucy's Warbler
Wandering Tattler	Northern Parula
Spotted Sandpiper	Yellow Warbler
Whimbrel	Magnolia Warbler
Long-billed Curlew	Yellow-rumped Warbler
Marbled Godwit	Myrtle's Warbler
Ruddy Turnstone	Audubon's Warbler
Black Turnstone	Black-throated Gray Warbler
Surfbird	Townsend's Warbler
Red Knot	Hermit Warbler
Sanderling	Yellow-throated Warbler

Semipalmated Sandpiper	Palm Warbler
Western Sandpiper	Bay-breasted Warbler
Least Sandpiper	Blackpoll Warbler
Baird's Sandpiper	Black-and-white Warbler
Pectoral Sandpiper	American Redstart
Sharp-tailed Sandpiper	MacGillivray's Warbler
Dunlin	Common Yellowthroat
Stilt Sandpiper	Hooded Warbler
Short-billed Dowitcher	Wilson's Warbler
Long-billed Dowitcher	Yellow-breasted Chat
Common Snipe	Summer Tanager
Wilson's Phalarope	Western Tanager
Red-necked Phalarope	Rose-breasted Grosbeak
Red Phalarope	Black-headed Grosbeak
Parasitic Jaeger	Blue Grosbeak
Little Gull	Lazuli Bunting
Bonaparte's Gull	Indigo Bunting
Common Black-headed Gull	Painted Bunting
Heermann's Gull	Green-tailed Towhee
Mew Gull	Spotted Towhee
Ring-billed Gull	California Towhee
California Gull	Chipping Sparrow
Herring Gull	Clay-colored Sparrow
Thayer's Gull	Brewer's Sparrow
Western Gull	Vesper Sparrow
Glaucous-winged Gull	Lark Sparrow
Glaucous Gull	Lark Bunting
Black-legged Kittiwake	Savannah Sparrow
Caspian Tern	Belding's Savannah Sparrow
Royal Tern	Grasshopper Sparrow
Elegant Tern	Fox Sparrow
Common Tern	Song Sparrow
Forster's Tern	Lincoln's Sparrow

Least Tern	Swamp Sparrow
Black Tern	White-throated Sparrow
Rock Dove	Golden-crowned Sparrow
Band-tailed Pigeon	White-crowned Sparrow
Spotted Dove	Harris' Sparrow
White-winged Dove	Dark-eyed Junco
Mourning Dove	Bobolink
Common Barn-Owl	Red-winged Blackbird
Great Horned Owl	Tricolored Blackbird
Burrowing Owl	Western Meadowlark
Long-eared Owl	Yellow-headed Blackbird
Short-eared Owl	Brewer's Blackbird
Lesser Nighthawk	Great-tailed Grackle
	Brown-headed Cowbird
	Orchard Oriole
	Hooded Oriole
	Northern Oriole
	Purple Finch
	House Finch
	Red Crossbill
	Pine Siskin
	Lesser Goldfinch
	Lawrence's Goldfinch
	American Goldfinch
	Evening Grosbeak
	House Sparrow

Table 7. Common fishes of Coal Oil Point Reserve.

Scientific name	Common name	Habitat
Girella nigricans	Opaleye	intertidal
Gibbonsia montereyensis	Crevice kelpfish	intertidal
Heterostichus rostratus	Giant kelpfish	intertidal
Alloclinus holderi	Island kelpfish	intertidal
Gibbonsia metzi	Striped kelpfish	intertidal
Oligocottus snyderi	Fluffy sculpin	intertidal
Hypsoblennius gilberti	Rockpool blenny	intertidal
Clinocottus analis	Woolly sculpin	intertidal
Fundulus parvipinnis	California killifish	Slough
Mugil cephalus	Mullet	Slough
Leptocottus armatus	Staghorn sculpin	Slough
Gillichthys mirabilis	Longjaw mudsucker	Slough
Hypsopsetta guttulata	Diamond turbot	Slough
Atherinops affinis	Topsmelt	Slough
*Eucyclogobius newberryi** (extirpated)	Tidewater goby	Slough

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Various people assisted with the development of the COPR Management Plan. The COPR Advisory Committee helped develop the concepts and contents of this Plan. The Biogeography Laboratory (Department of Geography) and Dave Court (Museum of Systematics and Ecology) assisted with the production of maps. Wayne Ferren, Dave Coon, and Steve Gaines produced an earlier version of the COPR Draft Management Plan. Wayne Ferren and Mark Holmgren provided valuable information on the botanical and vertebrate resources respectively. Elaine Miller from the U.C. Natural Reserve System provided suggestions on organization and writing. The UCSB office of Budget and Planning provided funds and reviewed this draft plan.

Figures

Figure 1. Location of Coal Oil Point Reserve

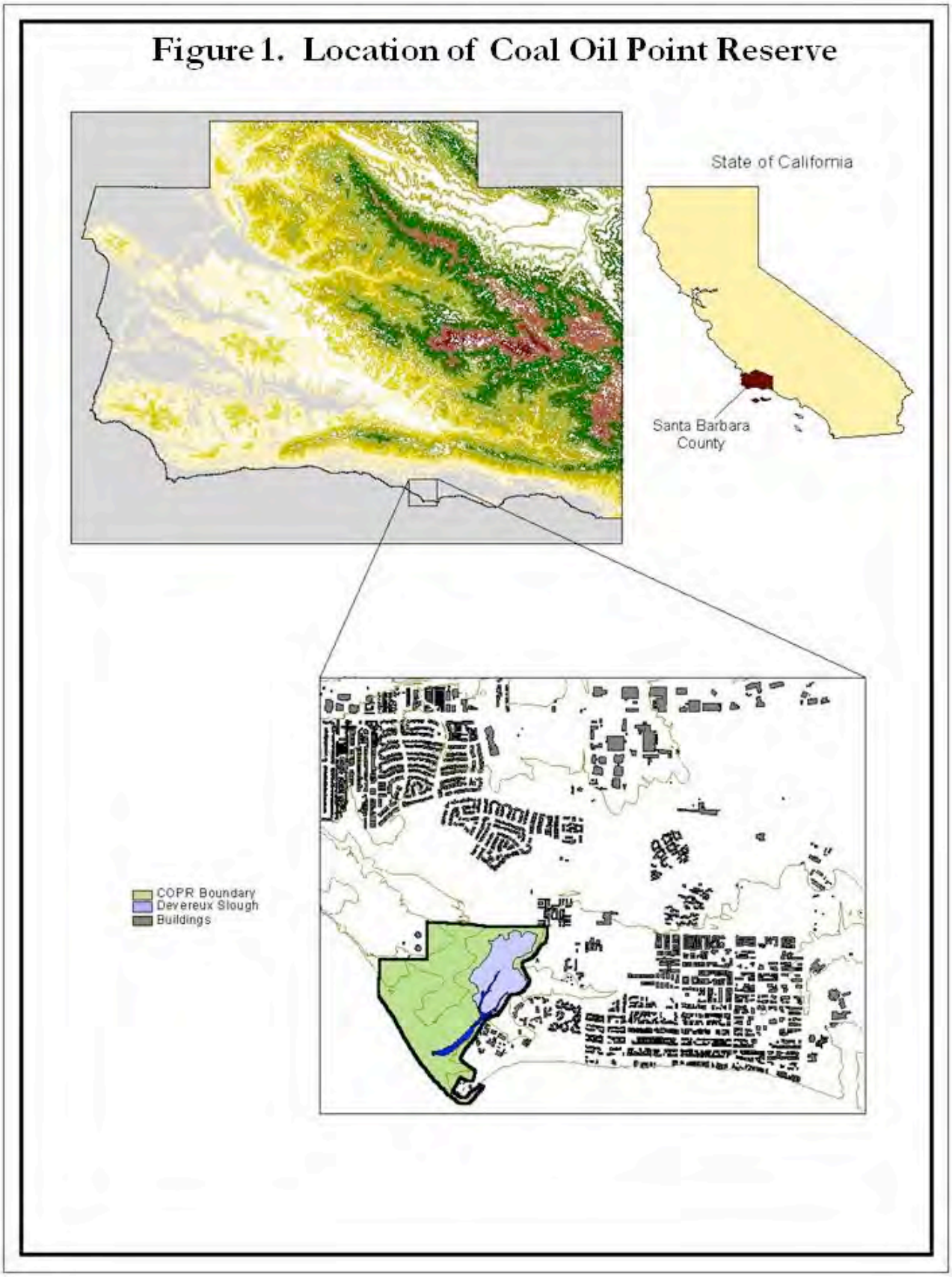
Figure 1. Location of Coal Oil Point Reserve
State of California
Santa Barbara County
COPR Boundary
Devereux Slough
Buildings

Figure 2. Coal Oil Point Reserve general features

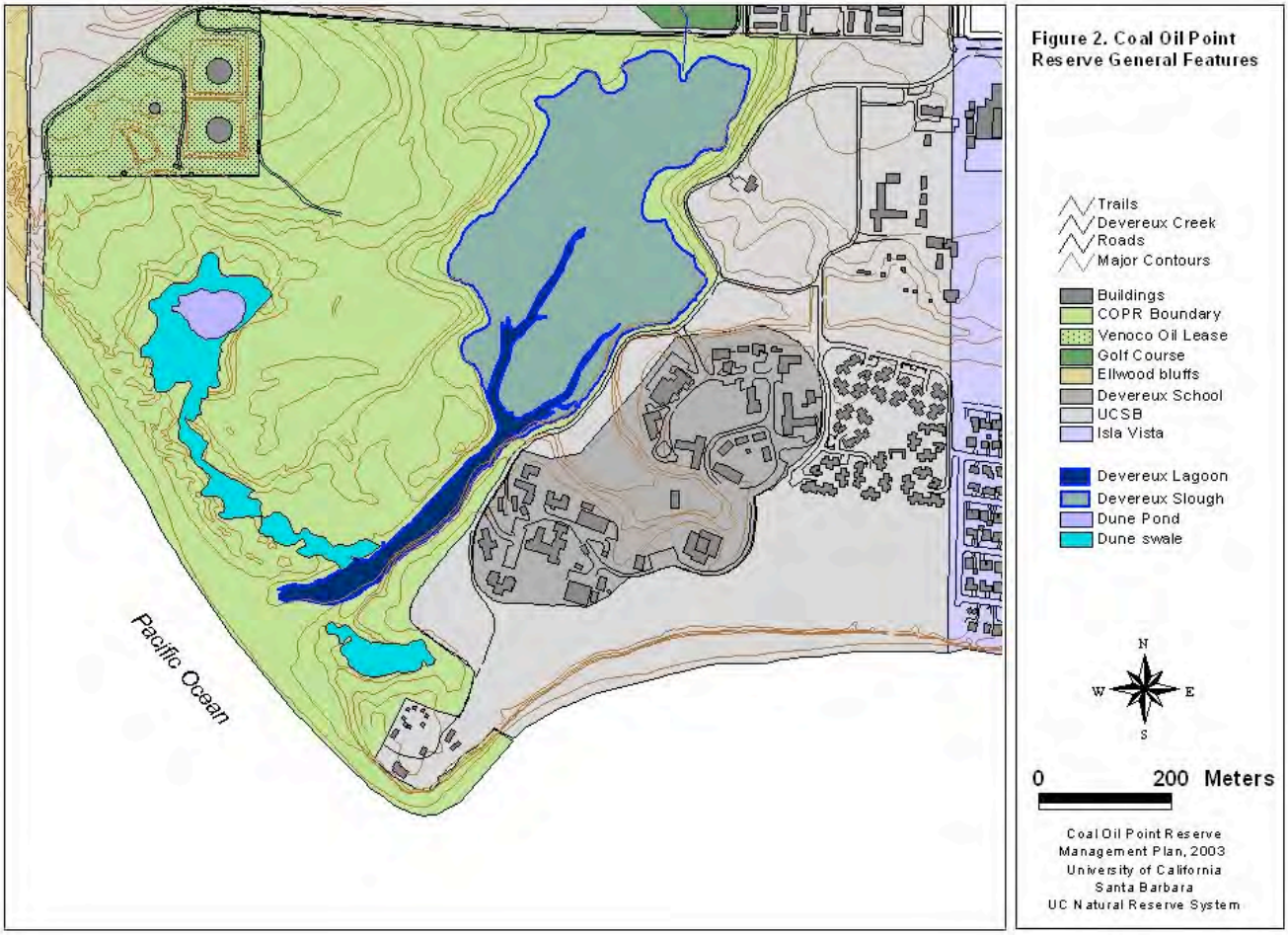

Figure 3. Research use plan

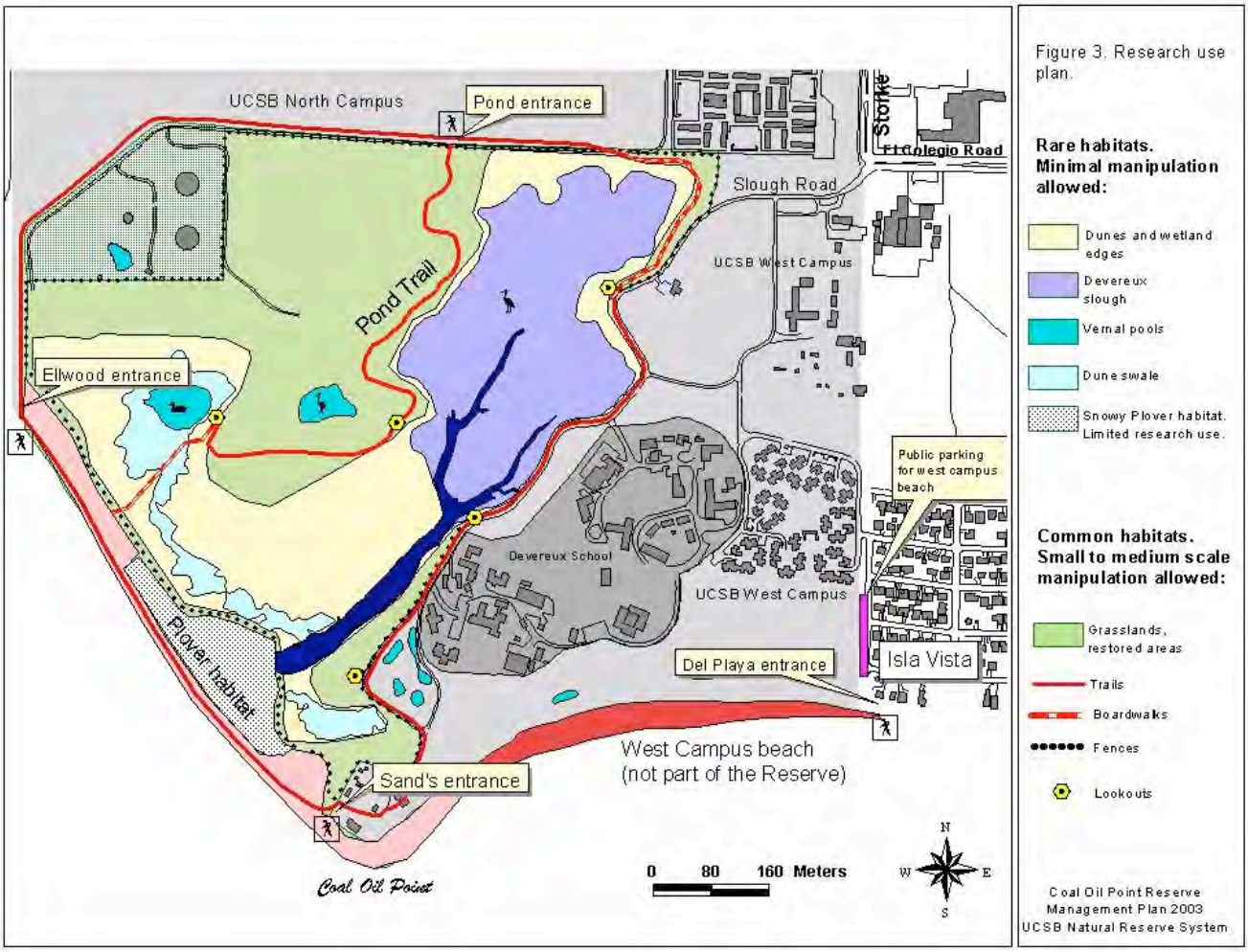

Figure 4. Habitat types of COPR

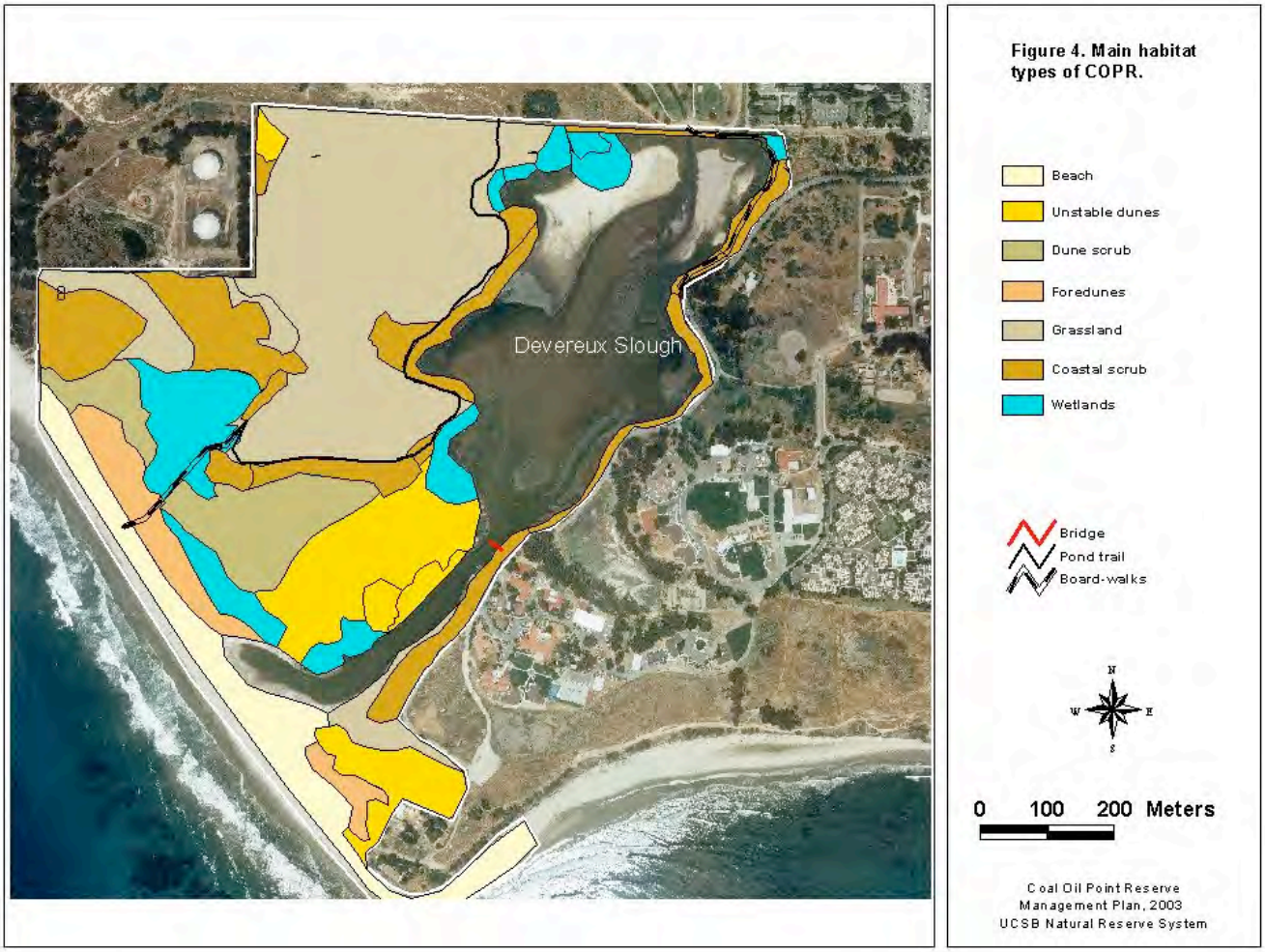

Figure 5. University-level class use plan

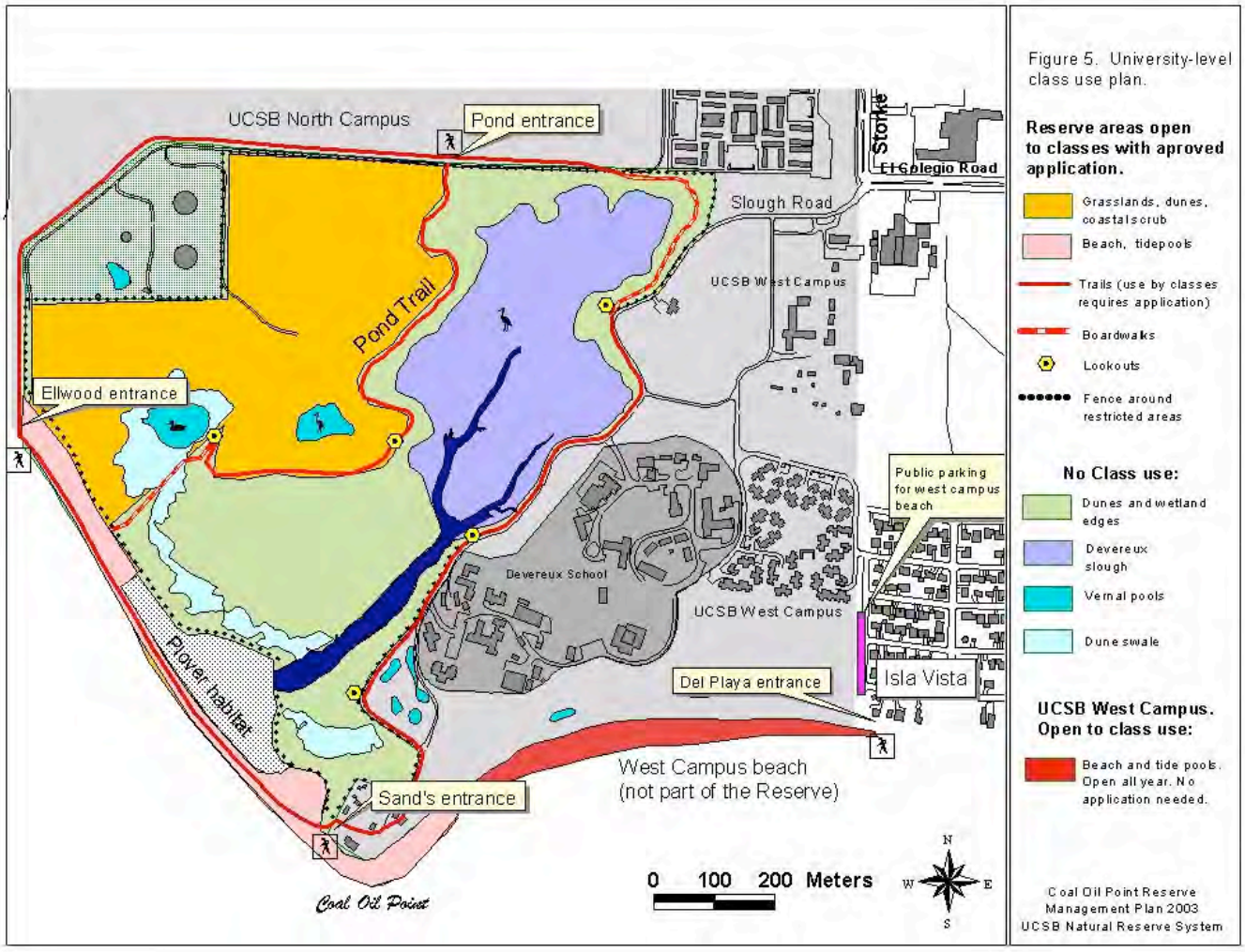

Figure 6. Access plan for public outreach

Figure 7. Restoration plan for COPR

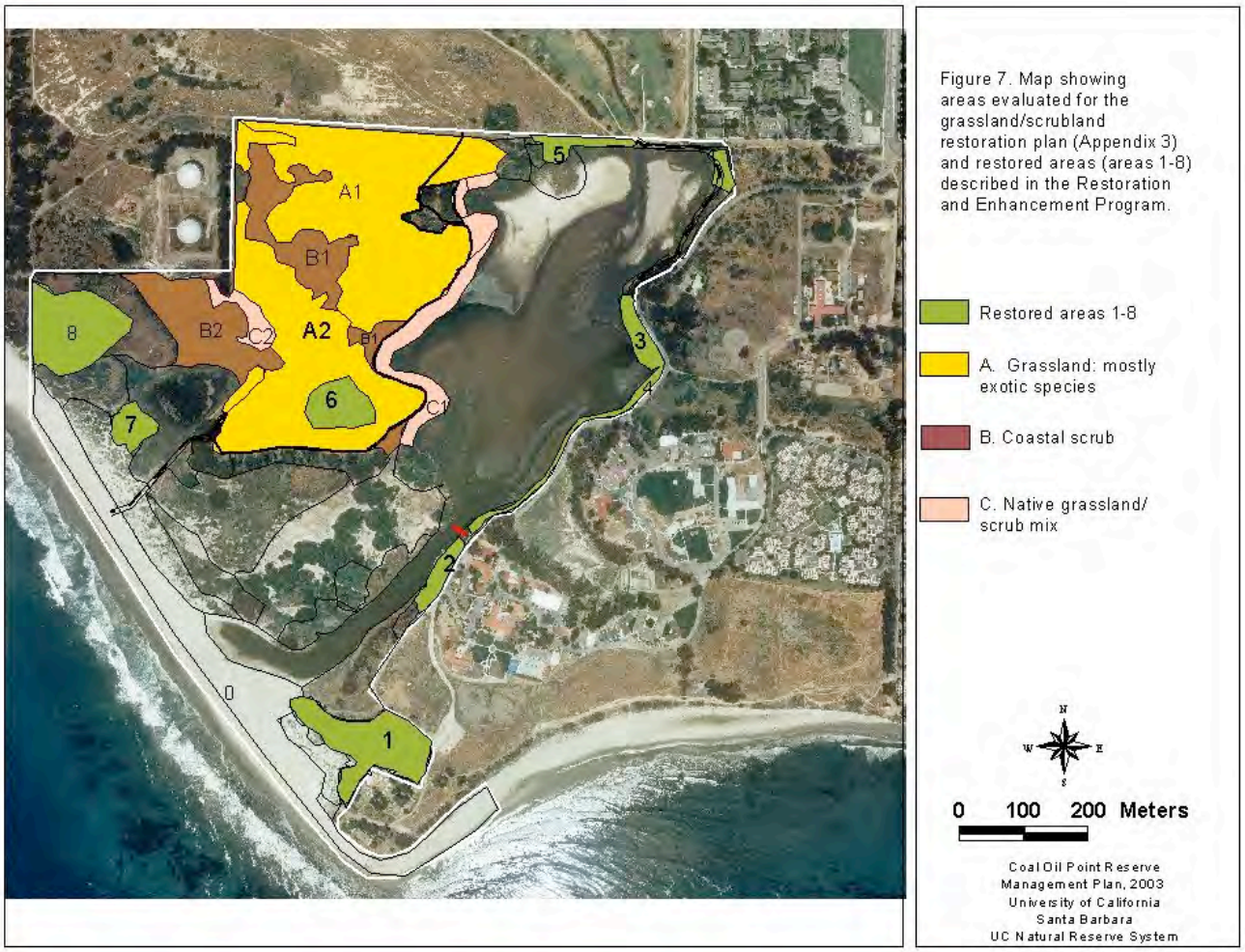

Figure 8. Examples of rare plants of COPR

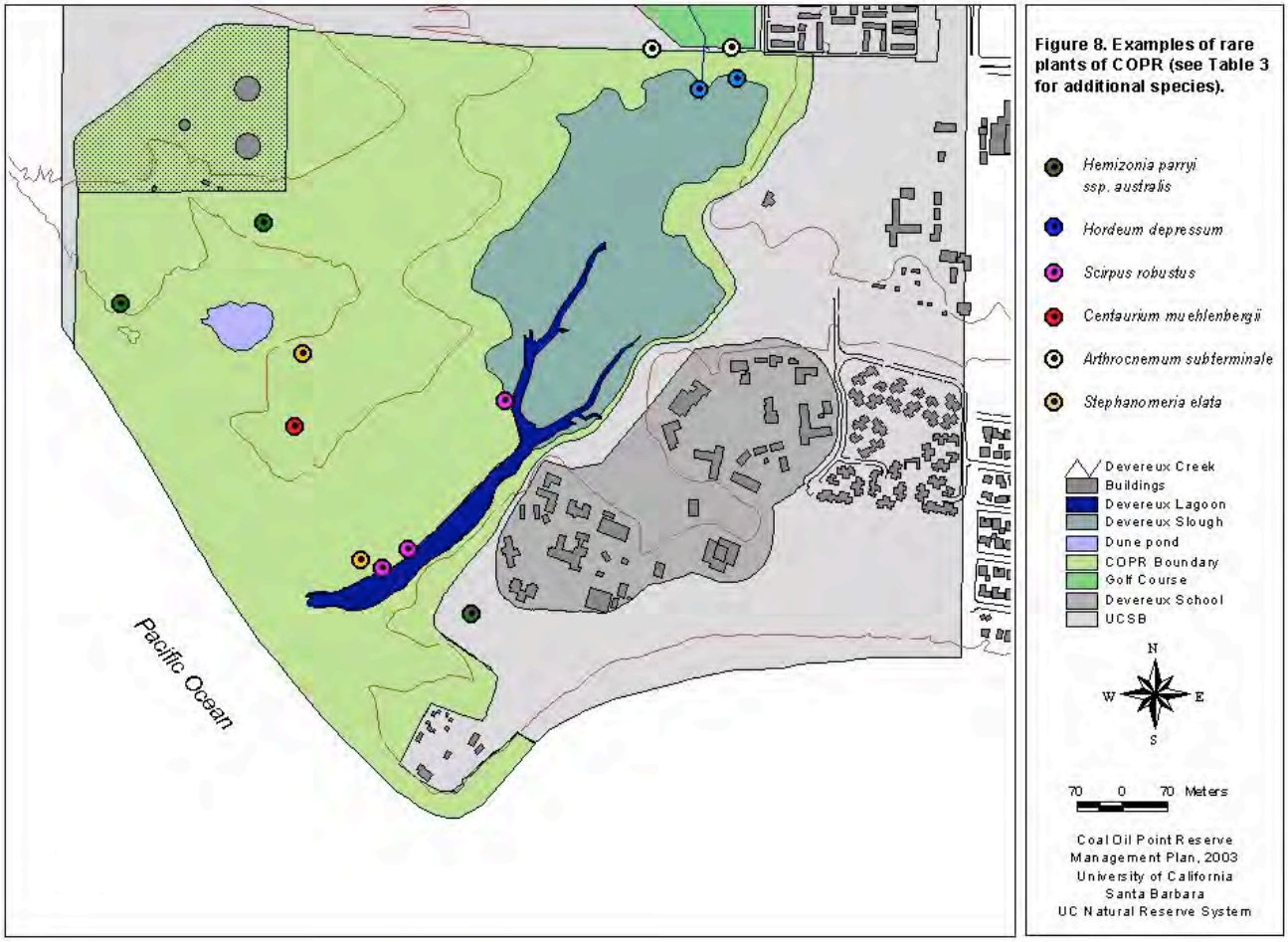

Figure 9. University-owned buffer zones around COPR

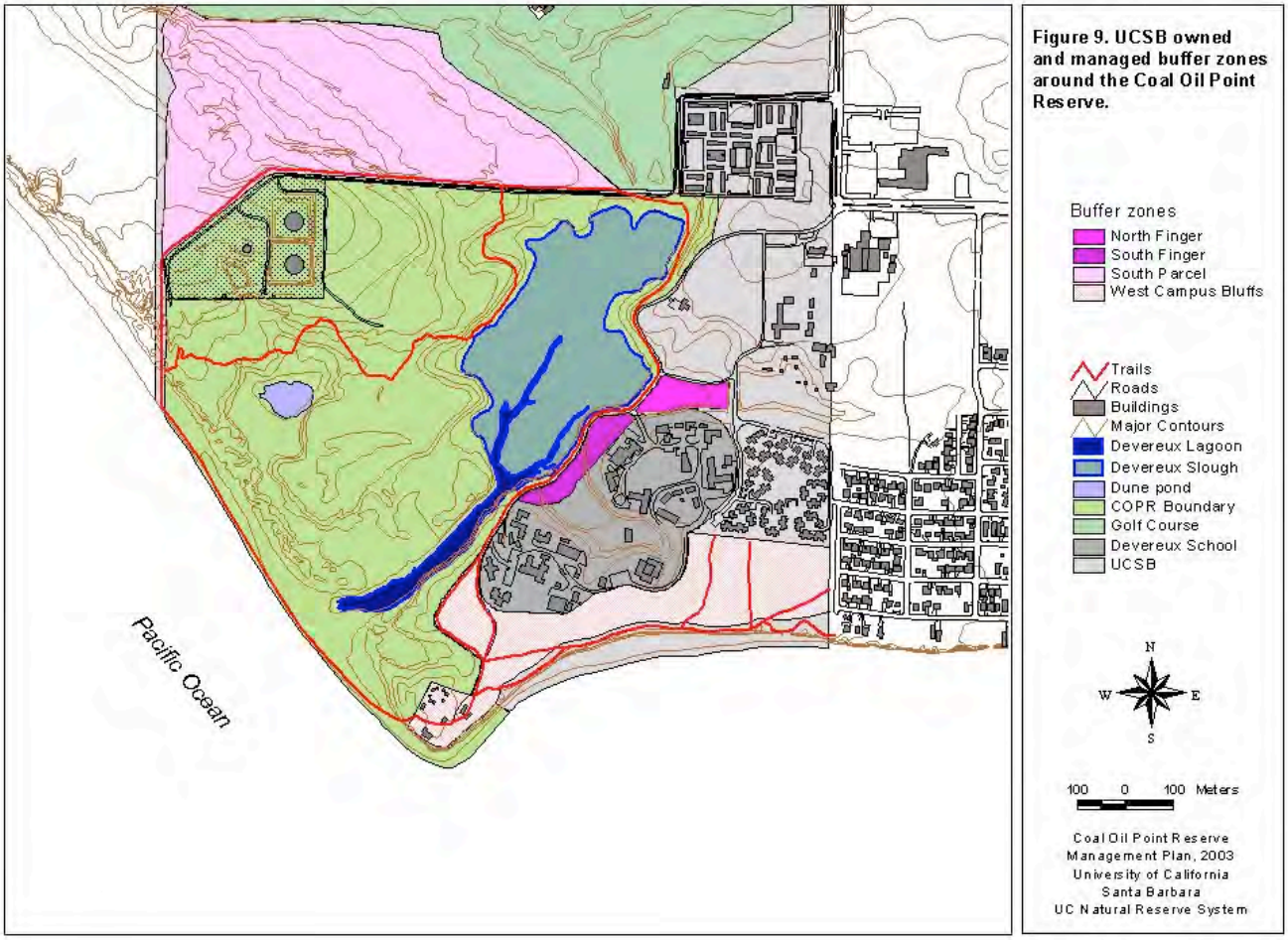

Figure 10a. Snowy Plover Management Plan: year-round fence

Figure 10b. Snowy Plover Management Plan: breeding-season fence

Figure 11. COPR watershed and tributaries

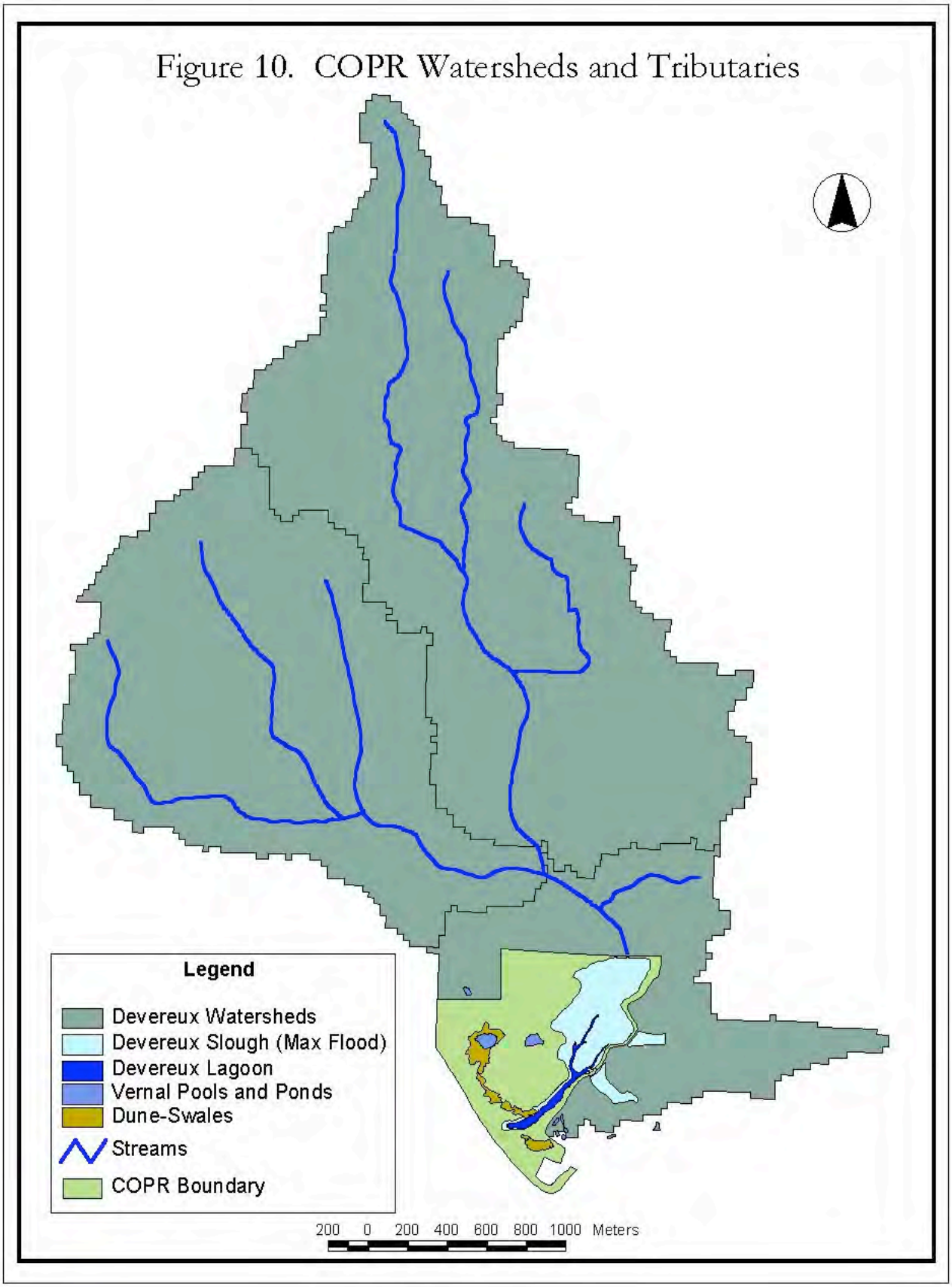
Figure 10. COPR Watersheds and Tributaries
Legend
Devereux Watersheds
Devereux Slough (Max Flood)
Devereux Lagoon
Vernal Pools and Ponds
Dune-Swales
Streams
COPR Boundary
200 0 200 400 600 800 1000 Meters

Figure 12. Topographic map of COPR and vicinity

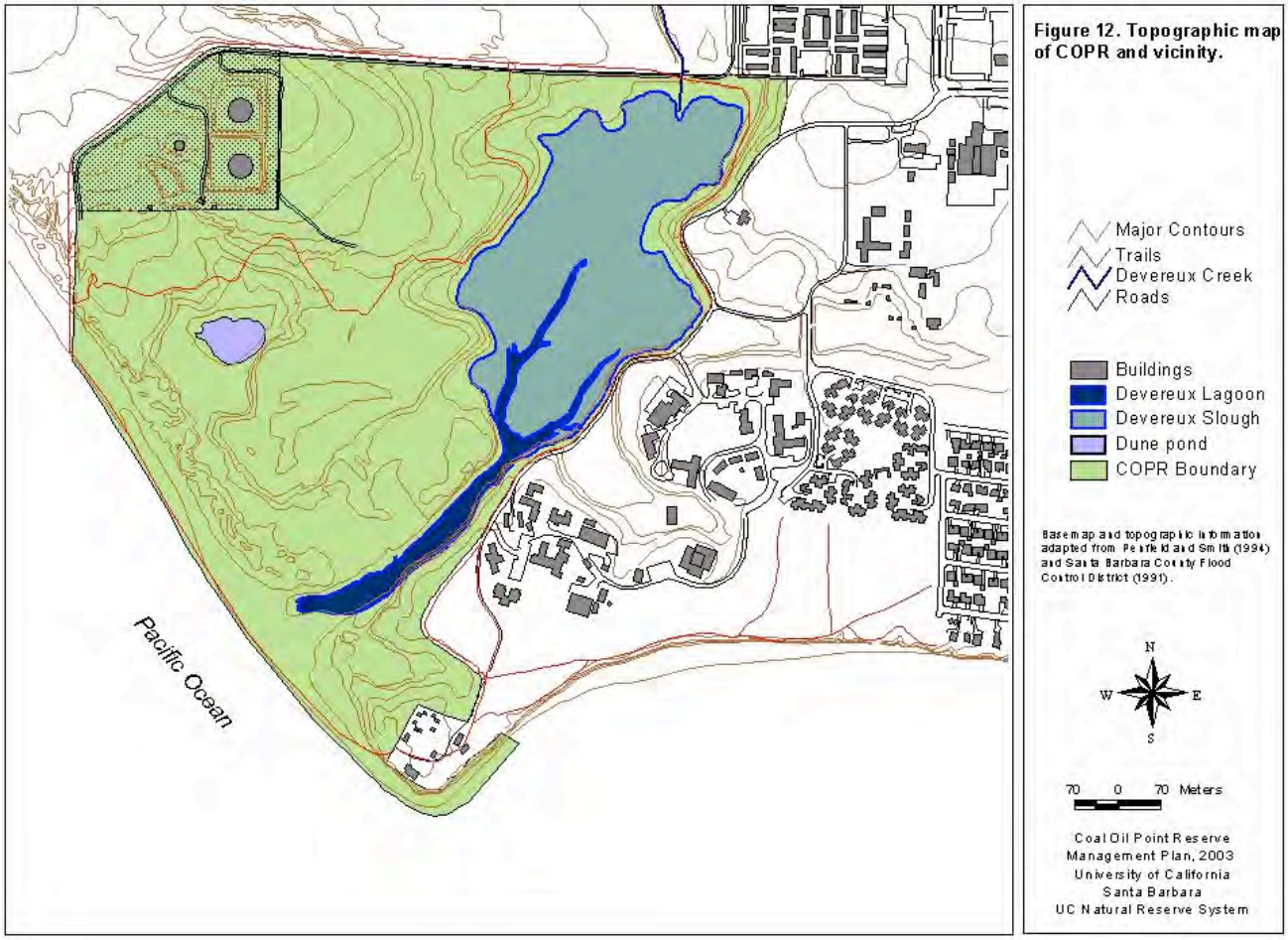

Figure 13. Geology map of COPR and vicinity

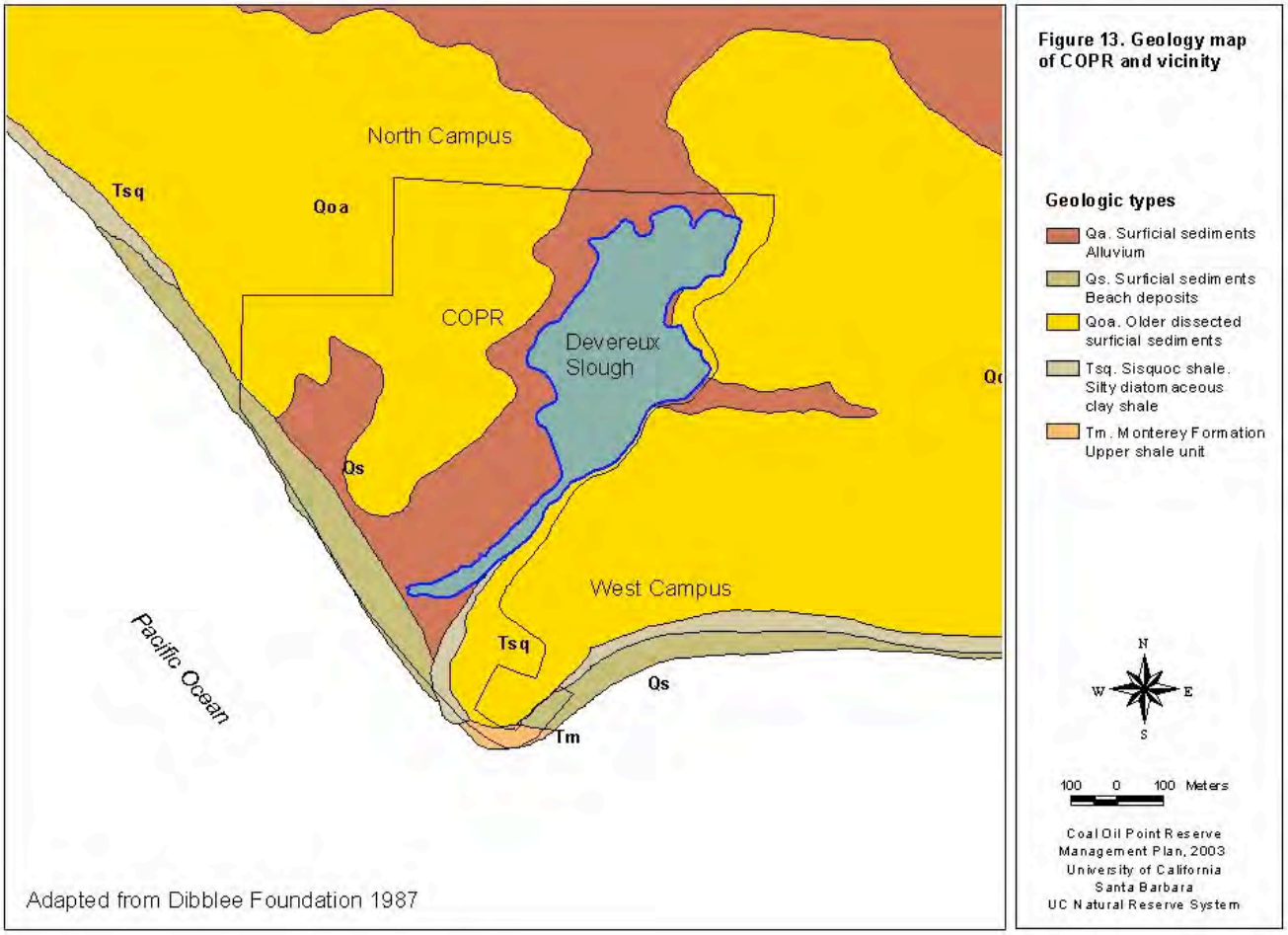

Figure 14. Soils types of COPR and vicinity

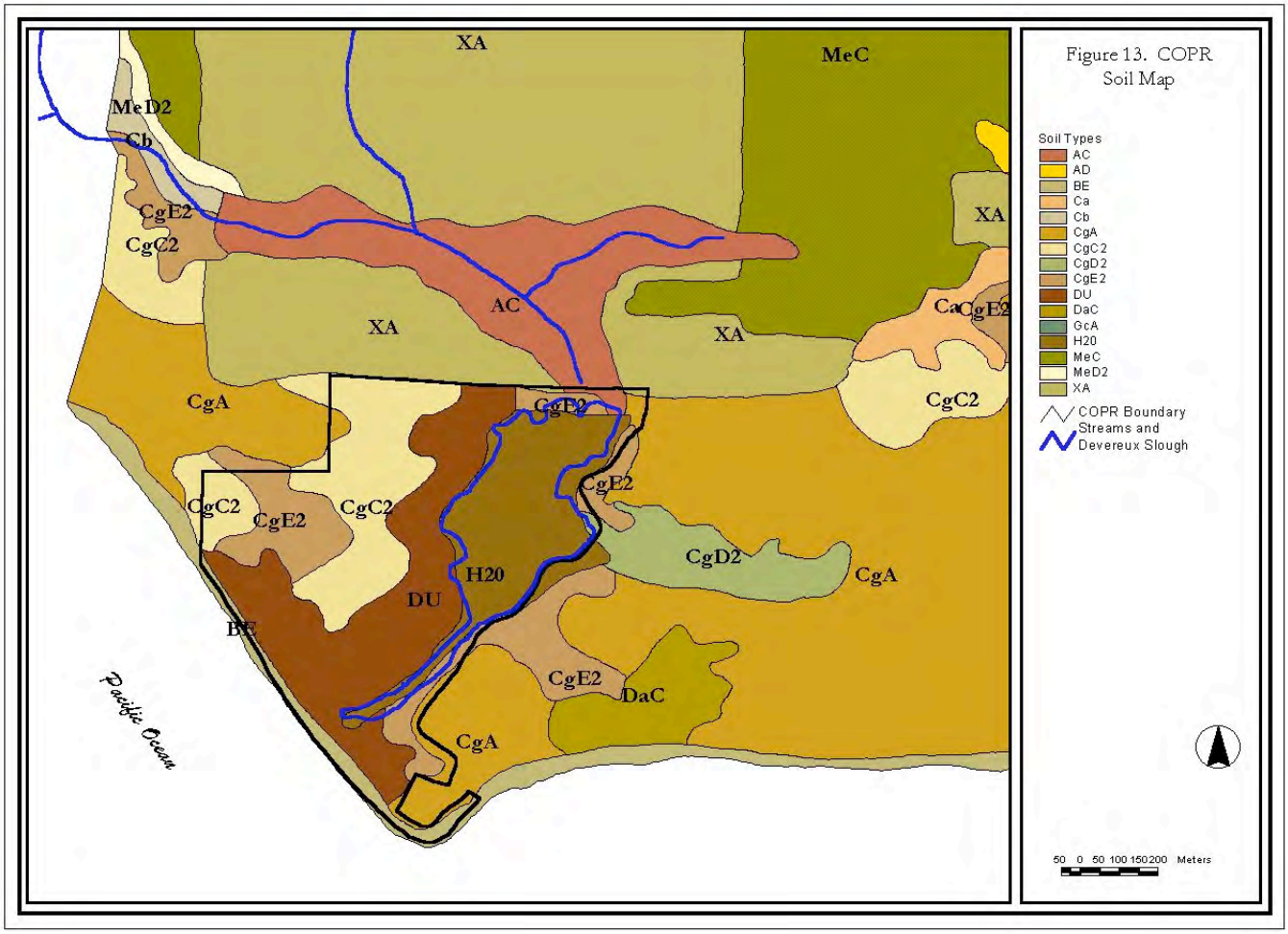

Figure 15. Coal Oil Point geologic faults

Figures 16 A-D. UCSB campus region aerial photographs

Figure 16-D. Coal Oil Point and vicinity: 1997

N
W E
S

40 0 4080 Meters

Coal Oil Point Reserve
Management Plan, 2003
University of California
Santa Barbara
UC Natural Reserve System

Figure 17. Hydrology map of COPR and vicinity

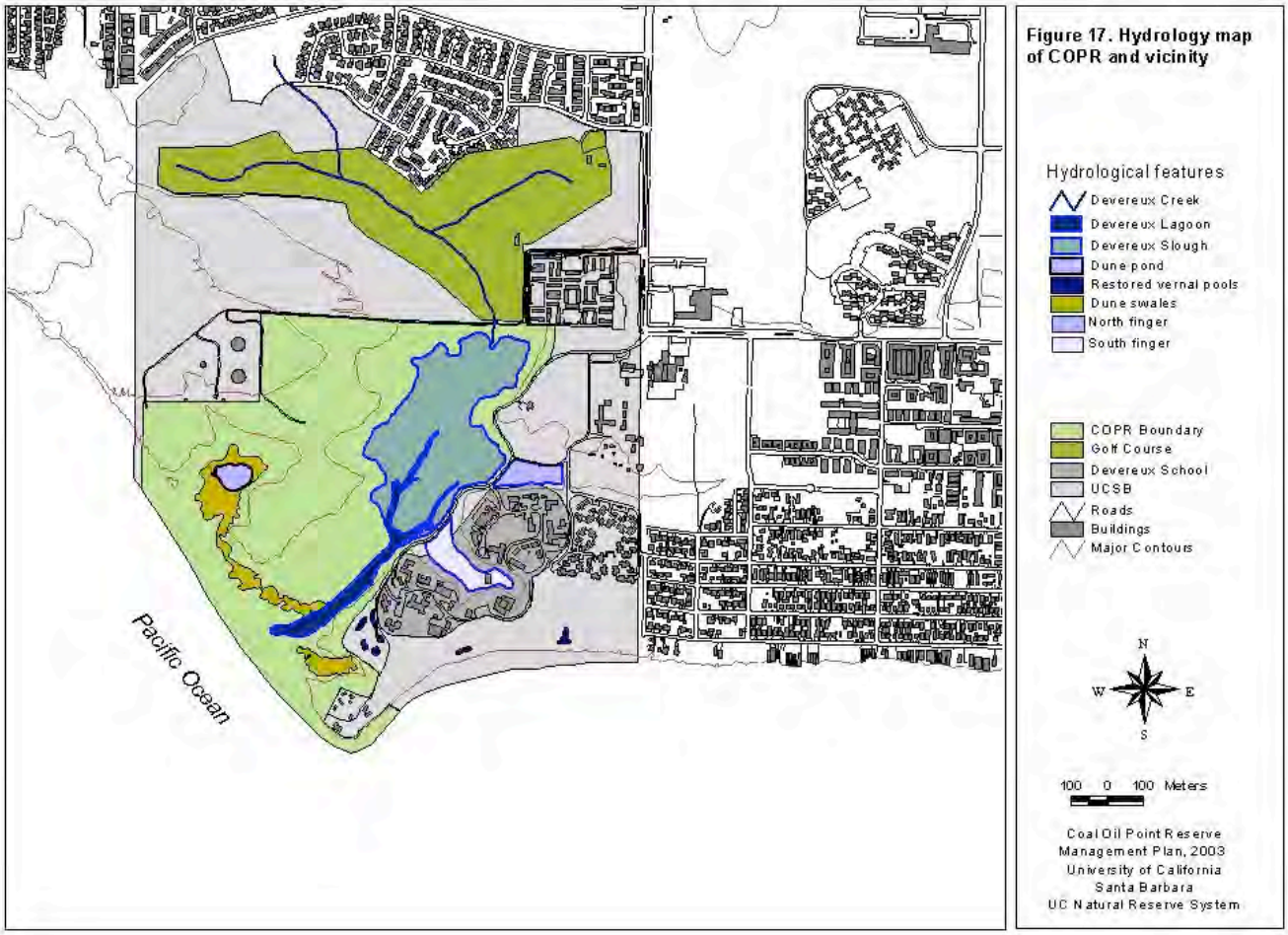

Figure 3.1. Project areas for actions listed in Table 3.1 of Appendix 3.