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STAFF REPORT COASTAL DEVELOPMENT PERMIT AMENDMENT APPLICATION

Permit Number: E-99-009-A2

Applicant: Union Oil Company of California ("Unocal")

Project Location: Guadalupe Oil Field, San Luis Obispo County (Exhibit 1).

Amendment Description: Commission action on application by Unocal for permit amendment approving Wetland Restoration and Mitigation Plans for excavation sites B-11 and D-14.

Substantive File Documents: Appendix A

EXECUTIVE SUMMARY

In this permit amendment application, Unocal requests Coastal Commission approval of a Wetland Restoration and Mitigation Plan required by Coastal Development Permit ("CDP") E-99-009, which was granted to Unocal for oil field abandonment and spill remediation activities at the Guadalupe Oil Field site in San Luis Obispo County. Special Condition 20 of CDP E-99-009 requires Unocal to submit for approval (in the form of a permit amendment) a Wetland Restoration and Mitigation Plan where activities will cause unavoidable wetland habitat impacts.

There are two sites, called B-11 and D-14, both located within the Commission's retained permit jurisdiction, for which the removal of petroleum-hydrocarbon contamination will unavoidably affect wetlands. Excavating the two sites will result in a total loss of 0.47 acres of State jurisdictional wetlands (0.10 acres at B-11 and 0.37 acres at D-14). To satisfy the 4:1 wetland mitigation ratio required by CDP E-99-009, Unocal proposes to restore/create 1.88 acres of wetlands by: (a) restoring all disturbed wetland acreage at the B-11 and D-14 sites (0.47 acres), (b) creating an additional 0.36 acres of wetland habitat at D-14, and (c) creating an additional 1.05 acres of wetland habitat at B-11.

To facilitate preparation of a Wetland Restoration and Mitigation Plan, Unocal formed a Restoration Working Group, which includes staff representatives of the USFWS, California Department of Fish and Game, Coastal Commission, San Luis Obispo County, and the Army Corps of Engineers. In cooperation with this group, Unocal has prepared a site-wide Wetland Restoration and Mitigation Plan and Site Specific Restoration Plans for sites B-11 and D-14.

The plans describe in detail the goals and objectives of wetland mitigation, success criteria, site monitoring and maintenance requirements, agency reporting requirements, and contingency measures (including adaptive management). See Exhibits 3-5. Unocal will fund an independent biological performance monitor, to be chosen by the Commission's Executive Director and County, to conduct final performance monitoring. If, after 10 years, the Executive Director determines that the wetland mitigation success criteria have not been met, Unocal must, within 180 days of the Executive Director's determination, propose alternative mitigation in the form of a permit amendment application.

The Commission staff, who provided guidance to Unocal on the Wetland Restoration and Mitigation Plans, believes the plans satisfy the wetland mitigation requirements of Coastal Act Section 30233(a) and Special Condition 20 of CDP E-99-009. The Commission staff therefore recommends that the Commission **approve** permit amendment application E-99-009-A2.

1 RECOMMENDATION OF APPROVAL

Motion:

I move that the Commission approve the proposed amendment to Coastal Development Permit E-99-009 pursuant to the staff recommendation.

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in approval of the amendment and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

Resolution:

The Commission hereby approves the coastal development permit amendment on the ground that the development as amended will be in conformity with the policies of Chapter 3 of the Coastal Act and will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. Approval of the permit amendment complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

2.0 FINDINGS AND DECLARATIONS

The Commission finds and declares as follows:

2.1 Project Location

The former Guadalupe Oil Field site is located on the central coast of California approximately 15 miles south of the City of San Luis Obispo (Exhibit 1). It occupies over 2,800 acres of the larger Guadalupe–Nipomo Dunes Complex. Most of the site is within San Luis Obispo County, though a small portion extends into Santa Barbara County along the southern boundary. The site is bounded on the south by the Santa Maria River and estuary/lagoon system, on the west by the Pacific Ocean, on the north by Nature Conservancy-managed sand dunes, and to the east by agricultural land. The majority of the site consists of sand dunes ranging up to approximately 160 feet in elevation, while the western edge of the site is a relatively flat beach.

The majority of the former Guadalupe Oil Field is located within San Luis Obispo County's certified local coastal program ("LCP") jurisdiction. However, portions of the site that border the oceanfront and Santa Maria riverbank are within the Coastal Commission's retained coastal permit jurisdiction.

2.2 Project Background

The production of oil and gas was the principal land use at the Guadalupe Oil Field from 1946 to March 1994. Unocal first acquired a 49 percent oil interest in the Guadalupe Oil Field in 1951. By March 1953, the Guadalupe Oil Field produced up to 2,000 barrels per day from 34 wells. In June 1953, Unocal purchased the remaining 51 percent oil lease interest. By 1988, the Guadalupe Oil Field contained 215 potential producing wells and produced 3,500 barrels per day. Oil production operations ceased in April 1994.

In the 1950s, Unocal had introduced a refined petroleum hydrocarbon known as "diluent" (a kerosene-like additive used to thin oil) to assist in the recovery and transportation of heavy crude oil. Unocal transported the diluent to the site by pipeline and truck and distributed it throughout the field by a system of storage tanks and pipelines. Over the years, diluent released from the pipelines and storage tanks and is now present in ground water and soil at the site.

In January 1988, surfers discovered petroleum hydrocarbons on the beach and in the ocean offshore of the oil field. In January 1990, California Department of Fish and Game ("CDFG") staff discovered diluent surfacing in sand in front of the oil field's 5X well pad. The Central Coast Regional Water Quality Control Board ("RWQCB") immediately ordered Unocal to investigate the source of the diluent spill.

In March 1990, Unocal installed a subsurface bentonite slurry wall in front of the 5X well area to stop diluent from reaching the ocean. The CDFG and RWQCB also discovered diluent surfacing at a site called C-12 that is adjacent to the river estuary. In December 1991, Unocal installed a subsurface high-density polyethylene ("HDPE") wall at the C-12 site to prevent migration of the diluent into the river. Because diluent continued to surface on the beach, in 1993 the RWQCB ordered a site-wide investigation of petroleum-hydrocarbon contamination in the soil and ground water at the Guadalupe Oil Field. The CDFG investigation also led to the filing of criminal charges against Unocal and six of its employees. The defendants pleaded "no contest" to the criminal charges, were placed on three years probation, and fined \$1.3 million. By 1996, Unocal's site-wide investigation discovered over 90 diluent plumes and 150 sumps (i.e., areas of concentrated and contaminated wastes consisting of drilling mud, heavy metals, and variety of petroleum products). No one knows how many gallons of petroleum hydrocarbons spilled onto soil and ground water, but estimates range from 8.5 and 20 million gallons.

The contamination consists of both "separate-phase" (i.e., free product) and "dissolved-phase" diluent. Since diluent is lighter than water and has a low solubility, most of the diluent spilled to the shallow dune aquifer remains as separate-phase and floats on top of the water. Separate-phase diluent is also present in the soil column above the groundwater. Some of the diluent dissolves into the groundwater (i.e., dissolved-phase) and moves downstream with the ground water flow, generally from east to west. This has resulted in ground water contamination beneath much of the site with a flux toward the ocean and Santa

Maria River. In several areas, Unocal discovered contaminated groundwater entering surface water bodies.

During 1994-1995 (during the winter storm seasons), there continued to be marine and river releases of diluent at the oil field. Both the U.S. Coast Guard and CDFG directed Unocal to undertake immediate emergency actions to prevent the continued release of petroleum into surface waters. Coastal Commission staff issued multiple emergency permits authorizing the excavation of contaminated sand at a beach site called 5X, installation of HDPE and sheet pile wall barriers, sump removal, and the placement of up to 160 sand-filled geobags along the upper edge of the Santa Maria river bank (to prevent the river's migration into areas of known diluent plumes).

In March 1996, Unocal submitted to the RWQCB and San Luis Obispo County a Remedial Action Plan. The County used the Remedial Action Plan to prepare an environmental impact report ("EIR") under the California Environmental Quality Act ("CEQA") for overall site cleanup and abandonment of the oil field.

In April 1998, the RWQCB issued Cleanup or Abatement Order ("CAO") 98-38 requiring Unocal to abandon and remediate the Guadalupe Oil Field. The RWQCB took a phased approach to site cleanup, proceeding first with cleanup up of the most critical plumes (those known to be introducing petroleum hydrocarbons into surface waters) while continuing with investigations into the total extent of site contamination.

In December 1998, San Luis Obispo County approved Coastal Development Permit/Development Plan D890558 to remediate and restore those high-priority sites required by CAO 98-38. In November 1999, the Coastal Commission approved Coastal Development Permit E-99-009 for the remediation activities located within the Commission's retained permit jurisdiction (i.e., those plumes and sumps located on the beach and along the Santa Maria riverbank). Activities within the Commission's jurisdiction include removal of 2.29 miles of pipeline, excavating the 5X, A2A North, and A5A diluent plumes, and removing access roads, well pads and six sumps.

To date, Unocal has completed all activities authorized by CDP E-99-009 except for excavation of the A5A diluent plume, excavation of the sumps¹ located at sites TB4, D-14, and B-11, and removal of some access roads. Excavating sumps D-14 and B-11 will unavoidably disturb wetlands. Condition 20 of CDP E-99-009 requires Unocal, before undertaking any activities that could result in avoidable wetland impacts, to submit and obtain approval of a Wetland Restoration and Mitigation Plan in the form of an amendment to CDP E-99-009.

¹ Removal of a sump is similar to plume excavation except some sumps may be composed of solid material only.

2.3 Amendment Description

Unocal seeks Coastal Commission approval of Wetland Restoration and Mitigation Plans for Guadalupe Oil Field excavation sites B-11 and D-14, pursuant to the requirements of Special Condition 20 of CDP E-99-009.

Condition 20 of CDP E-99-009 requires:

If any project activities could result in unavoidable impacts to wetlands, Unocal shall submit a Wetland Restoration and Mitigation Plan in the form of an amendment to this permit. The plan must be approved by the Coastal Commission prior to initiation of project activities that could result in unavoidable impacts to wetlands. The Wetland Restoration and Mitigation Plan shall include, but not necessarily be limited to, the following elements:

- a. The ratio of the area created or restored wetlands to the area of impacted wetlands shall be 4 to 1, unless otherwise required by resource agencies.*
- b. To promote the establishment of desired wetland and transition habitats where these habitats have been excavated, post-treatment ground elevations shall be established so as to provide saturated surface soil conditions at the lowest points, surrounded by zones of gradual transition averaging less than 5 percent slope to provide a range of microhabitats that can accommodate the requirements of sensitive plan species. Final elevations shall be determined based on monitoring records for the site and the observation of groundwater depths during remediation.*
- c. A plan for monitoring dissolved-phase diluent to ensure detection of exposures approaching potential damage thresholds as determined by USFWS and CDFG. Monitoring reports shall be submitted to the Executive Director, the County Department of Planning and Building, USFWS and CDFG quarterly or whenever thresholds are exceeded.*
- d. The restored or created wetland and adjacent upland and transitional habitats within 100 feet, or greater distance if required by appropriate resource agencies, shall be included in the Habitat Restoration, Revegetation, and Monitoring Plan described in Condition 9.*

Excavating nine sites at the Guadalupe Oil Field will unavoidably destroy wetland habitat. Of the nine sites, two -- sites B-11 and D-14 -- are located within the Commission's retained permit jurisdiction and subject to the requirements of CDP E-99-009.

To facilitate preparation of the Wetland Restoration and Mitigation Plans, Unocal formed in the fall of 2000 a Guadalupe Oil Field Restoration Working Group. The Restoration Working Group includes representatives of the USFWS, the Army Corps of Engineers, California Department of Fish and Game, San Luis Obispo County, and the Coastal

Commission. The Restoration Working Group gave guidance to Unocal for how to develop a plan that would meet the various agencies' wetland mitigation requirements.

In cooperation with the Restoration Working Group, Unocal has prepared a site-wide Wetland Restoration and Mitigation Plan and nine Site Specific Restoration Plans. The site-wide Wetland Restoration and Mitigation Plan describes the functions and values of existing Guadalupe Oil Field wetlands in a broad manner, the generalized goals of wetland mitigation, and a description of how wetland restoration activities will be conducted generally. An excerpt of the site-wide Wetland Restoration and Mitigation Plan is attached as Exhibit 3. The Site Specific Restoration Plans provide detailed descriptions of restoration goals for each site. The B-11 Site Specific Restoration Plan is attached as Exhibit 4. The D-14 Site Specific Restoration Plan is attached as Exhibit 5.

In excavating the B-11 and D-14 sites, a total of 0.47 acres of State jurisdictional wetlands will be lost. To satisfy the 4:1 mitigation ratio requirement, Unocal will restore 1.88 acres of wetlands.

Site B-11

Site B-11 is a well pad that was the location of a former oil production well, sump, and associated equipment. It is located within the southwestern portion of the Guadalupe Oil Field (Exhibit 2). It is on a spur road to the west of the B road, between the B road and B and C ponds. Excavation of the B-11 sump will destroy 0.10 acres of State jurisdictional wetlands. The wetland will be replaced at a 4:1 ratio or 0.4 acres. A total of 3.02 acres of new wetlands will be created at or adjacent to the B-11 site. Of the 3.02 acres of new wetland area created, 0.4 acres will mitigate for impacts due to excavating the B-11 sump, and the remaining 2.62 acres will serve as mitigation for disturbance/loss of wetlands at other excavation sites (including the D-14 mitigation requirement).

Site D-14

D-14, located within the Santa Maria River floodplain, is a former oil well pad that is contaminated with diluent and sump material (Exhibit 2). Riparian habitat is present to the north, west, and south of the D-14 site. To the east is a steep dune slope with Coastal Dune Scrub vegetation. Unocal estimates approximately 1,350 cubic yards of sump material will be removed. Removal of the contaminated material at D-14 will destroy about 0.37 acres of State jurisdictional wetlands. At a 4:1 wetland mitigation ratio, 1.48 acres of wetlands must be created. A total of 0.73 acres of wetland habitat will be restored at the D-14 site. The remaining 0.75 acres will be created at the B-11 site (see above).

Both the D-14 and B-11 excavations are within the habitat of the California red-legged frog ("CRLF"), and therefore excavation and restoration activities will occur outside the CRLF breeding season (generally from the first significant rain through April). Currently, site D-14 is planned for June 2007, and B-11 for May 2008. Restoration activities will begin immediately after remediation. Grading and contouring the sites to create wetland habitat will occur first. Soil will be stabilized until planting is initiated in early winter (November or

December) following rainfall sufficient to create adequate soil moisture conditions for survival of container stock plants.

3.0 Coastal Act Issues

3.1 Wetlands

Excavating sites B-11 and D-14 will result in a loss of .47 acres of State jurisdictional wetlands (0.37 acres at D-14 and 0.10 acres at B-11). Section 30233(a) of the Coastal Act in part allows for the “dredging” of wetlands where “feasible mitigation measures have been provided to minimize adverse environmental effects.” In approving the remediation activities ordered by Cleanup or Abatement Order 98-38, the Commission in CDP E-99-009 imposed upon Unocal a requirement (Special Condition 20) to submit in the form of a permit amendment application a Wetland Restoration and Mitigation Plan where remediation activities would unavoidably damage or destroy wetlands. Special Condition 20 requires the Wetland Restoration and Mitigation Plan to include, at minimum, the following:

- a. A 4:1 mitigation ratio (the ratio of the area created or restored wetlands to the area of impacted wetlands), unless otherwise required by resource agencies.*
- b. Establishment of post-treatment ground elevations so as to provide saturated surface soil conditions at the lowest points, surrounded by zones of gradual transition averaging less than 5 percent slope to provide a range of microhabitats that can accommodate the requirements of sensitive plant species. Final elevations shall be determined based on monitoring records for the site and the observation of groundwater depths during remediation.*
- c. A plan for monitoring dissolved-phase diluent to ensure detection of exposures approaching potential damage thresholds as determined by USFWS and CDFG. Monitoring reports shall be submitted to the Executive Director, the County Department of Planning and Building, USFWS and CDFG quarterly or whenever thresholds are exceeded.*
- d. The restored or created wetland and adjacent upland and transitional habitats within 100 feet, or greater distance if required by appropriate resource agencies, shall be included in the Habitat Restoration, Revegetation, and Monitoring Plan described in Condition 9.*

As described above, Unocal has submitted a site-wide Wetland Restoration and Mitigation Plan and a Site Specific Restoration Plan for each of the B-11 and D-14 sites. In addition to the minimum requirements set forth in Special Condition 20, the Commission reviewed for conformity with the Coastal Act’s Section 30233(a) wetland mitigation requirements each plan’s restoration goals and objectives, success criteria (i.e., performance standards), ongoing site maintenance and monitoring requirements, agency reporting requirements, and contingency measures (including adaptive management).

Unocal's overall site-wide Wetland Mitigation and Restoration Plan sets forth the general goals and objectives of wetland mitigation, wetland maintenance during the monitoring period, and a monitoring plan (which includes botanical, coastal dune scrub habitat, and wildlife success criteria). See Exhibit 3.

Unocal proposes to restore all lost wetlands at both the B-11 (.10 acres lost) and D-14 (.37 acres lost) sites. However, to meet the 4:1 mitigation ratio requirement, Unocal proposes, as described in detail in the Project Description section of this report, to create additional wetland habitat at both the D-14 and B-11 sites.

The Restoration Working Group undertook a lengthy process to identify sites at the Guadalupe Oil Field appropriate for wetland restoration/creation to meet the agencies' wetland mitigation requirements. The Restoration Working Group developed 15 criteria for selecting restoration sites:

1. Soil surface close to groundwater table
2. Low variation in groundwater elevation range
3. Site is not down gradient from a subsurface plume that may create an unacceptable risk
4. Wetland creation within or adjacent to an excavation
5. Area not subject to potential erosion or depositional effects
6. Expansion of an existing wetland area
7. Existing wetlands in proximity to restoration site
8. Existing conditions provide poor quality habitat (i.e., asphalt, oil spray, red-rock, high cover of alien or invasive species)
9. Accessibility to site is good
10. Suitable for potential research opportunities involving sensitive species
11. Located outside of environmentally sensitive areas
12. Site will provide a bridge to isolated wetlands
13. High degree of confidence in groundwater data
14. Site more than one acre in size
15. Compatibility with adjacent land uses

None of the potential wetland restoration/creation sites meets all 15 criteria. Site D-14 meets 10 of the 15 criteria, and B-11 meets 11 of the 15.

The Restoration Working Group chose D-14 as a good wetland restoration/creation site in part because

- The site must be excavated and it is preferable to restore and create wetlands on or adjacent to the excavation areas;
- The site is located within the Santa Maria River floodplain and is located adjacent to existing wetlands;
- Access to the site good;

- The area proposed for restoration is a former pad underlain with compacted road base or red-rock material. Conversion of this area to wetland habitat will improve the wildlife functions and values of the site; and
- Groundwater levels have little variability (and there is greater confidence in creating wetlands at sites with low groundwater elevation fluctuations).

The Restoration Working Group chose B-11 as a good wetland restoration/creation site in part because

- The site must be excavated and it is preferable to restore and create wetlands on or adjacent to the excavation areas;
- The upland area within the B-11 site is underlain with red-rock and asphalt, and is dominated by ice plant, a non-native invasive species. Conversion of this area to wetland habitat will improve the wildlife functions and values of the site;
- Creation of wetland habitat at this site will result in an expansion of wetlands located directly west and south of the site; and
- Access to the site is good.

For each site, excavating the hydrocarbon-affected soils and removal of sump material will provide the initial lowering of topographical elevations to accommodate the restoration of wetland habitat. To promote the reestablishment of desired wetland and transition habitats, post-treatment ground elevations are designed to provide saturated surface soil conditions at the lowest points, surrounded by zones of gradual transition to provide a range of microhabitats that will accommodate the requirements of local wetland plant species/associations. Final elevations will be low enough to provide surface water in the event of foreseeable drought conditions. Final elevations are determined based on site-specific monitoring records and observation of groundwater depths during the remediation/restoration process. To meet the requirement of Special Condition 20(b), Figure 4 of each site specific restoration plan provides the post-excavation plan and cross sections (each cross section shows the plan in relation to historic ground water depths). Unocal will then incorporate stockpiled vegetated overburden into the soil, implement erosion control measures as needed, and implement a planting and irrigation plan.

A maintenance program (including watering of installed plants, weed control, replanting/seeding, erosion and pest controls, and plant protection) is necessary to ensure success of the wetland restoration activities. Supplemental irrigation will only be used if precipitation levels are below normal and there is a significant loss of plants. Maintenance will be conducted until the success criteria are met (described below) and the created habitats are becoming self-sustaining (minimum maintenance).

Unocal will monitor and maintain each site for no longer than 10 years, or when it believes the success or performance criteria have been met, whichever occurs first. In developing performance criteria, reference sites were selected based on an evaluation of the physical, chemical, and biological attributes that would assist in determining the success of meeting the goals and objectives. In consultation with the Restoration Working Group, Unocal

developed wetland botanical success criteria, coastal dune scrub success criteria, and wildlife success criteria. There are two levels of success criteria: (1) field-wide criteria (i.e., all created and restored wetlands field-wide considered together), and (2) criteria developed for each site. Exhibit 3 describes the general success criteria for the overall site-wide wetland restoration effort. These include:

- Restored or created wetlands will have a topographic profile similar to the lost wetlands (to the extent feasible).
- The target for non-native invasive species within wetland areas is zero.
- For wetland plant species, field-wide 75% of the created or restored wetland sites must have three or more of the five wetland plant species associations observed at the Guadalupe Oil Field. Each created or restored wetland shall have at least two wetland plants (except where site constraints (e.g., size) prevent this).
- Field-wide, for each association, the mean richness of native perennials and the percent of absolute cover composed of native perennials must fall within the 95% confidence interval derived from the reference wetlands.
- Within upland/coastal scrub areas, the cover of native perennial vegetation shall be approximately 45%, which is the mean of the reference site values.
- At least 15 native perennial species need to be present at upland/coastal scrub areas. The top four dominant species of coastal dune scrub on the reference sites (*Ericameria ericoides*, *Eriogonum parvifolium*, *Lessingia filaginifolia*, and *Senecio blochmaniae*) need to contribute 20% or more of the total cover (any combination of the four species).
- For wetland buffer areas, topsoil shall be stable and not subject to wind and water erosion. No gullying or blowouts may exist that affect the wetland restoration area or adjacent wetlands. The combined cover of invasive, non-native plant species is to remain at less than 5%. The total plant cover in the buffer area is to be comparable to similar, undisturbed plant associations at the Guadalupe oil field.

Site-specific success criteria for the D-14 and B-11 wetland restoration sites are shown in Exhibits 4 and 5. These include:

- Affected wetlands will be replaced at a 4:1 mitigation ratio. A wetland delineation will be conducted five years after restoration activities are complete and at the end of the overall site-wide Wetland Restoration Program.
- The restored and created wetlands shall have at least two wetland plant species associations.
- Topsoil shall be stable and not subject to water and wind erosion. No gullying, washouts, or blowouts shall persist.
- Two plants for each documented lost La Graciosa Thistle plant shall survive, flower, and set seed.
- Richness and absolute cover of non-native invasive species is zero.

Monitoring progress on the B-11 and D-14 restoration sites will be reported in a Quarterly Ecological Monitoring Report. Elements within the report include a qualitative overall

assessment of the restoration site, evaluations of weed presence, sensitive species, erosion, and wildlife usage. Unocal will also present an assessment of how the restoration site is progressing in relation to its success criteria and the schedule defined within each site's Site Specific Restoration Plan.

Special Condition 20(c) also requires Unocal to develop a plan to monitor dissolved-phase diluent. Unocal has developed jointly with the Regional Water Quality Control Board a plan to monitor ground water and surface water. The results of the monitoring are documented in a Quarterly Report for Water Monitoring and Remedial Activities, submitted to the Regional Water Quality Control Board, and for the wetland sites will also be reported in the Quarterly Ecological Monitoring Reports, which are submitted to the California Department of Fish and Game, USFWS, Coastal Commission, and County of San Luis Obispo.

Unocal will fund an independent biological performance monitor to be selected by the Executive Director and the San Luis Obispo County Department of Planning and Building. The independent biological monitor will assist Unocal in the interim monitoring and conduct, on behalf of the Coastal Commission and County, final performance monitoring. Unocal shall notify the Executive Director of the Coastal Commission and the County when it believes the success criteria have been met. When the Executive Director and County have determined that the success criteria have been met, no further performance monitoring shall be required. If performance standards are not met within 10 years, or if before that time Unocal concludes that restoration and re-vegetation activities will not meet performance standards, Unocal will, within 180 days, propose to the Coastal Commission alternative mitigation in the form of a permit amendment application.

The Commission finds that successful implementation of Unocal's proposed site-wide Wetland Restoration and Mitigation Plan and B-11 and D-14 Site Specific Restoration Plans will adequately mitigate for the loss of wetland habitat caused by spill remediation activities. The Commission therefore finds that the plans meet the wetland mitigation requirements of Special Condition 20 of CDP E-99-009 and Coastal Act Section 30233(a).

APPENDIX A

SUBSTANTIVE FILE DOCUMENTS

California Coastal Commission. Adopted Findings for Coastal Development Permit E-99-009.

Unocal. Coastal Development Permit E-99-009-A-2 Permit Amendment Application, January 25, 2006.

Unocal. Letter from Kyle Rutherford to Alison Dettmer, August 2, 2006.

Unocal. Letter from Kyle Rutherford to Alison Dettmer, August 18, 2006.

Unocal. Wetland Restoration and Mitigation Plan for Guadalupe Restoration Project (includes Site Specific Restoration Plans for B-11 and D-14), January 7, 2006.

Figure 1 Proposed Project Location

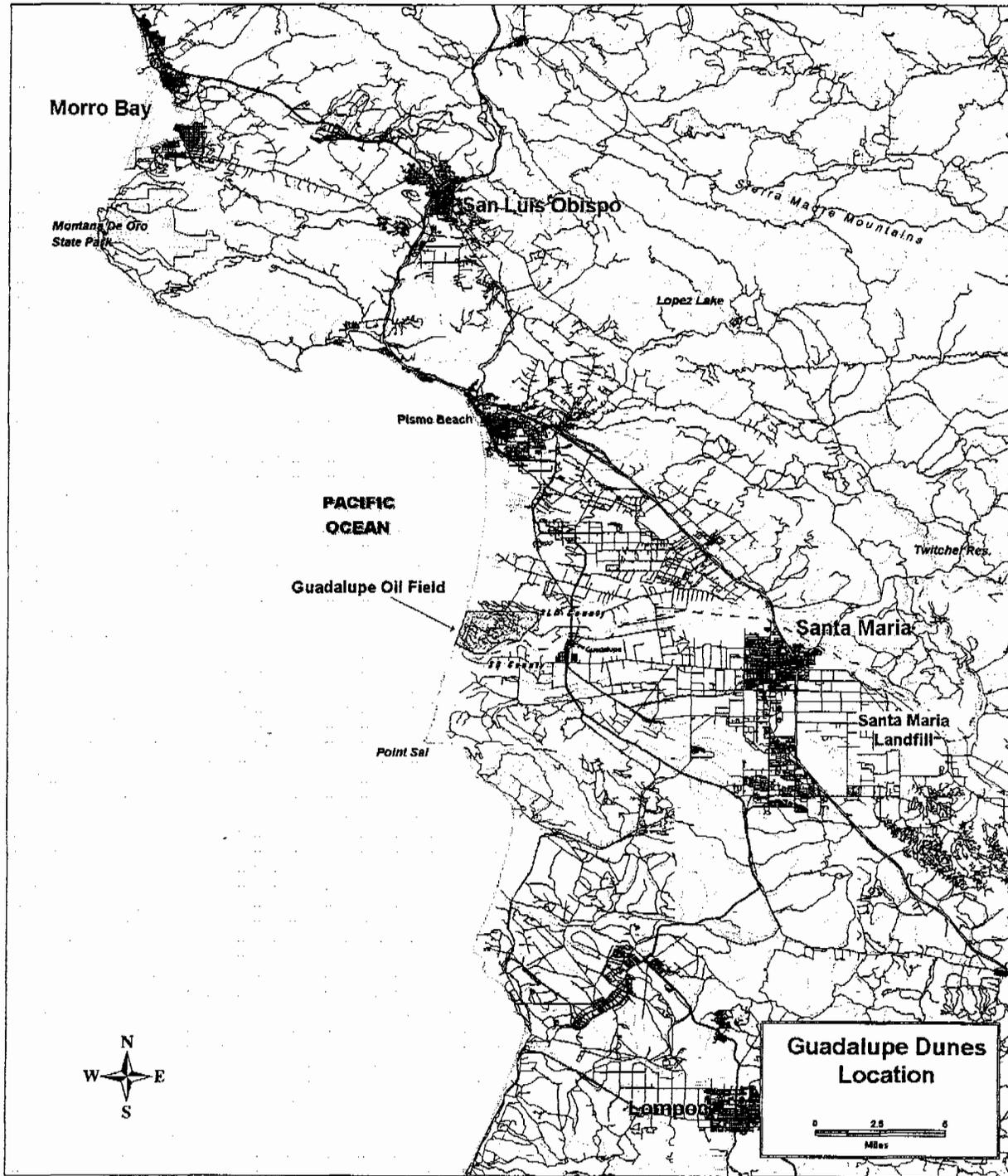
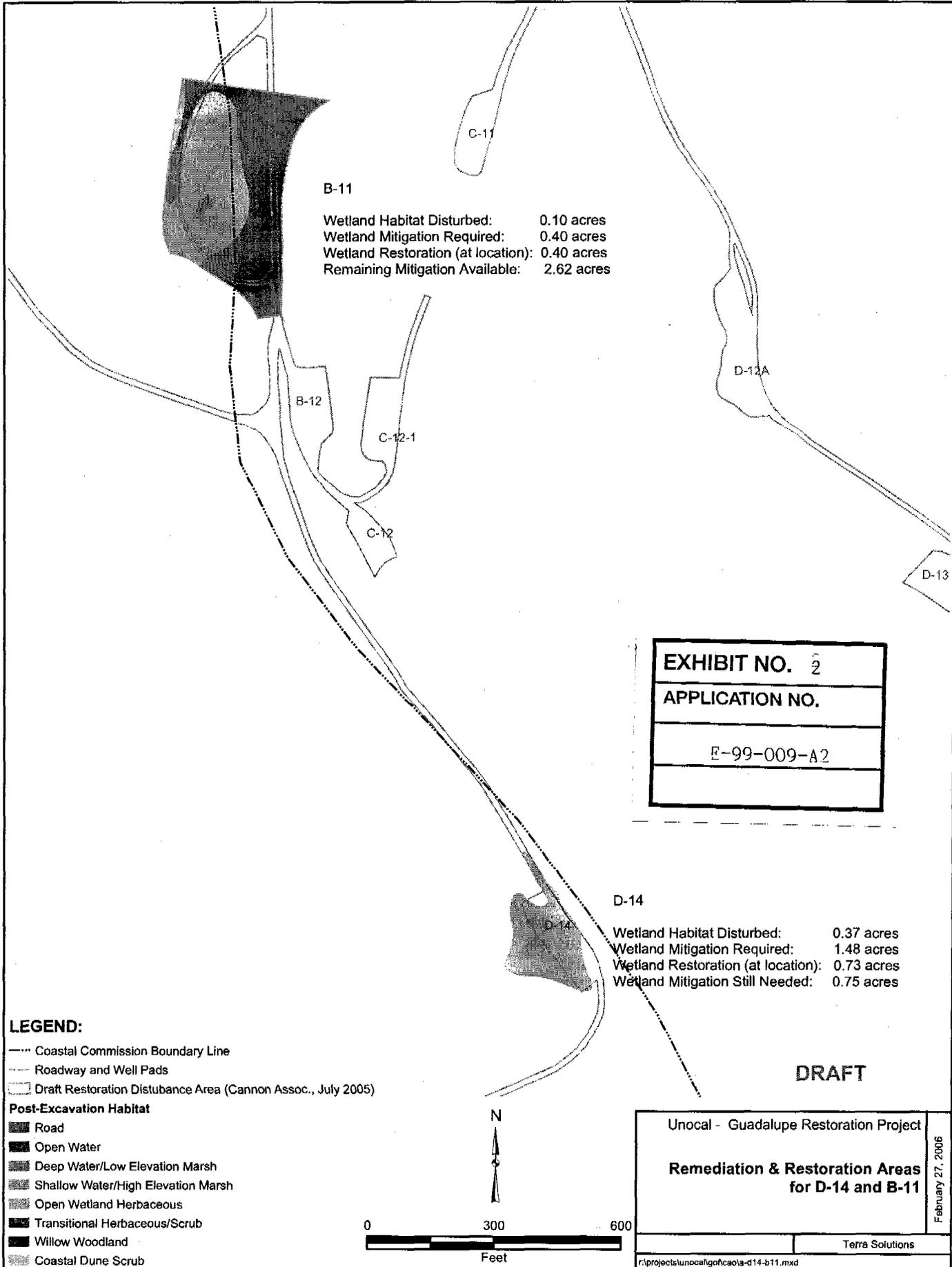


EXHIBIT NO. 1
APPLICATION NO.
E-99-009-A2



6.0 SITE SPECIFIC RESTORATION PLAN TEMPLATES

The WRMP is intended to serve as a single integrated document that incorporates the SSRPs required by the County CDP/DP Condition F64. To that end, a succinct SSRP has been prepared for each of the 12 locations where post remediated, created or restored wetlands are proposed. Each SSRP is in the form of a template and contains all of the information necessary for the restoration of each Site. A separate template for each remediation/creation/restoration Site will be included in Appendices D to O of the Final WRMP.

A general SSRP template with descriptions of each of its elements is provided in Appendix C.

7.0 IMPLEMENTATION PLAN

7.1 Rationale for Expecting Implementation Success

Unocal has collected an extensive amount of data regarding soils, hydrology, water quality, and vegetation that are applicable to the post-remediation, creation, and restoration of the dune swale wetland/upland habitat complex following site remediation. Because of the subsurface nature of the hydrocarbon-affected areas throughout the Field, Unocal has studied the groundwater, surface waters, soils, regional soil stratigraphy, and vegetation to determine the location and extent of hydrocarbon affected areas. The data collected for the Project have proven to be invaluable in understanding how the dune swale wetlands function in response to the fluctuating water table of the shallow Dune Sand Aquifer (DSA). This section summarizes the extensive data collection effort to date, and identifies the physical, chemical, and biological characteristics that demonstrate the feasibility of on-site restoration of the dune swale wetland/upland habitat complex. Based on the feasibility analysis, a basis of design is presented that has its foundation in the soils and hydrology data collected to date. These data are combined with the analogue of existing wetland habitats that represent the surface expression of the multiple factors that will contribute to the restoration, creation, and enhancement of the dune swale wetland/upland habitat complex.

Feasibility Analysis

Soils and groundwater investigations reported in 2002 describe the regional context and site-specific geology and hydrogeology of the Field (LFR, 2002a). Ponds and wetlands at the Field occur where the DSA groundwater table is higher than or near in elevation to the land surface. From a hydrologic viewpoint, the DSA is an unconfined aquifer that is bounded below by fine-grained deposits of the Confining Unit. Hydraulic heads in the DSA at the Field have been relatively consistent over time and range from greater than 60 feet above mean sea level near the eastern boundary of the Field to near sea level adjacent to the Pacific Ocean. Over the past ten years, a gradual increase in groundwater elevation of approximately 2-feet has been observed. Quarterly variations in groundwater elevation of

±0.5-feet, on average, are typically observed with more significant variations (±2-feet) as a result of heavy rainfall (LFR 2002b).

The U.S. Geological Survey believes that recharge to the DSA is mainly by percolation of precipitation across its exposed surface (Worts, 1951). At the Field, the exposed sands of the DSA allow for negligible runoff and rapid infiltration of precipitation to the water table. Groundwater flow modeling further indicates that recharge accounts for nearly all of the influent water to the DSA (PMGC, 2000).

Ongoing water monitoring activities conducted since 1993 have provided soils information from well construction lithologic logs and documented the location of the Confining Unit. The water monitoring reports have also provided information on Field-wide groundwater elevation contours over time and in response to a variety of rainfall periods. Groundwater elevations have been established over time at specific points (monitoring well locations), and established the response of the shallow DSA to average and above average yearly rainfall patterns.

This Plan is based upon known parameters of topography, soils, hydrology, and plant materials that have been thoroughly investigated in the Field and in relevant literature. The existing soil and hydrologic conditions which formed the dune swale wetland/upland complex will not be significantly altered by the proposed excavation/remediation effort, and it is reasonable to expect that similar conditions will continue to dominate the site. The rhizomatous nature of the dominant wetland plant species present is ideal for propagation and revegetation purposes, and cuttings, divisions, and seed collection can satisfactorily propagate other desirable species. Salvaged wetland topsoil will provide additional seed, spores, mycorrhizal fungi, and rhizome material. Target elevations for wetland areas will be designed to provide ranges, which match the desired plant species' observed hydrologic requirements. The upland species required for dune scrub habitat revegetation can be easily propagated under growing facility/nursery conditions from locally collected seed. Propagated plant material will be supplemented by broadcast of a collected seed mix during favorable weather conditions. Salvaged upland topsoil will provide additional seed, spores, mycorrhizal fungi, and other organic materials that will facilitate regrowth.

The feasibility analysis and basis for design factors described above indicate that post-remediation, , creation, and restoration of the dune swale wetland/upland habitat complex are feasible with a high degree of probability for success. A key factor to the successful restoration of wetlands will be restoring ground contours to an elevation that will intersect the shallow Dune Sand Aquifer during periods of normal rainfall. Grading and contouring the Site to a variety of elevations and gradients will create diverse wetland habitat that will become established and self-sustaining throughout the range of hydrologic conditions that occur at the Field.

7.2 Site Preparation

Restoration of excavated and disturbed wetland and upland habitats will be accomplished through grading and recontouring to meet optimal conditions for successful establishment

of the native dune swale wetland/upland habitat complex. Surface expression of wetlands occurs in the topographic low areas of the dune swale where groundwater intersects or approaches the ground surface elevation, creating ponds or saturating the surface soils sufficiently to support wetland plants. The precept for the wetland restoration component of this Plan is to grade and contour excavated and disturbed areas to a series of target elevations to meet the varied hydrologic conditions that currently support surface water and wetland swale habitats at the Field.

The feasibility analysis described previously provides the information to support the establishment of wetland habitats that will function through the varied hydrologic regimes that are influenced by the shallow DSA and seasonal and yearly rainfall patterns. The grading plan, target habitat elevation zone designations, and planting plans are designed to provide for normal wetland functions during periods of average rainfall. During periods of above average rainfall, the balance of open water pond to saturated wetlands will shift to an increase in the surface extent of ponding. In periods of less than average rainfall, it is expected that a small ponded area will remain, surrounded by an increased zone of saturation. The observed dominance of rhizomatous genera, such as *Carex* and *Juncus*, in the dune swale wetlands provides evidence that these plant are well adapted to a wide range of hydrologic conditions. Naturally, the effects of extremes in either rainfall pattern direction on the restored habitat areas are unpredictable at this time.

7.2.1 General Sequence of Restoration-Related Activities

Site-specific habitat restoration activities planned for the wetland Sites are generally organized into three chronological groups: prior to, during, or after the soil excavation/remediation. Because Site remediation will be coordinated so that Sites close to each other will be restored together, some restoration activities planned for different periods will overlap, and some will be extended over more than one-year. The general sequencing for the wetland excavation Site activities are summarized in Figure 5. For each wetland restoration site, all physical and biological restoration and all required mitigation for that site will be completed within two years after the completion of excavation and remediation activities.

7.2.2 Pre-Disturbance Activities

Locate and Mark Project Sites and Construction Boundaries

Individual site-specific remediation project construction plans will include a site map showing, at a minimum, the geographic limits of surface disturbance and the geographic boundary of the restoration and revegetation activities. The limits of construction will also be marked in the Field. The boundary of restoration activities may be larger than the area of disturbance (CDP/DP Condition F64.a.iii). All boundaries will be based on site conditions, including the presence of sensitive plant species in adjacent areas. Adjustments to the planned boundary will be made in the Field to provide adequate protection to adjacent areas.

Abate Weeds

Weed control activities will be implemented on both a Field-wide and site-specific level. Where practicable, each wetland Site, including a 20-foot buffer zone will be initially treated during at least one growing season prior to any remediation/restoration activities. This early treatment will be followed by a subsequent treatment approximately 30-days prior to initiation of remediation/ restoration actions. The intent is to remove living weeds and minimize the weed seed bank in the soil.

Conduct Baseline Ecological Surveys

Before any excavation or infrastructure removal activities begin, pre-disturbance, or baseline, surveys shall be completed according to CDP/DP Condition F64.a-i. These surveys document the following:

- Pre-disturbance vegetation (species, frequency, and coverage) and wetland plant associations
- Observed and potential wildlife species
- Presence of sensitive plant and animal species or habitat
- Existing wildlife habitat elements

The results of the most recent quantitative vegetation surveys are provided with each Site-Specific Restoration Plan appended to this Plan (refer to Appendices D to O). The results from these surveys have been used in developing the planting components of this Plan, including appropriate seed mix and success criteria for revegetation.

Although surveys were conducted for the purpose of preparing this Plan, Condition F64.a-i requires that wildlife surveys be conducted within 24-months of disturbance and include the seasons during which disturbances will occur. Additional vegetation surveys shall be conducted, at least within 6-months to a year of Site disturbance, and surveys of sensitive species shall also be conducted within 6-months of disturbance or during a suitable season when plants are most observable.

Another aspect of documenting site-specific baseline conditions involves selecting wetland reference sites. Five wetland associations have been documented as occurring at the dune swale habitats at the Field (see Section 4.3). Fifteen different wetlands were selected as reference wetlands and included wetlands of different sizes, hydrology and species composition. An adequate sample of each wetland association was obtained.

Comparing data collected at individual post remediated, created or restored wetland sites with similar data from wetland reference sites will help determine the causes of potential performance problems. For example, does plant mortality or limited growth reflect natural,

Field-wide population variability, or is it due to problems with revegetation/planting methodology?

Protect Sensitive Wildlife Species

Before removing the vegetated overburden from a project Site, wildlife species (particularly listed species) shall be captured and relocated. In appropriate habitat (coastal dune scrub and transitional herbaceous scrub), silvery legless lizards will be surveyed for and those found relocated per the methods provided in the EMP. Daily wildlife clearance surveys of work areas shall also be performed to ensure that wildlife is not impacted by construction activities. Protocols used to protect wildlife, including capture and relocation are presented in the Ecological Monitoring Program (Unocal, 2001). All capture and relocation activities will be documented on the Daily Field Reports and published in the Quarterly Ecological Monitoring Report.

Prior to construction, the limits of disturbance shall be fenced. No unauthorized personnel or equipment will be allowed beyond the disturbance limits. Any potentially affected locations of sensitive plant species in proximity to the Site shall be fenced with t-bar or orange construction fence to exclude vehicles or pedestrians.

Protect Sensitive Plant Species

A number of sensitive plant species occur at the Field and potentially within the post-remediation, created, and restored, wetland project Site areas. These include upland plant species such as Blochman's daisy, Blochman's groundsel, suffrutescent wallflower and Nuttall's milkvetch. The La Graciosa thistle, a federally endangered and state threatened species occurs in some of the wetland areas and may also be impacted by activities

During the conduct of pre-disturbance baseline vegetation surveys, sensitive plants that occur within or adjacent to the disturbance area shall be identified. The number of individuals or percentage of ground coverage or other appropriate measures of presence shall be determined and recorded..

If any sensitive plant species may be impacted by Project activities, such impacts shall be mitigated by salvaging, or propagating the impacted species and planting them either in the impacted area or in other suitable habitat upon completion of the Project. Salvaging activities typically begin at least one year prior to disturbance. Seeds shall be collected during the proper season for individual species found on site. Divisions and cuttings also shall be generated at the appropriate time. Sensitive plants that have been salvaged from disturbance areas shall be transplanted following completion of project activities in that area or in an alternate area possessing suitable habitat.

Additionally, within 30 days before excavation, construction, and installation of equipment, surveys of sensitive plants shall be conducted. All individuals and colonies of sensitive plant species in the immediate vicinity of construction area are mapped and clearly marked. Equipment is restricted to existing roads, pads or otherwise disturbed areas as much as

possible. Where feasible, areas containing the sensitive plant species are excluded from the limits of construction. Any potentially affected locations of sensitive plant species in proximity to the Site will be fenced with t-bar or orange construction fence to exclude vehicles or pedestrians

Unocal tracks the status of sensitive plants at each restoration site. Section 6 of each Quarterly Ecological Monitoring Report (QEMR) tracks sensitive plants disturbed at each impact area and annually (in spring) provides the current coverage or density of sensitive species at these sites. (see Sensitive Species Management Plan in Appendix E of the Ecological Monitoring Plan).

La Graciosa Thistle Protection

Prior to excavation, construction, installation of equipment, or any other ground disturbing activity associated with the proposed project in dune swale/wetland habitats, a qualified biologist will survey all proposed construction, staging, and access areas for the presence of the La Graciosa thistle. Colonies will be mapped and clearly marked, and numbers of individuals in each colony and their condition will be determined and recorded. Construction areas and access routes will be limited to avoid impacts to individuals or colonies of LGT.

In areas where impacts may be unavoidable to the LGT, a salvage, propagation, and replanting program will be implemented using both seed and salvaged (excavated) plants, and constituting an ample and representative sample of each colony of the impacted species. Seeds will be collected two seasons in advance of the disturbance, where feasible. Individuals of the species located within impact areas will be salvaged by hand and immediately transplanted to a suitable unaffected area or placed in containers for future transplanting or for use as seed stock (refer to Appendix P, La Graciosa Thistle Salvage, Propagation and Restoration Program).

Ground and Aerial Photographic Documentation

Photographs of project activities will be an integral part of documenting the impact of the activity and the progress of restoration at each Site. Of particular interest will be the effect of project activities on vegetation.

Ground-level photographs will be taken within 30-days prior to the initiation of Site disturbance to document the pre-project conditions. Permanent photo points will help in recording changes taking place over time. These permanent photo points will be established so that the photographs can reveal changes over time.

Annual aerial photographs will also be taken of each Site during the spring. Together with the existing aerial photograph library for these Sites, annual aerial photographs will be useful in documenting restoration progress.

Select Species for Revegetation

The list of native species to be used for revegetation is included in Table 8. This table also contains information regarding the preferred (or only) type of propagules (i.e., seed, cutting, division) to be collected prior to disturbance. The target collection period may be longer than the actual collection period. Year to year seasonal differences in weather may trigger timing differences in flowering, seed set, and seed maturity in the same species and may require careful monitoring.

7.2.3 Activities Conducted During Remediation

Salvage Vegetated Overburden

Prior to any project activities that will impact Site habitat, the upper 12-inches of clean plant material and soil will be harvested and stockpiled for use in re-establishing plant populations at restoration Sites. This salvaged topsoil and plant material will be stored close to the Site and monitored. This soil will be maintained to prevent wind erosion and to retain soil moisture until redistribution occurs.

In some instances, excess coastal dune scrub vegetated overburden will be generated since sites are being converted from coastal dune scrub habitat to wetland during the restoration process to meet the 4:1 mitigation requirement. This "excess" vegetated overburden will be used at other locations at the Field to restore degraded or disturbed areas.

Salvaged soil materials will be redistributed on the disturbance areas as soon as possible and will not be stored for more than one year. A storage period of over a year for vegetated overburden is longer than optimally desired to ensure the viability of seeds of the native plants and spores of mycorrhizal fungi. There may be a small loss of biological components (microbes, mycorrhizae, seed, etc.) as a result of the long-term storage; however, the value of the vegetated overburden as a source of appropriate organic material will not be completely lost. In particular, some of the seed bank may still be viable.

Protect Sensitive Species

All off-road vehicular and pedestrian use will be confined to designated construction areas and access corridors. Wildlife monitors will be available to remove wildlife from within the Site boundaries or anywhere that such wildlife could be threatened by construction activities.

7.2.4 Restoration Activities after Remediation

Grading and Contouring

The excavation of hydrocarbon-affected soils and removal of sumps will provide the initial lowering of the topographical elevations to accommodate the restoration of wetland habitat. Grading and contouring of disturbed areas will also provide the opportunity to restore and create additional wetland habitat. Returning surface topography to the lowest feasible elevations will assist restoration and creation of wetland habitats, since lowering the surface elevations will bring the ground surface in closer proximity to the water table.

In order to promote the reestablishment of desired wetland and transition habitats where they have been excavated, post-treatment ground elevations will be designed to provide saturated surface soil conditions at the lowest points, surrounded by zones of gradual transition to provide a range of microhabitats that will accommodate the requirements of local wetland plant species/associations. Final elevations will be low enough to provide surface water in the event of foreseeable drought conditions. Final elevations will be determined based on monitoring records of the Site and the observation of groundwater depths during the remediation/restoration process. When feasible, the wetlands will be designed to the elevation of two standard deviations below the average groundwater level at the site.

In order to maximize the lower elevations for wetland restoration and creation, steeper slopes should be created above the wetland zone elevations to tie into the surrounding upland sand dunes. This design concept will mimic existing conditions throughout the Field where the upland sand dunes rise abruptly and steeply from the dune swale areas.

The following discussion provides the conceptual grading and contouring plan for each plant association (see Section 4.3). Target elevation zones for each association are based upon transect data collected by FLx in 2002 at selected reference wetlands. The data collected along each transect included the distribution of plant species and the location of open water zones. Topographical elevations also were surveyed along the same transects. From these data, elevation zones measured above surface water level were identified for dominant plant species (refer to Figure 6) and for assemblages of species corresponding to each plant species association (refer to Figure 7). In each figure, the broad or bold section of the band for each species or association represents the mean range of occurrence of that species or association, and the remainder of the band indicates the total extent of the elevation range from minimum to maximum. The mean ranges provide the primary basis for establishing target hydrogeomorphic zones for each plant species association for wetland restoration and creation (further details regarding transect sampling and data collection are provided in Section 9.1.1).

- **Open Water habitat** will be created at an elevation range that is below two standard deviations below the average groundwater level, where feasible. This zone is likely to be ponded habitat during average rainfall periods. The intention is to ensure ponding during extremes in dry periods of rainfall.

- **Deep Water/Low Elevation Marsh habitat** is an ecotone area that grades between the open water pond into the vegetated dune swale habitat during normal and above average rainfall periods. It will be located at elevations ranging from approximately 1.5 feet below the groundwater level to the groundwater level. This zone will likely experience the greatest amount of both seasonal and yearly variation in hydrologic conditions. Average rainfall periods are anticipated to result in the ponding this zone. Drier rainfall patterns will result in a zone of saturation. It is expected that a fringe of aquatic and emergent wetland vegetation should prevail in this zone.
- **Shallow Water/ High Elevation Marsh habitat** will be located from about half-foot below to about 1-foot above groundwater level. This gradually sloping zone of varied seasonal and yearly saturation will create this habitat zone. Above average to average rainfall periods would result in permanent to seasonal flooding in this zone.
- **Open Wetland Herbaceous habitat** will be created at the upper limits of seasonal saturation. It will be located from about 1-foot above to about 4-feet above the groundwater level. This zone will provide for the greatest diversity in the composition and structure of wetland vegetation. It will be dominated by rhizomatous perennial wetland plant species that also include more facultative plant species. This highly variable inundation/saturation regime is also typical of the habitat of La Graciosa thistle
- **Willow Woodland habitat** on the Field is dominated by arroyo willow, which occurs in areas with variable hydrology. It can be found at areas that are flooded to upland areas. The only factor in the establishment of this association is that willow poles when planted must be in contact with ground water. Arroyo willows have been successfully planted at the Field in areas where the ground surface exceeds 5-feet from the ground water level.
- **Transitional Herbaceous/Scrub habitat** will be created from about 4-feet to about 10-feet above the groundwater level. This zone will be transitional from wetlands a lower topographic levels to upland dune scrub. To maximize lower elevations for wetland habitat, grading will establish an abrupt transition edge to intergrade with steeper upland dune areas.
- **Coastal Scrub habitat** will be created at levels 10-feet or greater than the average high groundwater. This zone will be revegetated with upland coastal dune scrub species.

Replace Vegetated Overburden

Stockpiled vegetated overburden will be incorporated into the topsoil of the area to be restored as needed to implement planned site-specific contouring. The vegetated overburden will create favorable microsites for plant establishment, limit the impact from raindrops striking the soil surface, and protect the soil surface from direct winds. Paddle

scrapers, front-end loaders/dump trucks, or other appropriate equipment will be used to collect and transport the material. Box scrapers, bulldozers, or similar equipment will be used to incorporate the material. Finish grading will result in a textured surface free of large clumps.

Field surveying will be performed to verify adherence to approved post-construction contours (wetlands will be designed to half foot contours). The area surveyed will include the entire limits of work including access corridors, staging areas, overburden storage areas and topsoil storage areas. The County Planning Director or designee will approve the post-construction monitoring report prior to revegetation efforts within the area physically disturbed. This does not preclude early restoration and revegetation activities in portions of the Site not subject to construction activities.

Stabilize Soil Surface

Erosion is not expected to be a significant problem within the restored/created wetland areas due to the gradual nature of changes in planned elevations. The major emphasis for erosion control will be focused on the surrounding dune scrub upland areas designed as slopes. Implementation of the following methods may be employed to minimize erosion and enhance revegetation success in dune scrub areas.

- Disking of the surface of the restoration site perpendicular to the slope will minimize the potential for erosion and sedimentation in low areas.
- Installation of cattle exclusion fencing at the limits of the restoration Site will eliminate a major cause of soil destabilization and promote natural re-establishment of vegetation.
- If necessary, temporary silt fencing can be installed at the base of created upland slopes adjacent to restored/created wetland areas to decrease sedimentation into the dune swale during winter rains.
- To provide additional erosion control on dune slopes, and trap seed and moisture in areas that would normally not provide suitable conditions for germination, plugs of certified "weed free" wheat straw could be spread over the disturbed slopes.
- Installation of fiber rolls or "strawlogs" along contour lines and at the base of the upland slopes will trap sand, seed and moisture, and provide stable planting areas. These 10-inch diameter, 16-foot long rolls are set into 2-4 inch deep trenches and held in place with wooden stakes. Placed at 10-15 foot intervals, these rolls will effectively shorten slope length and limit sheet and rill erosion on site.

The above measures can be used in combination as dictated by on-site circumstances to maximize slope stability and enhance revegetation efforts. Use of roll out netting materials is not recommended due to their ineffectiveness in preventing down slope migration of sandy soils. Application of a thick mulch cover may be more effective than netting, but

would add an unnatural amount of woody debris to the dune scrub habitat, and potentially increase colonization by non-native species.

7.3 Planting Plan

The following sections describe procedures intended to provide suitable plant materials for the re-establishment of native plant species in the dune swale wetland/upland complex impacted by the excavation/remediation effort, and to provide for the long-term persistence of those habitats.

7.3.1 Select Species for Revegetation

The plant material and densities specified in this Plan are intended to provide a starting point to restore plant diversity in the disturbed areas. This approach identifies the plant species that are best suited to the specific conditions at specific Sites and focuses on ensuring the best chance for successful restoration. Planting will occur after the disturbed upland areas have been filled, compacted, and graded to the planned elevations.

The list of native species to be used for revegetation is included in Table 8. The species, collection and planting times, and the quantities to be planted may be adjusted, as necessary, depending on project-specific or environmental constraints. Please refer to the Site-Specific Restoration Plans for actual plant selections (Appendices D to O).

Table 8 also contains information regarding the preferred (or only) type of propagules (i.e., seed, cutting, division) to be collect prior to disturbance. The target collection period may be longer than the actual collection. Year to year seasonal differences in weather may trigger timing differences in flowering, seed set, and seed maturity in the same species and may require careful monitoring. Care will be taken to ensure that qualified collectors are employed to maximize obtaining mature, viable seed.

In many cases, plants will be collected by taking cuttings, divisions or plugs. Many of the plants suggested in this Plan can be propagated by these methods any time of the year. However, the highest proportion of successful collection occurs when plants are not flowering or setting seed.

7.3.2 Guidelines for Plant Salvage from Impacted Sites

As much seed, soil, and plant materials as possible will be collected from the proposed post-remediation wetland Sites. However, if a particular post-remediation Site lacks adequate seed/propagules for the planned restoration, suitable materials can be harvested from similar nearby habitats.

Salvage of plugs, divisions, and uncontaminated topsoil containing useful vegetative material will occur before excavation begins. Salvage by a motorized sod cutter was considered for dune swale plants but due to the unconsolidated nature of the soil substrate,

the vibration and limited cut depth, it is believed that this method would reduce the viability of the salvaged material.

The following sections describe methods that will be implemented while salvaging (transplanting), dividing, and taking cuttings from plants for restoration purposes:

Transplanting/Salvaging

Excavation of and transplanting of plants is a method of salvaging plants before an activity that will result in the removal and destruction of the plants, such as clearing of a Site. This method is generally not recommended because the process of digging up, transporting, and replanting plants, bulbs or rhizomes can impose stress on the plant and cause death. However, in the case where Sites will be cleared and La Graciosa thistles are present, salvaging will be attempted. To avoid the impacts described above the following methodology will be employed.

The soil will be wetted a day or two prior to salvaging to make the plants easier to remove. The soil will be cut with a spading fork or shovel, 6- to 12-inches beyond the perimeter of the plant. Every effort will be made to remove the full extent of the rootball. The plants will be kept out of the sun and wind, and the foliage and roots will be kept damp until taken to the onsite Growing Facility.

Unocal's 2081 Permit allows for the salvage of LGT. Any LGT growing within the disturbance area just prior (approximately 1 month to days before) to the disturbance will be salvaged. LGT will be kept at the Growing Facility until planting at the restoration Sites but for no more than one year. No La Graciosa thistle from separate populations will be stored at the growing facility together, to prevent cross-pollination. LGT from different populations will be stored at least ¼ mile from each other, preferably in the area from where they were collected. If salvaged LGT flower before being planted, seed will be collected from these plants and used for restoration at the site of impact. LGT seedlings may also be propagated from collected seed.

LGT will not be planted at the restoration Sites until winter (January to February) when there is adequate soil moisture. Holes will be dug twice as large as the rootball, and partially backfilled with loose native soil. The soil will be tamped firmly around each plant to a firm hold, eliminating air pockets or voids that contribute to desiccation. A 4-inch high, hand-compacted earth berm will be constructed along the downslope of the planting for a watering basin. Plants will be watered immediately after installation to settle the soil and then as necessary until established.

Divisions

Any plant that forms rooted offsets or natural divisions may be separated and replanted. Dividing is the process of separating a part of a plant from its parent plant, such as the separation of new offshoots, suckers, or tubers from an already established plant or the splitting of a clump of woody or herbaceous plants. Division is generally only feasible for

perennials that grow in clumps with an expanding root mass. Though there are exceptions, fall is usually the best time to divide plants that bloom in spring or early summer, while those that bloom in late summer to fall should be divided in spring. Examples of plants that will be used for restoration in this category include cottonwood, blackberry, spreading rush, clustered field sedge, creeping rush, and salt grass.

Suckering Plants (cottonwoods and blackberry): Division is preferred in fall when the plant becomes dormant. Using a sharp spading fork or shovel, the soil will be cut 6- to 12-inches beyond the perimeter of the sucker plant. All roots will be cut with a saw or hand pruner, depending on the size of the root, to prevent root damage. Procedures for transplanting are the same as above. However, blackberries should be cut back to nearly the ground at transplanting.

Shrubs: Most woody plants, including most flowering shrubs, should be split apart in early spring. Vigorous small to medium-sized shrubs are best for dividing, but sometimes large old shrubs have smaller plants growing around them that can be removed and transplanted.

Before attempting division, the plant will be checked for sufficient roots by carefully digging around the perimeter of the plant. Each division will be large enough so that it has at least one good root, and at least one sturdy branch. A sharp spade or trowel will be used for separating the plant from the parent plant or clippers will be used to separate the smaller pieces and a pruning saw or hatchet to cut apart heavier sections. Procedures for transplanting are the same as above.

Perennial Herbs: Division is the most frequent method of propagating perennials. Early spring is generally the best period to divide all plants except for those that bloom in spring-early summer. From the time the plant starts to show signs of life in early spring until the shoots are 2- or 3-inches tall is the ideal period to split most perennials. However, in fall after the plants have flowered is also an excellent time.

The removing of some plants around the outside with a spade may separate perennial clumps. Each division should have good sprouts and roots on each piece. Small plants are less likely to thrive. If small plants are used, they should be transplanted to a flat or pot and transferred to the growing facility for special treatment for several weeks before transplanting to the Site. If the division is healthy and sturdy, it will be planted immediately at the same depth it was growing before. It will be watered until it becomes well established.

Rhizomatous and Stoloniferous Plants: Rhizomatous plants are those that have a stem that grows laterally at the soil surface, or slightly above or below it, the rhizome produces both roots and shoots at discrete points (i.e., nodes) along the stem. A stolon is similar to a rhizome, but grows at or slightly above the ground surface. Some plants (e.g., *Cynodon dactylon* [Bermuda grass]) have both rhizomes and stolons. Roots grow directly from its underside. The growing point is at one end of the rhizome; additional growing points form along its sides. New plants are produced from the growing points, so a planting that starts

with a single rhizome can spread horizontally into the surrounding surface. Examples of rhizomatous native plants are salt grass, clustered dune sedge and spreading rush.

To divide these plants, sections will be cut that have visible growing points. Tufts will be dug up, separated into individual culms (slender stems), lateral roots trimmed and the top one third of vegetation removed. The divisions will be kept moist until transplanting, which should occur immediately. If it is necessary to hold divisions of any species, they will be heeled in a protected location on site. Heeling in is a means of preventing roots from drying out. The simplest approach is to dig a shallow trench, lay the plant on its side so that its roots are in the trench, and then cover the roots with soil, sawdust, or another material, moistened to keep the roots damp. Procedures for transplanting are the same as above.

Cuttings

Propagation by cuttings is one of the most successful and common methods for salvaging plants. Plants propagated by rooting cuttings reach maturity faster than they do from seed. Cuttings are also the only way to increase stocks of plants that may not reproduce desired quantities from seeds. Stem cuttings are of three types; softwood, semi-hardwood and hardwood — depending on the maturity of the cutting material. Herbaceous plants can also be induced to root under the right conditions if cuttings are taken at the correct time of year, which varies with each plant.

Rooting of semi-woody softwood or herbaceous materials is usually faster and more successful than for woody plants. Semi-woody cuttings are pieces of new growth snipped from plants in early spring before the growth has started to harden. In some plants semi-hardened cuttings are taken from those same plants later in the summer, after the wood has hardened slightly. Hardwood cuttings are taken when the wood is dormant. Some plants also will reproduce readily from small pieces of roots that are cut from the parent and planted in early spring, referred to as root cuttings.

When taking cuttings, an equal number of cuttings will be taken from as many donor plants as possible in order to increase the genetic expression of the population. When taking semi-woody or herbaceous materials, it is important to take the cutting after a rain or a few hours after the plant has been well watered so it will be in a turgid condition. Cuttings should be made from unflowered, vigorous, healthy tips. Cuttings should be taken at an angle, rather than straight across to allow more surface area for rooting. With herbs, the cuttings may be taken anywhere there are sprouts long enough to be removed without harming the plants. Herbaceous cuttings may be of various lengths, but are usually from 3- to 6-inches long. Cuttings will be kept moist until taken to the Growing Facility for processing. Once cuttings are taken to the Growing Facility, they will be treated with a rooting hormone and grown in a perlite and peat moss growing medium, under a mist-system in the propagation house.

The procedure for rooting semi-hardwood and hardwood is the same as above, except for the time at which the cuttings are taken. Semi-hardwood cuttings are taken later in the

growing season, usually in summer or early autumn after the new growth has partly matured. Hardwood cuttings are taken when the wood is dormant. Cuttings should be taken only from healthy wood that grew the previous summer. Cutting should be taken on a slant above a node (growing points) and kept damp until processing.

Willow is a common hardwood cutting. Willow cuttings are preferably taken while the plants are dormant, generally December through February. However, when necessary, willows can be cut in the spring of the year, preferably after flowering. To prevent damage to the parent plant, cuts should be made slightly above a lateral growth bud. Cutting should be taken with sharp pruning shears or saw, without causing injury to the bark. The diameter of cuttings should be not less than ½-inch or more than 1½-inch. The length of cutting for rooting will be a minimum of 12-inches. However, if the cuttings are for poles that will be planted directly, cuttings should be at least 60-inches long. Side branches from the cuttings will be removed with a sharp pruning shears, flush with the pole cutting, without causing injury to the buds. Pole cuttings should be kept moist by covering them with moist fabric during transport. Cuttings may be stored in containers of water, but water should be changed daily. They also may be stored, wrapped in wet burlap or other materials, under refrigeration at 32-45°F until planting.

7.3.3 Guidelines for Collecting Seed Stocks On-Site

Seed collection will be emphasized within the project disturbance footprint and augmented from other sources within the Field as needed. Seeds will be collected by a seed collector/supplier with experience in site-specific, native seed collections. To ensure natural genetic variability and protection of donor plants, a minimum of three distinct areas will be used for seed collection of each species. The seed collector will obtain similar amounts of seed from each collection site. Collection areas and approximate quantities obtained from each site should be noted and mapped by the seed collector. Seeds should be collected so that donor plants are not degraded by the collection methods. Seed collection will not remove more than 10 percent of the seed present on each donor plant. Daily seed collection will be removed from the area, dried, and stored in a cool, dry place free of rodents. Seeds will be cleaned to a grade normally acceptable in the seed trade, with all sticks and large plant parts removed.

7.3.4 Planting Guidelines

Planting will be initiated in early winter (November or December) following the first heavy rains. If this is not feasible, later in the winter (January or February) is acceptable.

The installation of dune swale/wetland plant materials will be done as specified below. The process involves: (1) excavation of the planting hole; (2) filling each hole with water prior to planting; (3) backfilling excavated holes with native soil to the specified depth; and (4) filling again with water to eliminate air pockets and compact soil around roots.

Transplants and Divisions

- All planting holes will be dug to equal the depth and 1-1/2 times the width of the rootball or rhizome.
- Unamended soil will be well firmed around the root area and then watered.
- Each plant will be planted in the center of the pit, and backfilled with native material. Rootballs or rhizomes should not be disturbed when planting.
- Planting of plugs can be accomplished by using a dibble stick to create holes with similar dimensions, keeping the hole to the same length of the plug. If the soil is not moist, add about one cup of water can be added to each hole before planting. The soil should be returned gently to each hole and firmly tamp to settle the plant in contact with the soil while also creating a water retaining berm.

Seeding

Seeds will be hand-broadcast preferably in November or December after the first rains, when the soil surface is damp. All bare areas will be seeded after the planting of container stock plants and willow/cottonwood cuttings. Bare areas will be raked and seed broadcast onto the tilled soil. The seeds will then be gently raked into the top half-inch of soil to ensure good seed-to-soil contact and a good seedbank. The areas will be completed with a light watering to compact the soil.

7.4 Irrigation Plan

Supplemental water will be supplied during the initial installation and establishment period, as needed. However, irrigation is not planned as a regular maintenance activity. If precipitation levels are below normal and there is a significant loss of plants, irrigation will be provided as part of a contingency plan (see Section 8.1.1).

During the first several months of establishment, water trucks will be employed if plants show stress after a period of drought or high temperatures. The rate of irrigation will be monitored to ensure even soaking with little or no runoff. Irrigation will cease once the plants are self-sustaining.

7.5 As-Built Conditions

Unocal will submit a report to the ACOE, County Planning Director, and Executive Director of the CCC within 60-days of completion of Site activities, describing as-built status of each wetland restoration Site. Separate reports for grading, planting work and erosion control will be submitted if not completed within six weeks of each other.

These reports will provide topographic maps showing as-built contours of mitigation areas and will indicate location of plantings and any other installations or structures. Changes from the original plans will be indicated in red ink. Significant changes will be coordinated with the RWG and be approved by ACOE and Responsible Agencies prior to implementation.

8.0 MAINTENANCE DURING MONITORING PERIOD

8.1 Maintenance Activities

Maintenance during the establishment and monitoring periods is necessary to ensure success of the restoration activities. The maintenance program will ensure that the basic functions necessary for success, including watering of installed plants, weed control, replanting/seeding, erosion control, plant protection, pest control, and Site protection are performed adequately. Other maintenance measures may be conducted if determined necessary by monitoring. Weed control can be anticipated to occur throughout the establishment and maintenance period.

Maintenance will be conducted until the success criteria are met and the created dune swale/wetland and coastal dune scrub habitats have demonstrated a self-sustaining trend without requiring significant maintenance measures. The maintenance period will begin immediately upon completion of the restoration specifications, and will continue for ten years, or until the success criteria have been satisfied. This maintenance period will coincide with the established monitoring program as described in Section 9. At the end of the maintenance/monitoring period, the regulatory resource agencies will review the monitoring reports, evaluate whether the success criteria have been met, and determine whether the establishment maintenance period will be ended or extended.

8.1.1 Irrigation

Supplemental irrigation will only be used if precipitation levels are below normal and there is a significant loss of plants. If supplemental irrigation becomes necessary, it will be used only to augment the natural occurrence of precipitation so that the plants have available soil moisture to become established. Irrigation may occur in the fall, winter and spring seasons when moisture is normally available under natural conditions but summer irrigation will be considered carefully. Irrigation during the summer can have detrimental effects on some native plants, resulting in root rot. However if plants have not established an adequate root system before summer, irrigation may be needed during the summer months if the weather is particularly hot and dry.

If irrigation is needed, two methods are proposed: drip irrigation and water trucks. Drip irrigation is possible if prolonged drought conditions warrant this effort, but it will not be implemented unless necessary for the success for the restoration. Water trucks will be employed if plants show stress after a period of drought or high temperatures. The rate of irrigation will be monitored to ensure even soaking with little or no runoff. Irrigation will cease once the plants are self-sustaining.

8.1.2 Weed Control

Ongoing weed control will be needed because non-native plants compete with desired native plants for space, soil moisture, nutrients, and sunlight. Invasive non-native plant

species that occur, or have the potential to occur at the Field include: veldt grass, hoary cress, iceplant, bull thistle, slender leafed iceplant, poison hemlock, Harding grass and Cape-ivy. Other non-native species that occur at the Field include birdsfoot trefoil, riggut brome, red brome, Italian rye, and rabbitfoot grass. Although it may be impossible to eliminate all these species completely, control measures will be implemented to reduce their presence and cover, and to prevent their spread into new areas.

Non-native species will be removed through manual techniques or selective herbicide application on a regular basis to ensure successful establishment of the native plants. Weeds will be killed or removed before they set seed and before they grow higher than the adjacent native plantings. Any seed heads will be removed at the time of weeding, by carefully clipping and removing or bagging seed heads and disposing of off-site. Annual grasses will be controlled using manual methods wherever possible. If invasive species such as veldt grass cannot be controlled manually, herbicides may be used under the direction of the Onsite Environmental Coordinator.

There will be an aggressive treatment of birdsfoot trefoil early in the restoration effort, before it becomes established and individual plants can be eradicated by hand removal. Chemical treatment may also be possible during the early stages of establishment, when birdsfoot trefoil is not intertwined with other native species. However, most chemical treatments recommended above should not be used in wetland areas where contamination of water is possible and there is potential exposure to sensitive species (i.e. California red-legged frogs or La Graciosa thistle).

Data will continue to be collected on birdsfoot trefoil in both the reference and post-remediation, created, and restored wetland sites to determine if it is preventing the establishment of native plants (in restoration sites) or becoming more abundant (in reference sites). If it appears to be causing a problem, then Unocal may implement small scale field experiments to test potential eradication measures.

8.1.3 Debris Removal

The presence of trash and litter is not anticipated to be a problem due to the restricted access and isolated location of the mitigation sites. Non-fruiting organic debris created from the hand removal of weeds may be left on-site if the Onsite Environmental Coordinator determines that it will not significantly impact the establishment of native seedlings. However, noxious weed debris will be disposed of off-site to avoid further invasion of undesirable invasive non-native seed or propagules.

8.1.4 Replanting

The establishing plant cover at each Site will be regularly examined and monitored to determine if adjustments to the revegetated species are necessary. These adjustments may include additional planting of one or more species that may not be establishing at the desired densities. Species will be consistent with those in the plant palette of the

restoration program. Inspections will be made at regular intervals after any replanting.

8.1.5 Plant Protection

Plants may need protection from herbivores, such as deer, rabbits or cattle. Installation of cattle exclusion fencing at the limits of the restoration Site will eliminate a major cause of impacts to plants, but plant shelters may be needed if impacts from deer or rodents become significant.

8.1.6 Erosion Control

All restoration Sites will be monitored for water erosion with weekly inspections during the rainy season (October 1 to April 1). Erosion monitoring would also occur during and after significant storm events. "During" is defined as within 24-hours of a storm of 0.25-inches or more. Damage or deficiencies will be corrected as soon as practicable after the inspection.

8.2 Long Term Management

The Field is under the ownership and management of Unocal. Pursuant to County CDP/DP Condition F110, Unocal must dedicate an "...open space, habitat protection and public access easement for the purpose of visual resource protection, habitat protection and managed public access to the Guadalupe Dunes..." or grant fee title of the Field to a public agency or private not profit association for the purpose described in Condition F110.

The wetland restoration and mitigation Sites will be under the management of Unocal until success criteria are met. After success criteria are met, it will remain under the management of Unocal until another party has responsibility for the Field.

9.0 MONITORING PLAN

9.1 Background

The project goals and objectives provide the basis for the success criteria for this Plan. The success criteria were not derived from industry standards or permit conditions but have been derived in cooperation with the RWG and established based upon Field reference standards and existing conditions at the restoration Sites.

In accordance with the CDP/DP, impacted wetlands meeting state delineation requirements shall require a 4:1 mitigation ratio. In past actions, the oversight agencies have shown a preference for on-site and in-kind mitigation. Unocal and the RWG considered the definition in the context of the Guadalupe dune system. The wetland vegetation assessment, described below, determined that there are five wetland plant species associations that may occur along the moisture gradient at wetlands (described in Section 4.3). However, at the Field it is not feasible or desirable to restrict wetland mitigation to particular species associations. Certain associations provide habitat for sensitive species

such as the California red-legged frog and the La Graciosa thistle, and there is an interest in expanding habitat for these species. Furthermore, the wetland vegetation associations can vary seasonally or annually with fluctuations in water levels. Therefore, success criteria were developed to take these seasonal and annual variations into account "In-kind" is defined in this Plan as referring to the type of wetland (i.e. dune swale) rather than a particular plant species association. Flexibility has been allowed to create or expand wetlands with a variety of vegetation types, as long as there is a balance that reflects the conditions on the site. However, it will be necessary for each restoration Site to succeed in order for the overall goals and objectives of this Plan to be achieved.

9.1.1 Development of Wetland Botanical Success Criteria

Reference sites were selected based on an evaluation of the physical, chemical and biological attributes that would help to determine the success of meeting the goals and objectives for the restoration, creation and enhancement of dune swale wetland/upland habitats impacted by the remediation activities.

There are approximately 25 dune swale complexes at the Field. For the selection of reference sites a total of 60 wetlands in these dune swale complexes were examined and 15 of these wetlands were selected for detailed analysis. These reference sites were selected on the basis of a number of characteristics, including size, hydrology, proximity to restoration Sites, presence of CRLF or LGT, and the number of plant associations found at each site.

For the collection of quantitative data, vegetation plots were established in the 15 representative wetlands such that 30 plots were distributed in each plant association (not per wetland). These wetland plant associations include: deep water/low elevation marsh, shallow water/high elevation marsh, open wetland herbaceous, transitional herbaceous/scrub and willow woodland; and are described in Section 4.3. The number of plots per wetland varied based on the area covered by each plant association present in the wetland (and correspondingly to the size of the wetland). Plots were located using a stratified random sampling design. Plots were circular and each plot measured 5 square meters in area (i.e., 1.26 meter radius). The vegetation data collected from each plot included a visual estimate of percent cover for each plant species present in the plot, and a visual estimate of cover by layer for different vegetation layers. Appendix A provides a summary of the data collected from the reference wetlands.

From the individual species cover data, measures of plant species richness, absolute cover, and species frequency or composition for each association were calculated. Specifically, for the purpose of developing success criteria, richness and cover were calculated by wetland association for the plant categories of native perennials, non-native invasive species, and non-natives excluding invasives. These parameters were calculated for all wetlands together by deriving the 95 percent confidence interval of the mean value. In addition, for individual wetlands, means were calculated for each association present at that wetland represented by three or more sample plots.

One transect was placed in each representative wetland for the purposes of creating a topographic profile of the wetland and portraying plant species distributions along the profile. The overall transect placement was not random, but the exact location of the endpoints of the transect was randomized. The transect was located to cross the lowest (i.e., deepest) part of the wetland, and to cross as many plant associations present as possible. Topographical elevation measurements were taken typically at 1-meter intervals. The beginning elevation was estimated from existing topographic maps. The transect endpoints included the upper levels of the wetland plant associations, but generally did not extend into upland habitats. Species cover data using the line-intercept method were collected along the transect line.

Since the data collected from the reference wetland plots in 2002 were used to develop vegetation success criteria (see Section 9.2), and since some of the wetlands occurred in contaminated areas, there was a concern that the reference wetland data may not be representative of natural or uncontaminated conditions at the Field. The use of data from sites affected by contamination would not be appropriate for establishing success criteria. To explore this question, statistical and graphical methods were employed, as well as a GIS mapping analysis.

Of the 15 sampled wetlands, four were in contaminated areas targeted for remediation in certain portions of those wetlands. The four wetlands are B Pond, B2-3W1, D14, and M12W1. Plant species cover data from all 15 wetlands were examined to discover if the data from the four affected wetlands were notably different from the other 11 wetlands. The statistical techniques of nonmetric multi-dimensional scaling (MDS) and cluster analysis were used. Results from the MDS yielded a two-dimensional graphical configuration of the 15 wetlands based on the similarity of species cover among the wetlands. Results from the complete link cluster analysis then were embedded upon the MDS configuration (refer to Figure 8). The resulting graphical display shows that the four wetlands in question did not form a separate group that was distinctly dissimilar from the remaining 11 wetlands. It appears that the main or first dimension discernible from the data structure for the 15 wetlands may be interpretable as a moisture or wetness factor.

Further confirmation of the lack of effect of contamination on the species cover data collected from plots in the 15 wetlands was provided visually by the GIS data from the Field. Maps were generated that showed the location of the sampling plots, as well as the transects, relative to hydrocarbon sources (refer to Figure 9). Figure 9 shows that none of the reference wetland plots were located within areas of contamination.

Therefore, based on the statistical and GIS analyses, it was concluded that the selected reference wetlands would be suitable representative wetlands for developing success criteria for future comparison with post-remediation, created, and/or restored wetland Sites.

9.1.2 Development of Coastal Dune Scrub Success Criteria

Data were collected from 10 reference sites in "good" quality habitat (i.e., did not have evidence of disturbance and had low cover of weedy species) and analyzed to develop

performance criteria that could be applied to the restoration Sites. Analyses indicate that the point intercept method with 50 points in 100-meters was an efficient technique for measuring percent cover of native perennial vegetation in large areas. An analysis to determine the number of transects required to achieve a desired level of confidence in the mean gave a result of 17 transects to obtain a mean value for native perennial plant cover in the reference areas with a 95% confidence interval of +/- 5% of the mean.

Two transects were established at each reference area for a total of 20 transects. The methodology for point intercept sampling follows the field sampling protocol given by the California Native Plant Society (Sawyer and Keeler-Wolf, 1995). Points were sampled at 2-meter intervals (starting at 2-meters and ending at 100-meters) using a 1-meter long measuring rod placed at each sampling point. Each species intercepted by the point was recorded, providing a tally of hits for each species.

Furthermore, a belt was also established along the transect edge of 1-meter width (100-meters by 1-meter). All perennial species and identifiable annual species that were rooted within the designated belt were recorded.

The coastal scrub data from the reference sites included absolute vegetative cover (native perennial and native annual), dominant plant species, species richness, percent bare ground, and percent cover by non-native species.

9.1.3 Development of Wildlife Success Criteria

Resource agencies, including the CDFG and the ACOE require that the restoration plan ensure the reestablishment of any functions or values that were affected by remediation activities. Wetland "Functions" have been defined as the physical, chemical, and biological processes of a wetland. A wetland's "Value" has been defined as those wetland attributes that are valuable to society.

Most of the functions and values, as they relate to wildlife, are difficult to quantify or even verify their presence or absence. Relying exclusively on observations of wildlife at a site could be an unreliable measure of habitat value due to many species' mobility, the difficulty in locating some species, and the normal seasonal and annual fluctuations in population sizes.

All of the potential functions or values associated with each of the five wetland vegetation associations present in the Field (deep water/low elevation marsh, shallow water/high elevation marsh, open herbaceous, transitional herb/scrub, and willow woodland) and open water were assessed through detailed analysis of the wetlands in the Field (Table 9). This analysis was performed to correlate the various wetland plant associations with specific functions and values and related wildlife habitat elements as described below. Site-specific success in terms of wildlife resources will be measured by how well the functions and values of a particular wetland vegetation association are restored. Success will not necessarily depend on restoring those functions and values that were previously recorded as being present at the site prior to disturbance. The rationale of using wetland vegetation

association based success criteria, as opposed to the site-specific criteria, is that the functions and values at a particular site are known to change seasonally and annually. As apparent during 2003 and 2004, many of the existing wetlands on the field changed dramatically with regard to the presence of open water compared to recent years. Water levels and open water habitat have disappeared in several of the wetlands known to have supported wetter conditions a few years ago. Basing the baseline or pre-disturbance functions and values of a site using conditions existing at a single point in time could be misleading. Functions and values are expected to change from year to year at a site; therefore, using an established list of functions and values that are set and are expected at each of the wetland vegetation associations will avoid the confusion with specific wetlands having a wide range of "baseline" information.

The RWG has determined that wildlife success criteria shall include site-specific wildlife criteria based upon the presence of functions and values expected to be present in that specific wetland plant association and Field-wide criteria to ensure that the wildlife functions and values are "restored" at the same number of wetland Sites as were present prior to remediation activities. Similarly, Threatened and Endangered species (i.e., specifically LGT and CRLF's) must be present at the same number of wetlands as they were prior to remediation activities.

Wildlife Habitat Elements

Many of the wildlife functions and values of a particular site will be replaced simply by restoring the vegetative cover and key habitat elements such as open water. Demonstrating that the success criteria for wetland vegetation associations at a site have been met will also aid in proving success of restoring functions and values as they relate to wildlife use at that site. However, there are several other elements in addition to vegetative cover that are essential to proving that a post-remediated, restored or created wetland site is providing the adequate wildlife functions and values. The wildlife success criteria will employ the use of "habitat elements" to determine whether the essential wildlife functions and values are restored. Habitat elements are defined as those physical characteristics expected at specific wetland vegetation associations that are essential to a particular wildlife function or value.

A Wildlife Functions and Habitat Elements Matrix (Table 10) has been developed that relates the wetland vegetation associations to the wildlife elements and the wildlife functions and values. This matrix will be used to document the baseline functions and values present at each wetland site prior to remediation activities and to record and to record the presence of functions and values (i.e., wildlife habitat elements) during restoration monitoring.

Wildlife Functions and Habitat Elements Matrix

The *Post Restoration Wildlife Functions and Habitat Elements Matrix* (Table 10) is used to identify those Wildlife Functions and related Wildlife Habitat Elements that are expected to be replaced at a specific wetland based upon the Wetland Plant Association(s) to be

restored at the Site. This guide will assist in the interpretation of the information presented in the Matrix.

Each Wetland Plant Association has certain Wildlife Functions that are associated with it. Each Wildlife Function needs a suite of *essential* and *beneficial* Wildlife Habitat Elements to be present in order for that Wildlife Function to be performing. A Wetland Plant Association that is restored to a site will have Wildlife Functions that could be provided by that type of habitat (i.e., the Open Wetland Herbaceous Wetland Plant Association could provide the Wildlife Function of raptor/owl hunting). For the Wildlife Function to be performing, certain Wildlife Habitat Elements need to be present in a blend (i.e., for raptor/owl hunting there needs to a mixture of vegetation habitat elements, geologic habitat elements, and animal diet elements).

The Site name and Wetland Plant Associations/habitats to be restored are identified in the upper left hand corner of the Matrix. Columns at the top of the Matrix represent all potential Wildlife Functions that could be provided by wetlands located at the Field. Rows along the left side of the Matrix represent all the potential Wildlife Habitat Elements that could be present at a wetland. The Habitat Elements are grouped into seven categories:

- Vegetation Layers
- Vegetation Characteristics
- Geologic Elements
- Aquatic Elements
- Animal Diet Elements
- Plant Diet Elements
- Miscellaneous Elements

Columns highlighted in blue on the Post Restoration Wildlife Functions and Habitat Elements Matrix are Wildlife Functions that are expected to be replaced or restored at the Site. Wildlife Habitat Elements that are bolded in the left-hand side of the Post-Restoration Wildlife Functions and Habitat Elements Matrix are those that are expected to be replaced or restored that the Site.

Boxes in the Post Restoration Wildlife Functions and Habitat Elements Matrix highlighted in green indicate a *beneficial* element and/or habitat for a given Wildlife Function. Boxes highlighted in pink indicate an *essential* element and/or habitat for a given Wildlife Function. These *essential* elements must be present for the corresponding Wildlife Function to occur at the site. In addition, certain Wildlife Habitat Element group headings are highlighted in pink. This indicates that two or more of the Wildlife Habitat Elements listed under that group heading are *essential* to the Wildlife Function in that column.

As an example, in the *D-14 Post Restoration Wildlife Functions and Habitat Elements Matrix*, Shallow Water/High Elevation Marsh, Open Wetland Herbaceous, and Transitional Herb Scrub are the Wetland Plant Associations being restored to the Site. Some of the Wildlife Functions these Wetland Plant Associations support include: amphibian cover, amphibian foraging, tree frog and toad breeding, lizards, etc. For these Wildlife Functions to be successfully restored to the Site, some of the Wildlife Habitat Elements that should be

present include: shrubs, tall herbaceous plants, short herbaceous plants, duff/litter, small mammal burrows, terrestrial invertebrates, etc. Specifically, for the tree frog and toad breeding Wildlife Function to be successfully restored to the Site, it must possess algae diet elements (i.e., an *essential* Wildlife Habitat Element as indicated by the pink box), a mixture of tall emergent, short emergent, floating mat and/or submerged aquatic vegetation elements (i.e., *beneficial* Wildlife Habitat Elements as indicated by the green boxes), and any two of the four aquatic elements; open water, permanent surface water, long term seasonal surface water, or short term seasonal surface water (i.e., 50 percent of the *beneficial* Wildlife Habitat Elements as indicated by the pink "Aquatic Element" box).

9.2 Final Success Criteria

9.2.1 Wetland and Coastal Dune Scrub Habitat Success Criteria

The following provides general success criteria that have been developed for application to specific habitats within the project Sites. Specific success criteria for each restoration Site are provided in the restoration plan templates located in Appendices D to O.

Wetland Mitigation Ratios

- All federally delineated wetlands that are impacted will be mitigated by a 1:1 replacement ratio and these restored wetlands must meet the ACOE wetlands delineation criteria by the end of restoration.
- All State delineated wetlands that are impacted will be mitigated by a 4:1 replacement ratio.

Wetland Hydrogeomorphology

- Remediated, restored or created wetlands will have a topographic profile similar to impacted areas (to the extent feasible).
- For created sites, the topographic profile will include the hydrogeomorphic zones appropriate to the site and appropriate to the wetland plant species associations being created.

Erosion Control and Soil Stabilization

- Topsoil at the wetland restoration Sites will be stable and not subject to water and wind erosion. No gulying, washouts or blowouts should persist.
- All erosion control and soil stabilization treatments should be effective until revegetation results in adequate protective cover.

Non-Native Invasive Species Control

- The target richness of non-native invasive species and, and consequently the target percent of absolute cover composed of non-native invasive species within wetland areas will be zero (refer to Table 11).
- For surrounding or adjacent Coastal Scrub areas, the target for the combined cover of non-native, invasive and non-native, excluding invasive introduced species will be zero during the monitoring and maintenance period.

Revegetation

Wetland Plant Species Associations

There will be two levels of success criteria: 1) overall criteria for all restored Sites at the Field considered together, and 2) separate criteria for each restored Site by itself. Quantitative vegetation success criteria for the parameters of species richness, cover, and frequency have been developed for each wetland plant species association for the categories of native perennials and non-natives excluding invasives. These criteria are provided in Table 11 and are described below.

- Number of associations: Field-wide, 75 percent of the created or restored wetland sites must have three or more of the five plant species associations observed at the Field's wetlands. Each created or restored wetland should have at least two wetland associations (except where physical/size constraints prevent this).
- Native perennials: Field-wide, for each association, the mean richness of native perennials and the percent of absolute cover composed of native perennials must fall within the 95 percent confidence interval derived from the reference wetlands. For each individual created or restored wetland, mean richness and cover values must fall within the range of means for that association in the reference wetlands.
- Non-natives excluding invasives: Field-wide, for each association, the mean richness of non-natives excluding invasives and the percent of absolute cover composed of non-natives excluding invasives must fall below the upper bound of the 95 percent confidence interval derived from the reference wetlands. For each individual created or restored wetland, mean richness and cover values must fall below the upper limit of the range of means for that association in the reference wetlands.
- Species frequency: Field-wide, for each association as listed in Table 11, the designated subset(s) of species must be present at the minimum percent frequency value(s) listed. In addition, for each individual created or restored wetland, the criteria require that the designated subset of species listed must be present.

Upland / Coastal Scrub

- The cover of native perennial vegetation should be approximately 45 percent, which is the mean of the reference site values. The data collected from the restoration Site will be compared with the reference site using a standard t-test with alpha set at 0.2 (or 20 percent) and beta set at 0.05 (or five percent). This would result in an up to 20 percent chance of concluding that a Site has not met the success criteria when in fact it has; and a five percent chance of concluding that a Site has met the success criteria when in fact it has not.
- At least 15 native perennial species need to be present on the Site (additional species may show up in the species count data [visual survey or belt method], but may not be in the point-intercept data). At least five species need to have 50 percent or better frequency of occurrence on transects, indicating the species are well distributed over the restoration Site.
- The top four dominant species of coastal dune scrub on the reference sites (*Ericameria ericoides*, *Eriogonum parvifolium*, *Lessingia filaginifolia*, and *Seneclo blochmaniae*) need to contribute 20 percent or more of the total cover (any combination of the four species). In the reference data, these four species had a combined average cover of 28.9 percent and greater than 50 percent frequency. (Note: If the criterion includes the top 5 species, the next species on the list, *Melica imperfecta* had 2.6 percent average cover and 65 percent frequency).
- Bare areas (with no vegetative cover) should not extend across a continuous distance of more than 6-meters along the transect line.

Wetland Buffer Area

The following provides success criteria for buffer areas to wetland restoration sites (includes post-remediation, restored or created wetlands). The buffer area is a 100-foot zone outside of wetland restoration boundaries and is a requirement of CAO condition 67.d. This buffer area may include wetland habitats as well as upland habitats in various stages of development or habitat quality. The purpose of the requirement is to ensure that habitat surrounding wetland restoration sites will be of good quality and not negatively affect the restoration efforts.

- Erosion Control and Soil Stabilization: Topsoil within the buffer areas should be stable and not subject to water and wind erosion. No gulying or blowouts should exist that may impact the wetland restoration site or adjacent wetland areas.
- Non-Native Plant Species Control: The combined cover of invasive, non-native plant species should remain less than 5 percent. The combined cover of non-invasive, non-native plant species, excluding birdsfoot trefoil (*Lotus corniculatus*), should remain less than 20 percent during the monitoring period.

Birdsfoot trefoil is a non-native plant species that is common to the Open Wetland Herbaceous and Transitional Herbaceous Scrub plant species associations at the

Field. Birdsfoot trefoil is a naturalized species to the Guadalupe Nipomo Dunes and there is no known effective and environmentally sensitive method for control. Unocal will continue to collect data on this species in both the reference and restoration/mitigation sites to determine if it is preventing the establishment of native plants (in restoration sites) or becoming more abundant (in reference sites). If it appears to be an increasing problem, Unocal may conduct small scale, experiments for eradication and control of this species.

- **Revegetation:** The total cover in the buffer area should be comparable to similar, undisturbed plant species associations at the Field. Each plant species association in the buffer area should have at least 4 species from Table 12 (Buffer Area Species Mix), with the exception of the deep water / low elevation marsh. The deep water / low elevations plant species association should have a species richness of at least 2.

La Graciosa Thistle

Separate success criteria for La Graciosa thistle were developed by the CDFG in the Incidental Take Permit for this Project. These are:

- **Intermediate Success Criteria**
Intermediate success criteria have been established to function as thresholds for remedial activities. These intermediate guidelines are based on qualitative measures and not specific quantitative values.

The intermediate success criteria include:

- No weed interference with establishment of the La Graciosa thistle.
 - The growth, vigor and establishment of seedlings or transplant plants is comparable with naturally occurring populations
 - The survival of the initial generation of seedlings or transplant plants is comparable with naturally occurring populations
 - Additional qualitative measures determined by experience
- **Final Success Criteria**
 - Two plants for each impacted thistle documented to survive, flower, and set seed;
 - Second generation of seedlings established without management intervention (planting, watering, weeding, etc.)
 - Recruitment of newly established population is within 20% of natural population
 - No overall decline in existing population due to mitigation activities.

In addition to these criteria for LGT, Unocal is also required to have LGT present at the same number of wetlands as was present prior to remediation activities.

Reconsideration of Success Criteria

If a Site meets all of the criteria described above, the restoration can be considered successful and accepted by the appropriate agencies. When it is decided that the restoration has progressed to a point that success criteria are likely met, data will be collected from the restoration Site(s) and compared to the previously set success criteria. If a Site looks reasonably good in comparison to reference sites but data analysis results do not meet all of the criteria or if a site meets all criteria but the associated buffer area does not, Unocal can request (in writing) that the oversight agencies (SLO County, CCC, CDFG and FWS, as appropriate) reconsider the success criteria for the restoration Sites.

The oversight parties will then reconvene to:

- a) Determine if the failure to meet criteria is due to intrinsic characteristics of the Site (i.e., soil conditions, topography, location, etc.), which cause the Site to be different from the reference sites such that the success criteria cannot be met. In this case, if the Site generally appears to meet the goals of the restoration, agencies may authorize an exception.
- b) Determine if the failure to meet criteria is an artifact of the sampling methodology. For example, the Site visually appears to meet the goals of the restoration but it is not demonstrated in the results of data analysis. In this case, additional data or evidence of success would be considered.
- c) Determine if the failure to meet criteria is a result of deficiencies in the restoration effort, in which case remedial measures to be implemented by Unocal will be identified.

There will be no partial acceptance for restoration areas. If a restoration Site includes a mix of habitat types, as is likely for areas involving wetland or swale habitats, the Site will only be considered successful when all the habitats met the established criteria.

9.2.2 Success Criteria for Wildlife

Site-Specific Wildlife Success Criteria

Each site specific plan will identify the wetland vegetation associations planned for the Site. This will, in turn, be used to generate a target list of wildlife function or values for the Site. To meet the site-specific success criteria for wildlife a Site must possess all of the functions and values associated with the wetland vegetation association as measured by the presence of the essential wildlife habitat elements as shown on the Wildlife Functions and Habitat Elements Matrix (Appendix B).

If a specific function or value has been recorded as being present at a restored, created or remediated site but not all of the associated habitat elements are present, it will be concluded that the function or value has been replaced at the site and restoring the missing elements will not be required. For example, one of the functions of a site may be that it provides foraging for dabbling ducks. The associated habitat elements would include floating and submerged aquatic vegetation and emergent vegetation for cover. If dabbling ducks are recorded foraging at the site, even though there are only some of the elements previously identified as being essential for replacing this function, the function will be considered successfully restored.

To be successful in meeting the site-specific wildlife success criteria, a Site must possess either (a) documented presence for two years of 100% of the wildlife habitat elements identified as being essential and 50% of those elements identified as being beneficial or (b) documented presence for two years of the actual function or value.

Field-wide Wildlife Success Criteria

The site-specific vegetative success criteria require that each of the remediated, restored or created wetlands will contain at least two of the five wetland vegetation associations. Also, the Field-wide vegetative success criteria require that at least 75 percent of these wetlands must contain at least three community types to be considered successful. These standards will ensure that the wildlife functions and values for a minimum of three community types will be restored at each post-remediated, created or restored wetland site.

There is a slight chance that all of the remediated, created or restored wetlands could contain the same three community types (which would still be considered a success using the site-specific vegetation criteria). If all of the post-remediated, created, or restored wetlands supported the same three community types, this would virtually eliminate the other three potential community types at the created wetlands on the field. However, the wildlife success criteria require that all of the functions and values that were impacted during remediation activities must be replaced. Although the goal of the restoration efforts is to replace the functions and values at the designated wetland, those functions and values can be replaced at restoration sites elsewhere on the field. Therefore, restoration will not be considered successful in terms of wildlife use until all of the functions and values have been replaced in the same number of wetlands as pre-disturbance conditions.

Threatened and Endangered Species Criteria

Several functions and values are associated with two endangered or threatened sensitive species (California red-legged frog and La Graciosa thistle) and include a spatial distribution that may be critical for the species' survival. Therefore, prior to disturbance the number of wetlands that would be affected by remediation activities in which La Graciosa thistle or red-legged frogs are known to occur will be quantified (refer to Figure 10). Restoration will not be complete until the functions and values associated with La Graciosa thistle or California red-legged frogs are restored at the same number of wetlands that were disturbed, preferably at the same sites.

9.3 Monitoring Methods

9.3.1 Botanical Monitoring Methods

Restoration Monitoring

Vegetation monitoring will be carried out at the restored wetlands periodically, and will consist of interim monitoring, as well as final monitoring of the Sites. The purpose of interim monitoring is to document the establishment of native vegetation, track the longer-term development of target native plant associations in the restored wetlands, and identify areas that may need maintenance or further revegetation. The purpose of final monitoring is to determine whether vegetation success criteria have been met.

Monitoring will consist of qualitative and quantitative evaluations of vegetation development over a period of up to ten years. The success criteria will not be considered to have been met until all maintenance activities other than weed control have ceased at the restored Sites for a minimum period of two years. If the criteria are not met after two years of no maintenance, remedial actions will be taken and monitoring will be extended as necessary to meet the success standards.

Wetlands at the Field exhibit a relatively wide range of variability, and the overall aim of restoration monitoring is to examine the created or restored wetlands and to ensure that they fall within the range of variability of reference wetlands. To that end, in general, the approach to wetland restoration monitoring and the assessment of success is to apply a multi-faceted methodology investigating various monitoring parameters, and to evaluate them in the context of the observed variability at the Field.

There will be two levels of botanical monitoring and success criteria evaluation: overall evaluation for all restored Sites at the Field considered together, and separate evaluations for each restored Site by itself. The overall evaluation will be carried out at the end of the monitoring period, whereas the individual Sites will be monitored and assessed more frequently during the entire monitoring period.

Qualitative monitoring of the restored wetlands will take place annually, and will include walking the Site to observe and document general vegetation development, animal activity, potential erosion problems, and weed infestations. Erosion monitoring will occur monthly during the rainy season and after every major rain event (more than 0.25-inch in 24-hours). Photographs will be taken from established permanent photo points once a year, in the summer.

Quantitative monitoring will be carried out once a year, during the summer. It will include the collection of vegetation data at the reference and restored wetlands following similar sampling procedures. Permanent monitoring stations (transects and plots) will be established to consistently document changes over time, and to allow direct comparability of data between years.

One transect each was established in 12 of the 15 reference wetland sites in 2002. Each transect was located to cross the lowest/deepest part of the wetland, and the exact location of the end points of the transect was randomized. Transects will be set up similarly at each restored Site, and vegetation data will be collected following similar sampling procedures as in the reference wetlands. Species cover data will be collected along the transect using line-intercept sampling. Elevation data using surveying instruments also will be collected typically at 1-meter intervals along the transect to portray the topographic profile of the transect and water depths. Transect data will be collected annually at the restored wetlands, and at intervals of about five years at the reference wetlands.

Transect profiles will be portrayed graphically and the distribution along the transect of the ten species with the highest cover will be plotted. The species will be arranged on the profile diagram from bottom to top approximately corresponding to their wetland indicator status, with the obligate species at the bottom, and the upland species at the top of the graph.

The transect data will be used to evaluate whether an appropriate topographic profile has been created at the restored Sites (i.e., not too steep or too shallow, gentle rather than steep slopes, etc.) and if appropriate hydrogeomorphic zones are developed that support the different target wetland plant species associations.

Thirty 5-square meter plots were established in each of five plant associations in the 15 reference wetlands in 2002, using a stratified random sampling design. Similarly, a stratified random sampling design will be applied to locate 5-square meter plots in a representative manner at the restored wetlands, stratifying by the plant association anticipated to develop in a particular hydro geomorphic zone. The number of plots in each wetland and in each developing association will vary according to the size of the wetland and the aerial extent of the association. A minimum of six plots will be located in each restored wetland, with at least three plots in each association. For all restored Sites considered together over the Field, at least 30 plots will be established for each target restored plant association, as at the reference wetland sites. These procedures will ensure direct comparability of the plot data between the reference and restored wetlands. Furthermore, a minimum sample size of 30 will allow the use of statistical techniques appropriate for large sample analyses; 30 plots can reasonably be expected to provide a robust 95 percent confidence interval about the estimated mean.

Plot data will be collected and analyzed annually at reference and at mitigation sites to show how the created or restored sites are developing over time and to determine how similar the created and restored wetland associations are to those in the reference wetlands. Data will be collected in the summer beginning with the first year following initial restoration.

Individual plant species cover data will be collected from each plot. Measures of species richness, absolute cover, and frequency will be derived from these data. Individual species data also will be aggregated by wetland plant association to obtain the richness and proportional absolute cover of native perennials, non-native invasive species, and non-

native, excluding invasive introduced species. The density of sensitive species will be documented in each plot for descriptive purposes.

At the general level of all restored Sites considered together over the entire Field, mean species richness and mean proportional absolute cover will be calculated for each wetland plant association for the above plant categories. The mean values for non-native excluding invasives must fall below the upper bound of the 95 percent confidence interval about the estimated mean from the reference wetlands (Table 10). On a site-specific basis, the mean species richness and mean proportional absolute cover will be evaluated for each association to determine whether these values fall within the range of the means of the corresponding reference wetland values, as specified in the success criteria. In all cases, the target criteria for richness and, consequently, the cover of non-native invasive species have been set at zero. Therefore, if monitoring indicates that any of these species occur in the restoration sites, they will be eradicated.

Species frequency data also will be calculated for each plant association for all restored wetlands at the Field, to determine whether the appropriate species listed in the success criteria are found at the frequencies specified (Table 10). In addition, for each individual created or restored wetland, the criteria require that in each association, these species must be present.

Depending on site conditions following restoration at the wetland Sites, monitoring procedures may be modified by the Unocal Restoration Biologist, if deemed necessary, with approval by the cooperating oversight agencies.

In addition to the annual Field-wide quantitative surveys, intermediate qualitative, La Graciosa thistle monitoring will occur three times a year (April, June and October) for the entire five-year monitoring period.

A wetland delineation will be conducted at restored wetlands five years after initiation to assess progress. Another delineation will be performed at the end of the wetland restoration and creation program. At the end of the program, there will be a determination of the area of federal and state wetlands to determine if the appropriate 1:1 and 4:1 mitigation ratios have been met. It is expected that the completion of the wetland restoration and creation program associated with this Plan will be completed within ten years. However, under favorable conditions (normal or more rainfall), it is expected that individual Sites may meet all success criteria prior to the estimated 10-year timeframe.

When success criteria are met, the next two years will continue to be monitored but without any maintenance activities. If after these two years the site meets its success criteria, the revegetation will be considered complete by Unocal.

La Graciosa Thistle (LGT) Restoration Monitoring

LGT will be monitored weekly during the first month after planting of seedlings or transplant plants to assess if plants are water stressed or under unexpected herbivory pressure. Contingency measures will be implemented if warranted.

Qualitative, intermediate La Graciosa thistle monitoring will occur three times a year (April, June and October) for the entire five-year monitoring period. Monitoring will assess the weed threat, growth, vigor and establishment of the seedlings. The survival of the initial generation of seedlings will be quantified. Each LGT seedling will be tagged and tracked over the duration of its lifecycle. All second generation thistles or recruits will also be tagged and tracked during their lifecycle.

A final quantitative monitoring will occur in the fifth year and evaluate the overall success of the program following the standards outlined in the success criteria. The resulting analysis will be presented in standard scientific format and include all appropriate graphs, tables, statistical output and interpretations.

To determine if recruitment at the restoration site is within 20% of the recruitment at a natural population, an adjacent colony to the study site will be censused and compared to the restoration site. The densities, frequencies and distribution of stages and size classes of the LGT will be compared between the restoration site (study site) and the reference site. The boundaries of each colony will first be mapped. A grid-cell method will then be used to randomly sample each colony. The quadrat size will be 1 square meter. Four life-stages will be censused and are as follows: (1) seedlings (S) - plants with cotyledons still present or plants with denticulated or sinuously denticulated leaf margins that were not undulated or lobed, (2) young vegetatives (V1) - plants with denticulated lobed leaf margins to slightly spiny lobed leaf margins which were not undulated, 3) mature vegetative plants (V2) are defined as plants with distinct undulating leaf margins that are deeply lobed with many long spines, and 4) flowering plants (FL) defined as plants with flower heads. Data collected will be stored in EXCEL and statistically analyzed using a chi-square test to compare the distributions of life-stages between the sites.

To determine if mitigation activities have resulted in overall decline in existing populations, two reference colonies located within the same population as the remediation activity will be censused prior to and five years after remediation activities. One reference site will be located adjacent to the remediation activity and one will be located at a distance where remediation activities are not expected to have had an impact. Each site will be sampled as described above and comparisons of S, V1, V2, and FL will be made between the years and study sites.

9.3.2 Wildlife Monitoring Methods

The wildlife habitat restoration success criteria shall be based solely on the assessment of wildlife habitat elements. Wildlife monitoring, however, will consist of primarily two approaches. The first approach will be directed towards a wildlife habitat assessment of

each wetland restoration or creation Site based on the habitat elements present. The second approach will be directed towards wildlife surveys.

Wildlife Habitat Elements

Post-disturbance monitoring efforts of habitat elements will be conducted within two years of initial restoration efforts. The findings of the initial post-disturbance monitoring effort will be used to assess whether any additional restoration efforts are warranted for the satisfactory establishment of wildlife habitat and the desired wildlife functions and values. "Interim" post-disturbance habitat elements will be monitored by Unocal, who may request input from the OEC (i.e., the Third-Party Independent Monitor) and/or agency consultation. However, "final" post-disturbance habitat elements monitoring will be conducted by Unocal in conjunction with the OEC (i.e., the Third-Party Independent Monitor). Monitoring effort of habitat elements will continue up to a period of five years following restoration. If a finding of successful replacement of all desired wildlife functions and values has not been achieved within that period of time, then monitoring of the habitat elements shall continue on an annual basis until the goal of successful replacement of the desired wildlife habitat functions and values has been met.

Wildlife Surveys

In addition to the monitoring of wildlife habitat elements at wetland post-remediation, creation, and restoration Sites, wildlife species will also be monitored. The wildlife surveys, although not intended to be part of the actual success criteria for a Site, will none the less provide additional information regarding the success of the restoration efforts.

Surveys will be conducted for amphibians, reptiles, birds, and mammals. With the exception of surveys for amphibians, these more general surveys will be conducted at the time that it is decided wetland wildlife success criteria have been achieved at a Site and that monitoring efforts for vegetation are completed. All of the Sites shall be included in the quarterly amphibian surveys as described below, following the initial restoration efforts.

Amphibian Monitoring Methods

All of the post-remediated, created, and restored wetland Sites designed to provide surface water shall be included in the quarterly eyeshine surveys, egg mass surveys, and tadpole surveys beginning in the first year following initial restoration or creation efforts. These surveys will continue for the duration of the California red-legged frog monitoring program, which also includes data collection on other species of amphibians.

The monitoring methods currently used for amphibian surveys are summarized in the Ecological Monitoring Plan (EMP). Egg masses, tadpoles, and eye-shined individuals shall be identified to the species level. Through these various survey methods it should be possible to establish amphibian species richness, relative abundance, and breeding trends at the wetland Sites located throughout the Field.

Reptile Monitoring Methods

Surveys for two-striped garter snakes will be conducted by walking along the entire perimeter of the wetland. Multiple surveys shall be conducted on warm days during spring and fall and at regularly spaced intervals (for example, once per week over a five week period).

Surveys for southwestern pond turtles shall be conducted at wetlands with open water and tall emergent vegetation. The entire habitat shall be visually scanned using binoculars from pre-determined observation points and shall occur only on warm days. The site and observation points shall be approached as quietly and unobtrusively as possible. Survey time will last as long as it takes to carefully scan the wetland, focusing on basking sites and water surface.

Other non-aquatic reptile species, such as lizards and terrestrial snakes, shall be noted as observed through incidental observations.

Bird Monitoring Methods

Depending upon the wetland Site, either area searches or point count surveys would be used to monitor the presence of birds. Both monitoring techniques have limitations when applied to wetland Sites. Area searches require habitat that allows for visual identification of birds throughout the Site. Many of the wetland Sites have dense emergent or riparian vegetation that limits visibility. Point counts rely on both visual and acoustical identification, but most of the wetlands are small and therefore any point counts conducted would also include species present in the surrounding upland habitat.

Mammal Monitoring Methods

Mammal survey methods may include small mammal trapping, track stations, photo stations, burrow surveys, sign surveys, or echolocation surveys. Methods utilized will be dependent upon various factors such as habitat characteristics, size of Site, and presence of sensitive species.

Aquatic Invertebrate Monitoring Methods

Aquatic invertebrate monitoring may be undertaken if a specific wetland is not meeting success criteria in order to help determine possible causes of the wetland not meeting those criteria. Aquatic invertebrates would be monitored using either one or a combination of some of the following methods: dipnet or sweep net samples, activity traps, or artificial substrates. These methods help minimize sorting time because they collect less debris that has to be searched through. Activity traps may present a hazard for amphibian larvae depending upon placement and season of use, while dipnet sampling may result in accidental "take" of California red-legged frogs. This does not mean that California red-legged frogs would necessarily be killed through these monitoring methods, but it could be considered "harassment". Identification of species would be limited to higher taxonomic

levels, feeding groups, or to specific taxonomic groups in order to reduce time spent keying out samples.

9.3.3 Surface Water Quality Monitoring

Condition 67(c) requires that Unocal develop and implement a plan for monitoring water quality at the restored wetlands. This plan is required since some of the restored wetlands could be exposed to residual contamination after excavation and/or diluent from diluent sources that are up-gradient of restored wetland sites.

A comprehensive water monitoring plan has been developed jointly between Unocal and the Regional Water Quality Control Board (RWQCB) to monitor groundwater and surface water quality at the Guadalupe Restoration Project. This water monitoring plan defines groundwater monitoring procedures, monitoring frequency and chemical constituents monitored on an ongoing basis as well as following excavation of separate-phase diluent sources. The same post-excavation water monitoring approach will be implemented in the vicinity of the restored wetlands after excavations.

The water monitoring plan also specifies surface water monitoring procedures, frequency and constituents; however this is primarily relative to pre-existing surface water bodies at the site. The water monitoring plan does not include frequency of monitoring specifically designed for post-excavation restored wetlands. Quarterly monitoring for 8 quarters, followed by semi-annual monitoring of total petroleum hydrocarbons (TPH), as diluent, and benzene, toluene, ethylbenzene and xylenes (BTEX), is an appropriate frequency for surface water in restored wetlands. If after 4 years of monitoring the TPH concentration levels are consistently below 1 mg/L, the monitoring frequency may be additionally reduced with the approval of the RWQCB.

As excavations occur and wetlands are restored, Unocal will prepare site-specific post-excavation/wetland restoration water monitoring plans, which will include surface water quality monitoring for restored wetlands designed to have surface water expression. These plans will identify post-excavation groundwater monitoring well names and locations, and will define surface water monitoring station names and locations. The plans will be incorporated into the comprehensive site-wide water monitoring plan when it is revised/updated by RWQCB and Unocal staff (typically every two years).

The results of the water monitoring will be documented in the quarterly Report for Water Monitoring and Remedial Activities, submitted to the RWQCB, and in the Quarterly Ecological Monitoring Reports, submitted to the California Department of Fish and Game, U.S. Fish and Wildlife Service, the California Coastal Commission, and San Luis Obispo County. These monitoring reports shall include the concentration of hydrocarbon (expressed as TPH) and BTEX in the surface water at each of the restored wetland sites. The results of the most recent water monitoring as well as all previous results will be provided in each report so that TPH concentrations over time can be evaluated.

Previous excavations, performed without dewatering and without sheetpile, have resulted in temporarily elevated TPH concentrations in groundwater, which over a period of 1 to 2 years diminish (LFR 2003; *Comparison and Evaluation of Excavation Activities for the Guadalupe Restoration Project*, July 3). Similar temporal "spikes" in TPH concentrations might also be observed in surface water at the wetland restoration sites after excavations are performed. However, use of sheetpile and dewatering to remove diluent sources during the excavations should minimize this temporal "spike" affect.

The risk management analysis, conducted as part of the development of the Wetland Restoration and Mitigation Plan, established ecological thresholds for both vegetation and wildlife (see Appendix Q, Risk Management Evaluation of Restoration Wetlands). If the quarterly monitoring reports indicate that diluent concentrations (i.e., TPH concentration) at any of the restored wetlands is greater than 1 mg/L and increasing over time or that BTEX concentrations are equal to or exceed Maximum Contaminant Levels, then Unocal shall initiate consultation with the appropriate agencies. In addition, if a sheen or free-product is observed in any restored wetland site, the appropriate agencies will be consulted with as soon as possible.

If consultation is initiated, Unocal, in cooperation with the appropriate agencies, shall evaluate the need for action to minimize the potential risk to ecological receptors and other beneficial uses of surface water in a restored wetland from TPH as diluent. Examples of actions that could be taken include more frequent surface water monitoring, installation of additional up-gradient drive-point wells or monitoring wells, installation of a biosparge system or other control system, and/or modifications to the restored wetland's design.

Unocal will work cooperatively with the appropriate agencies in determining the most appropriate course of action for a given restored wetland where persistently elevated levels of TPH as diluent are increasing the risk to vegetation and/or wildlife.

9.4 Annual Reports

Monitoring progress will be reported in the Quarterly Ecological Monitoring Report (QEMR). Progress will be reported according to the schedule defined within the SSRP for the respective Site. Elements within the reporting include a qualitative overall assessment of the restoration Site, evaluations of weed presence, sensitive species, erosion, and wildlife usage. An assessment of how the restoration Site is progressing in relation to its success criteria will also be presented. Other parameters that may be included are survival rates and average height of planted container stock, total percent cover, relative cover, and diversity of seeded species.

Furthermore, annual reports shall be provided to the CDFG on the success of LGT restoration. This report will provide a description of maintenance activities conducted that year, summarize the previous year's activities, and document the success of the restoration program. The report will also identify remedial actions and adaptive management measures conducted to ensure the success of the LGT restoration.

9.5 Adaptive Management

If the restoration monitoring indicates interim progress is substantially different from the success criteria, then the restoration approach may need to be reassessed. An adaptive management strategy will then be used to determine the cause, take remedial actions, and/or adjust the approach or methodology (refer Section 11.2 for further details).

The assessment of how the mitigation Site is progressing will be made during the restoration monitoring efforts, as scheduled and prescribed within the individual SSRPs. The reporting of any deficient progress will be in the annual reporting along with the proposed adaptive management strategy to address the delinquency.

10.0 SCHEDULE

The development of a project schedule for the completion of the remaining CAO excavation sites requires the consideration of several factors and constraints. As required in County Permit Condition F10, excavations of adjacent sites must be scheduled concurrently so that adjacent sites can be used for clean material stockpiles, etc. These integrated sites have been grouped as B-12/C-12, L-11/M-12 Sump, and the TB 1 sites.

The protection of sensitive resources creates additional considerations for the conduct of work. Several of the Sites are directly adjacent to or in ponded areas; therefore an attempt has been made to schedule those projects most likely to affect surface water bodies to be conducted in late summer or early fall when water levels are expected to be at the lowest seasonal levels. Furthermore, the seasonal uses and requirements of surface water bodies are considered in the development of a project schedule for remaining remediation sites. Attempts to avoid the flowering season of LGT have been incorporated into the project schedule. These same scheduling considerations have been applied to avoid the dispersal and sensitive development stages (eggmass, tadpole, and metamorph) of CRLF.

Several items must be completed prior to the initiation of remediation activities. Primarily this Plan must be approved by the appropriate regulatory agencies. This process is being facilitated by the co-development of the Plan with the RWG. As such, the beginning date of the remediation activities is presented as a target subject to adjustment. It is Unocal's desire to begin initiation of the remediation Sites as quickly as possible. Therefore, depending on the date the necessary plans are approved, the sequence the Sites are conducted may be adjusted due to ecological constraints.

Table 13 provides a matrix of when Remediation Sites describing potential timing constraints, their time periods, and considerations for planning excavations within the time period follow.

Snowy Plover Breeding Habitat

Historical use of the oil field by the snowy plover for nesting has been largely within the foredune areas west of the A Road and south of 8X on an annual basis from about March 1

to September 15. Projects must be scheduled to avoid the beach area during breeding season.

California Red-Legged Frog Breeding Habitat

Ponded areas and streams with slow or still water on the site are used by the California red-legged frog for breeding from late November to mid-April, producing tadpoles that transform into juvenile frogs in 3.5 to 7 months during the summer. Projects involving frog breeding habitat areas should be scheduled between May 1 and October 31 to minimize the impacts to the California red-legged frog during breeding season.

California Red-Legged Frog Breeding Migration Routes

Some areas on the site are frequently used by California red-legged frogs for migration during the breeding season. Migration is most prevalent at night and during rainy weather. Construction traffic and nighttime construction operations during the breeding season should be minimized to the extent possible in order to avoid impact to migration routes.

Surface Water Level

Many of the sites involve excavation directly adjacent to or in ponded wetlands. As feasible, these projects should be scheduled in late summer or early fall when the water level should be at the lowest seasonal elevation.

The temporary disturbance at each site will vary with the size of the excavation, type and quantity of equipment used, quantity of manpower, weather conditions, etc. However, it is currently estimated that the remediation time would vary from 2 weeks to 4 months. It is projected the construction activities will last approximately 2-years. The construction activities will be completed sequentially without breaks between Sites; equipment will mobilize to the next Site once construction is complete on the previous.

11.0 CONTINGENCY MEASURES

Adaptive management is a process that will allow the wetland revegetation and monitoring plan to be adjusted throughout the implementation and monitoring period to ensure the restoration program is as effective as possible. Accordingly, the status of the restoration and revegetation will be monitored and analyzed under the monitoring and reporting program to determine if the Plan is producing the desired results to meet the goals, objectives, and success criteria set forth in the Plan. If all, or a portion of the desired results are not being achieved, or if other information needs to be incorporated into the Plan, adjustments in the restoration effort will be made to account for changing conditions and new information. This section explains the circumstances for adaptive management provisions and how decisions will be made to ensure the greatest potential for success of the restoration and revegetation Plan.

11.1 Initiating Procedures

The following conditions could result in the need to adjust the restoration and revegetation efforts to ensure that the goals and objectives of the Plan are achieved. Several circumstances could lead to the need to implement adaptive management provisions. These include:

- Not achieving the anticipated range of open water pond habitat;
- Not achieving anticipated growth and establishment of aquatic and emergent wetland vegetation;
- Not achieving anticipated growth and establishment of dune swale vegetation;
- Not achieving anticipated growth and establishment of upland dune scrub vegetation;
- Changes in anticipated hydrologic conditions;
- Prolonged periods of extremes in seasonal and yearly rainfall patterns (either above or below average rainfall);
- New information on plant propagation and planting techniques;
- New information on groundwater levels and functioning of the Dune Sand Aquifer;
- New information on the sensitive species from outside sources or researchers;
- New information from the monitoring program;
- Development of FWS recovery plans for listed species;
- Not achieving the required mitigation ratios.

11.2 Adaptive Management

Each of these circumstances could result in new information and/or new approaches that would need to be incorporated into the restoration of the dune swale wetland/upland habitat complex. The adaptive management process will include:

- Identifying the circumstance or problem needing rectification;
- Identifying the cause and effect of the circumstance needing rectification;
- Distinguishing if the cause is a result of planning or implementation of the restoration plan or if it is a result of factors of natural factors such as floods or drought;

If the cause is a result of natural factors, remedial measures to rectify the situation will be evaluated and implemented, as appropriate and reasonable;

If the cause is a result of planning or implementation of the restoration plan, remedial measures to be evaluated and implemented could include, but not be limited to:

- Changes in planting palette to better match vegetation to restored habitat conditions;
- Changes in propagation and planting techniques;
- Supplemented watering;
- Replant or reseed areas not meeting success criteria;
- Increase/decrease in irrigation during the plant establishment period;
- Minor recontouring of the surface to better match existing hydrologic conditions;
- Major recontouring, excavation and grading to better match existing hydrologic conditions; and/or
- Selection of alternative sites to achieve mitigation requirements and restoration goals and objectives.

The adaptive management process will be initiated through evaluation of the circumstances and review of options for remedial actions. Unocal will consult with the County, CDFG, CCC, ACOE and FWS to apprise them of the situation and options for remedial actions. Approval of adaptive management provisions for changes in planting and propagation techniques, planting palette, reseeding or replanting efforts, and irrigation regime, will be obtained from the Onsite Environmental Coordinator. Significant modifications to the revegetation program including selecting an alternative site or additional surface disturbance and earthwork shall require approval from the County, CDFG, CCC, ACOE and FWS.

11.3 Alternative Locations for Contingency Mitigation

There are nine locations where remediation activities will disturb existing wetlands. A number of these Sites will be expanded to create additional wetland habitat. Additionally, three remediation sites may also be used to create wetland habitat. However, due to the presence of adjacent, up-gradient plumes in some locations where remediation activities are proposed, it may not be feasible to replace wetlands in the same location(s). The decision to replace such wetlands will be based in part upon the Screening Level EcoRA and in consultation with the Resource Agencies.

As mentioned previously, additional locations in the Field have been identified where new wetlands can be created or existing degraded wetlands may be restored to increase their

function/value (refer to Figure 3). These additional Sites may also be used in the future as contingencies if created wetlands do not meet success criteria even after the application of adaptive management techniques

11.4 Funding Mechanism

Prior to the initiation of the Guadalupe Restoration Project, Unocal provided funding assurances to satisfactorily guarantee compliance with remediation and restoration requirements to the Responsible Agencies. Unocal does not believe further assurance is necessary for this aspect of the project implementation.

12.0 COMPLETION OF MITIGATION

12.1 Notification of Completion

When all success criteria are met, the next two years will continue to be monitored but without any maintenance activities; if after these two years the site still meets its success criteria and Unocal believes the final success criteria have been met, Unocal shall notify the ACOE when submitting the Final report that documents this completion. The other oversight agencies (SLO County, CCC, CDFG and FWS, as appropriate) will also be notified and receive this report.

Data to be included in the final annual monitoring reports will include but not be limited to:

- Results of floristic data and inventory;
- Results of special-status plant and wildlife surveys;
- Results of wildlife studies
- Photographs of vegetation, habitat types, and special-status species habitat;
- Water quality analysis;
- La Graciosa thistle revegetation monitoring results;
- Demonstration of compliance of terms and conditions of agencies (CDGF, CCC, ACE, and FWS);
- Analysis of achieving the goals of the restoration plan; and

Where appropriate, a current delineation of the created wetland area may be submitted with the report (copies of all field data sheets should be available).

12.2 Agency Confirmation

Unocal shall fund an independent biological performance monitor to be selected by the SLO County Department of Planning and Building, and the Executive Director of the CCC, after consultation with Unocal and other agencies, to conduct performance monitoring. The performance monitors will coordinate their activities with the Restoration Working Group and with the revegetation contractors. The performance monitor shall participate in the

final assessment of the mitigation program, so their assessment can be incorporated into, or accompany, the final report for each Site.

The ACOE and/or other oversight agencies may also require a site visit to confirm the completion of the mitigation effort and any delineation under this Plan.

When the County Department of Planning and Building and the Executive Director of the Coastal Commission have determined that the success criteria have been met, no further performance monitoring shall be required. If performance standards are not met in ten years, or if prior to that time Unocal concludes that restoration and revegetation will not meet performance standards, within 180 days Unocal shall apply to the County Department of Planning and Building for an amendment to the Coastal Development Permit which will include alternative mitigation.

13.0 REFERENCES

- Adamus, P.R. 1987. Wetland Evaluation Technique (WET): Volume II-Methodology. Vicksburg, MS: U.S. Army Corps of Engineers, Waterways Experiment Station.
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- California Fish and Game Commission. 2005. California Fish and Game Code, 2005. California Edition, Fish and Game Commission Policy on Wetland Resources
- CNPS, 2001. Inventory of Rare and Endangered Plants of California (6th Edition). Rare Plant Scientific Advisory Committee, D.P. Tibor, Convening Editor. California Native Plant Society, Sacramento, CA.
- FWS 1981. U.S. Fish and Wildlife Service Mitigation Policy. Federal Register 46(15): 7644-76663. January 23 (as corrected in the Federal Register of February 4, 1981)
- FLx 2002. Results of Wetland Site Surveys. Presented to the Restoration Working Group July 2002.
- JES (Jordan Environmental Services) 2001. Results of Coastal Dune Scrub Reference Area Botanical Survey. Presented to the Restoration Working Group September 2001.
- Kusler, J.A. and M. E. Kentula (Eds.). 1990. Wetland Creation and Restoration; The Status of the Science. Island Press, Washington, D.C. and Covelo, California)
- LFR 2002a. Compilation of Surface Water Pond and Wetland Information at the Former Guadalupe Oil Field San Luis Obispo County, California. Unocal, Central Coast Group, Guadalupe, CA.
- LFR 2002b. 2001 Fourth Quarter Report for Water Monitoring and Remediation Activities at the Guadalupe Oil Field. January 31.

SITE-SPECIFIC RESTORATION PLAN

Project Description

Project Description	Unocal proposes to excavate and remove the B-11 former oil well pad and surrounding sump material. Associated project activities include sheetpiling, excavation, hauling and backfilling. The remediation activities will impact approximately 0.09 acres of previously identified federal wetlands and 0.10 acres of state jurisdictional wetlands. The federal wetland will be replaced at a 1:1 ratio and the state wetland will be replaced at a 4:1 ratio (0.4 acres). A total of 3.02 acres will be remediated/restored at or adjacent to B-11; 0.4 acres will mitigate the impacts to state wetlands at the B-11 and the remaining 2.62 acres will serve as mitigation for disturbance to other wetlands at the Guadalupe Restoration Project (refer to Section 2.2 of the WRMP). The basis for the selection of the B-11 wetland restoration is included in Attachment G-1.
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Excavation Project Summary

Location	The B-11 project area is in the southwestern portion of the Unocal Guadalupe Restoration Project, Guadalupe, County of San Luis Obispo, California. Refer to Figure G-1.
Project Schedule	The start of construction activities has not yet been determined pending project approval by federal, state, and local agencies, and completion of the Supplemental EIR for the Unocal Guadalupe Restoration project. A schedule of the ecological events required prior to construction is provided in Attachment G-2.
Previous Activity	The B-11 well pad was the location of a former oil production well, sump, and associated equipment. The B-11 Site consists of underlying roads and well pads. It also has evidence of cattle impacts.
Duration of Excavation	It is anticipated the B-11 construction activities will last two weeks. Refer to Attachment G-2.

Site Area	Refer to Figure G-2.		
B-11		Size	
		Acre	Square feet
Remediation Area (area within excavation limits of disturbance):		1.34	58,327
Restoration Area (area outside remediation area but within restoration grading daylight boundary):		1.69	73,546
Total Remediation/Restoration Area:		3.03	131,873

Pre-Excavation Site Characteristics

Site Description	The Site is a former oil well pad that has residual sump and road base material and dissolved-phase diluent hydrocarbons. The Site has underlying pads and roads and is relatively level.
Site Elevations	Surface elevations range from 10-20 ft. above msl (refer to Figure G-2) with historical groundwater elevations ranging from 9.7 to 13.2 feet above msl (refer to Attachment G-3).
Approximate Pre-Excavation Topography	The Site is relatively level but includes an approximately 3 foot steep bank to the Marsh Ponds.
Unique Natural Features	The Site occurs on an elevated flat terrace, east of the Marsh Ponds. Stabilized parabolic dunes occur eastward of the Site.

EXHIBIT NO. 4
APPLICATION NO.
E-99-009-A2

Habitat Types & Plant Associations Present Within Limits of Disturbance (refer to Section 4.3 of the WRMP)

Habitat Type	Limits of Remediation (square feet)	Limits of Restoration (square feet)
Coastal Dune Scrub	1,133	11,587
Deep Water/Low Elevation Marsh	3,267	305
Open Wetland Herbaceous	479	174
Transitional Herbaceous/Scrub	4,574	14,593
Willow woodland		
Road	7,884	13,242
Pad	40,990	33,645
Total	58,327	73,546

Adjacent Habitat Types & Plant Species Associations

Open Wetland Herbaceous, Transitional Herbaceous/Scrub and Coastal Dune Scrub. Refer to B-11 Baseline Vegetation Report in Attachment G-4.

Functions and Values

Functions and Values
(refer to Section 2.5 of the WRMP)

Function or Value	Function Provided by Wetland?
Groundwater Recharge	No
Floodflow Alteration	Yes
Bank Stabilization	Yes
Sediment or Toxicant Retention	Yes
Nutrient Removal or Transformation	Yes
Bioproductivity	Yes
Aquatic Diversity and Abundance	Yes
Wildlife Diversity and Abundance	Yes
Botanical Diversity	Yes
Habitat for Sensitive Plant Species	Yes
Habitat for Sensitive Wildlife Species	Yes
Cultural Resource	Yes
Uniqueness	Yes
Scientific Research	Yes

Wildlife Functions (refer to the Wildlife Functions Baseline Matrix or Section 9.1.3 of the WRMP)	<ul style="list-style-type: none"> • Amphibian Cover/Refuge & Foraging Habitat • Treefrog & Toad Breeding Habitat • Lizard Cover/Refuge & Foraging Habitat • Terrestrial Snake Cover/Refuge & Foraging Habitat • Aquatic Snake Cover/Refuge & Foraging Habitat • Legless Lizard Habitat • Wading Bird Nesting, Foraging, & Resting Habitat • Waterfowl Nesting, Loafing, & Foraging Habitat • Raptor/Owl Hunting Habitat • Ground Nesting Bird Habitat • Songbird Foraging, Cover/Refuge, & Nesting Habitat • Colonial Songbird Foraging & Nesting Habitat • Insectivorous Mammal Foraging, Cover/Refuge, & Breeding Habitat • Bat Foraging Habitat • Carnivore Denning, Hunting, & Cover Habitat • Herbivore Foraging & Cover Habitat • Rodent Cover, Foraging, & Breeding Habitat • Wildlife Drinking Water Source
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Baseline Vegetation Survey

Source	August 2004. Refer to B-11 Baseline Vegetation Report in Attachment G-4.
Sampling Methods	The site was canvassed on foot, using preliminary construction maps provided by Cannon Engineering as reference. All observed plant species in identifiable condition were recorded. All scientific names of plants referred to in this report are standardized to the Jepson Manual, Higher Plants of California (Hickman 1993). Plant species associations were identified as those described by FLx (2002). The boundaries of each plant species association type in the project area were mapped. The plant species associations were quantitatively analyzed and species composition, percent cover, and frequency determined. Sampling was accomplished with quadrat sampling methods. Cross-sections were also established at the Site to provide information on elevational locations of each plant species association. Refer to Attachment G-4 and to Section 9.3.1 of the WRMP for in depth description of sampling methods.
Number of Samples	A total of 198, 2.5-meter radius quadrats were sampled at B-11. Fifty were sampled on the vegetated portion of the pad, 98 were sampled in the Transitional Herbaceous/Scrub and 50 in the Open Wetland Herbaceous.

Plants: Absolute Percent Coverage ± Standard Deviation of Common Plants

Habitat Type	Native	Non-Native
Transitional Herbaceous/Scrub - Clustered field sedge/iceplant phase	<i>Carex praegracilis</i> 30% ± 22.2	<i>Carpobrotus edulis</i> 22% ± 22.5
	<i>Baccharis pilularis</i> 15% ± 17.5	<i>Cynodon dactylon</i> 8.5% ± 15
	<i>Equisetum laevigatum</i> 14% ± 13.6	<i>Lotus corniculatus</i> 3% ± 6.9
	<i>Juncus lesueurii</i> 2% ± 3.4	
	<i>Isocoma menziesii</i> 2% ± 3.6	

Open Wetland Herbaceous	<i>Potentilla anserina</i> 32%± 20.6 <i>Carex praegracilis</i> 30% ± 18.3 <i>Juncus lesueurii</i> 11% ± 8.5 <i>Baccharis douglasii</i> 8% ± 16.9 <i>Eleocharis parishii</i> 4%± 8.9	<i>Lotus corniculatus</i> 40%± 24.7 <i>Cynodon dactylon</i> 13%± 12 <i>Carpobrotus edulis</i> 10%± 20 <i>Lolium multiflorum</i> 6%± 6.3
B-11 Pad	<i>Carex praegracilis</i> 23% ± 20.8 <i>Cardionema ramosissimum</i> 5% ± 6.8 <i>Erigeron blochmaniae</i> 4% ± 9.2 <i>Equisetum laevigatum</i> 2% ± 4.8	<i>Carpobrotus edulis</i> 29%±17.6

Sensitive Plants/Habitat

Habitat Type	Species, Percent Cover ± Standard Deviation (or numbers)	Status
Transitional Herbaceous/Scrub (Clustered field sedge/iceplant phase)	<i>Cirsium loncholepis</i> : trace cover ; 6 individuals during 2004 census	FE, ST, CNPS 1B
	<i>Astragalus nuttallii</i> var. <i>nuttallii</i> Trace	CNPS 4
	<i>Erigeron blochmaniae</i> Trace amounts	CNPS 1B
	<i>Senecio blochmaniae</i> Trace amounts	CNPS 4
B-11 Pad	<i>Erigeron blochmaniae</i> 4% ± 9.2%	CNPS 1B

Baseline Wildlife Survey

Source	August 2004. Refer to the Wildlife Survey Report for the B-11 Site-Specific Restoration Plan (Attachment G-5).
Sampling Methods	Eyeshine surveys, transect surveys, bird surveys, small mammal trapping, and incidental observations. Refer to Attachment G-5 and to Section 9.3.2 of WRMP.
Wildlife Survey Results	A list of wildlife species observed or expected at or adjacent to the site is provided in the Wildlife Survey Report for the B-11 Site-Specific Restoration Plan (Attachment G-5).
Special Status Wildlife Species	Sensitive wildlife species that may potentially occur on-site based on available habitat (species in BOLD have been seen at or near the site):

common name <i>scientific name</i>	state status	federal status
tidewater goby (<i>Eucyclogobius newberryi</i>)	CSC	FE
western spadefoot <i>Spea hammondi</i>	CSC	-
California red-legged frog (<i>Rana aurora draytonii</i>)	CSC	FT
southern Pacific pond turtle (<i>Actinemys marmorata pallida</i>)	CSC	-
California horned lizard (<i>Phrynosoma coronatum</i>)	CSC	-
California legless lizard (<i>Anniella pulchra</i>)	CSC	-
two-striped garter snake (<i>Thamnophis hammondi</i>)	CSC	-
double-crested cormorant (<i>Phalacrocorax auritus</i>)	CSC	-
western least bittern (<i>Ixobrychus exilis hesperis</i>)	CSC	-
white-faced ibis (<i>Plegadis chihi</i>)	CSC	-
osprey (<i>Pandion haliaetus</i>)	CSC	-
white-tailed kite (<i>Elanus leucurus</i>)	CFP	-
northern harrier (<i>Circus cyaneus</i>)	CSC	-
golden eagle (<i>Aquila chrysaetos</i>)	CSC	-

ferruginous hawk (<i>Buteo regalis</i>)	CSC	-
merlin (<i>Falco columbarius</i>)	CSC	-
burrowing owl (<i>Athene cunicularia</i>)	CSC	-
short-eared owl (<i>Asio flammeus</i>)	CSC	-
long-eared owl (<i>Asio otus</i>)	CSC	-
loggerhead shrike (<i>Lanius ludovicianus</i>)	CSC	-
California horned lark (<i>Eremophila alpestris actia</i>)	CSC	-
yellow warbler (<i>Dendroica petechia</i>)	CSC	-
Bell's sage sparrow (<i>Amphispiza belli belli</i>)	CSC	-
tri-colored blackbird (<i>Agelaius tricolor</i>)	CSC	-
pallid bat (<i>Antrozous pallidus</i>)	CSC	-
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	CSC	-
California mastiff bat (<i>Eumops perotis californicus</i>)	CSC	-

CSC-"California Species of Special Concern" have declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

CFP- California Fully Protected; may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected" species, although take may be authorized for necessary scientific research.

CE-California Endangered – a native species is endangered when its prospects of survival and reproduction are in immediate jeopardy from one or more causes.

FE- Federally listed as Endangered.

FT- Federally listed as Threatened.

Proposed Restoration Activities

Objectives	<ul style="list-style-type: none"> Restore all of the functions and values at B-11 that previously existed, such as: amphibian, lizard and snake cover and foraging habitat; ground nesting bird habitat, songbird cover and foraging habitat, raptor hunting and aerial insectivore foraging habitat; small mammal burrowing habitat, herbivorous mammal foraging area and carnivorous mammal hunting habitat. In addition, a new value will be created at B-11 – wildlife drinking - open water will be provided at B-11 at times of normal to above normal rainfall, producing a new source of water. Establish target zones of inundation and saturation at topographic contours that will allow for varied surface expression of wetland hydrology characteristics during below average, average and above average rainfall years (see Section 4.2 of the WRMP and Attachment G-3 of the SSRP for a detailed discussion of the Historical Groundwater Analysis). Remediate wetland habitats disturbed by remediation activities and restore wetlands in existing disturbed wetland habitat (existing roads and pads; non-native species dominated wetland habitat), resulting in a native dune swale wetland habitat complex similar in species composition, abundance and dispersion to those at reference sites. The following wetland plant species associations will be remediated and restored at B-11: 1) Open Water, 2) Deep Water/Low Elevation Marsh, 3) Shallow Water/High Elevation Marsh, 4) Open Wetland Herbaceous and 5) Transitional Herbaceous/Scrub. Establish a wetland habitat complex that supports California red-legged frog and a gradient zone of soil saturation conducive to LGT. Furthermore, a proper number of LGT will be planted, monitored and remedial measures enacted to achieve the performance standard of survival of two LGT for each one impacted until they reproduce (see Appendix P of the WRMP for the LGT Salvage, Propagation and Replanting Plan).
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Construction and Access Boundaries	Refer to Figure G-1.		
Baseline Surveys	Pre-disturbance vegetation and wildlife survey were conducted in August 2004. The results of these surveys are attached as Attachments G-4 and G-5. Additional wildlife surveys will be conducted, if remediation of this site is not initiated within 24-months of the pre-disturbance survey. An additional vegetation survey of the site will be conducted during the spring/summer within six months of the site disturbance.		
Proposed Permanent Photo Points (before/after photos)	There are 3 permanent photo stations (refer to Figure G-3). Pre-disturbance photos are included in Attachment G-7.		
Revegetation Species Selected	Species selected to be planted and/or seeded into the recontoured dune swale complex to include :)		
	Deep Water /Low Elevation Marsh:	% of area	lbs/acre
	<i>Scirpus californicus</i>	50%	14
	<i>Typha latifolia</i>	30%	4
	<i>Hydrocotyle ranunculoides</i>	10%	250 at 4'
	Shallow Water/High Elevation Marsh:	% of area	# plantings /acre
	<i>Scirpus pungens</i>	30%	3150 at 2'
	<i>Hydrocotyle ranunculoides</i>	15%	500 at 4'
	<i>Hydrocotyle verticillata</i>	15%	375 at 4'
	<i>Potentilla anserina</i>	5%	125 at 4'
	<i>Eleocharis macrostachya</i>	10%	450 at 3'
	<i>Eleocharis parishii</i>	5%	90 at 3'
	<i>Juncus phaeocephalus</i>	2%	90 at 3'
	<i>Juncus effusus</i>	10%	250 at 4'
	<i>Anemopsis californica</i>	2%	
	Open Wetland Herbaceous:	% of area	# plantings /acre
	<i>Carex praegracilis</i>	30%	1370 at 3'
	<i>Potentilla anserina</i>	20%	500 at 4'
	<i>Distichlis spicata</i>	10%	375 at 4'
	<i>Juncus lesueurii</i>	5%	230 at 3'
	<i>Trifolium wormskioldii</i>	10%	250 at 4'
	<i>Jaumea carnosa</i>	10%	450 at 3'
	<i>Scirpus pungens</i>	5%	525 at 2'
	<i>Leymus triticoides</i>	5%	230 at 3'

Transitional Herbaceous/Scrub	% of area	lbs/acre	# plantings /acre
<i>Carex praegracilis</i>	60%	17	2750 at 3'
<i>Juncus lesueurii</i>	20%	2.25	900 at 3'
<i>Baccharis pilularis</i>	2%	0.75	
<i>Solidago californica</i>	2%	0.25	
<i>Artemisia dracunculoides</i>	2%	0.25	
<i>Leymus triticoides</i>	5%	1.5	230 at 3'
<i>Distichlis spicata</i>	5%	1	125 at 3'
<i>Ambrosia psilostachya</i>	2%	1	
<i>Isocoma menziesii</i>	2%	1	

Collect, Store, and Maintain Seeds, Propagules, Cuttings, and Plant Materials	See WRMP Section 7.3.2 and 7.3.3 for detailed methodology. Plugs, divisions and cuttings will be collected from the project disturbance footprint and augmented from other sources within the Field as needed. Seeds shall be collected by a seed collector/supplier with experience in site-specific, native seed collections within a year prior to disturbance. WRMP Table 8 provides information on target collection periods. Seed shall be removed from the site, dried, cleaned and stored in a clean dry place free of rodents.
Non-native Plant Control	The B-11 project disturbance and restoration footprint will be treated for non-native plants for at least one growing season prior to any remediation/restoration activities. The site will again be treated 30 days prior to initiation of remediation/restoration activities.
Special Status Plant Species Protection	All La Graciosa thistle within or adjacent to B-11 are annually mapped and censused. Construction areas and access routes have been limited to avoid impact to individuals or colonies. However, impacts to some LGT may be unavoidable. Measures, as described in the attached Salvage, Propagation and Replanting Plan (Appendix P of the WRMP) will be implemented and the CDFG 2081 Permit will be complied with. La Graciosa thistle seeds will be collected from plants within the disturbance area for at least 2 years prior to disturbance. Furthermore, any plants in the disturbance area will be salvaged prior to the disturbance. An appropriate number of LGT will be planted to ensure two LGT will reproduce for every LGT impacted. These plants must be documented to survive, flower, and set seed.
Sensitive Plant Species Protection	The B-11 Site provides habitat for Blochman's leafy daisy (CNPS 1B), Blochman's groundsel (CNPS 4) and Nuttall's milkvetch (CNPS 4). Prior to the initiation of construction activities, seeds from these plants will be collected from the area of potential disturbance. Furthermore, plants or cuttings may be salvaged. These seeds or plants will be transplanted following completion of project activities in that area or in an alternate area possessing suitable habitat. Unocal tracks the status of sensitive plants at each restoration site. Section 6 of each Quarterly Ecological Monitoring Report (QEMR) tracks sensitive plants disturbed at each impact area and annually (in spring) provides the current coverage or density of sensitive species at these sites. (see Sensitive Species Management Plan in Appendix E of the Ecological Monitoring Plan).
Sensitive Wildlife Species Protection	California red-legged frog has been observed within the limits of disturbance, therefore special protocols will be initiated prior to and during construction. These protocols are provided in Section 7.2.2 of the WRMP and Appendix E of the Ecological Monitoring Plan.
General Wildlife Species Protection	In the week prior to the start of construction, clearance surveys will be conducted to look for amphibians, reptiles, and nesting birds. A wildlife monitor shall be present immediately prior to and during initial ground disturbance activities to search for and relocate any wildlife that may potentially be harmed.

Salvage Vegetated Overburden	The upper 12 inches of clean plant material and soil will be collected and stockpiled when appropriate. If vegetated overburden includes red-rock, asphalt, oil sand, excessive weed infestation, or affected material, it will not be salvaged. Only clean vegetated overburden will be used. The vegetated overburden from the pad and road area will not be salvaged, but the remaining vegetated overburden from the remediation area will be clean and salvageable. Refer to Section 7.2.3 of the WRMP.
Temporary Stockpile Location	Salvaged topsoil and plant material will be stored at designated/approved stockpile locations. Stockpile locations that could be used include E4-A, TB-8, and South B Road. In some instances, smaller overburden stockpiles may be placed within or adjacent to the excavation site, but within the limits of disturbance.

Restoration Activities Following Remediation

Habitats and Plant Species Associations Being Restored (refer to Section 4.3 WRMP)	Association/Habitat	Pre-disturbance Area Size (square feet)	Post-disturbance Area Size (square feet)
	Open Water	0	580
	Deep Water /Low Elevation Marsh	3,572	950
	Shallow Water/High Elevation Marsh	0	9,193
	Open Wetland Herbaceous	653	46,750
	Transitional Herbaceous/Scrub	19,167	74,400
	Willow Woodland	0	Not Proposed
	Coastal Dune Scrub	12,720	Not Proposed
	Pad	74,635	Not Proposed
	Road	21,126	Not Proposed
	Total	131,873	131,873

Post Excavation Contours	Refer to Figure G-4.
Source of Soils	A combination of clean, excavated/salvaged onsite soils, plus additional material as needed, will be brought in from Q-4 or other pre-approved onsite borrow sites. The use of Q-4 sand has been authorized by the CCC and the County through a substantial conformance review.
Recontouring Schedule	Recontouring will occur immediately following the completion of excavation activities and prior to demobilization of heavy equipment from the project area.
Vegetated Overburden (if available)	Immediately following contouring, vegetated overburden will be replaced.
Revegetation Schedule	Planting will be initiated in early winter (November or December) following the first heavy rains. If this is not feasible, later in the winter (January or February) is acceptable.

Type of Erosion Control	If necessary, temporary silt fences may be installed at the base of unstabilized dune slopes adjacent to remediated/created wetland areas. Exclusion fencing may be installed to prevent soil destabilization. Slopes within the project area are not anticipated to warrant additional protective measures.
Revegetation Plan & Methodology	Both container stock and seeds will be used. For species requiring seeding, the seed will be hand-broadcast after planting of the containers and will be raked into the soil between the container stock. Refer to Figure G-4.
Non-native Plant Control	Non-native plants will be removed through manual techniques or selective herbicide application on a regular basis to ensure successful establishment of the native plants. In wetland areas, only Aquamaster® or a similar resource agency approved herbicide will be used. Aquamaster ® is an aquatic, post-emergent; a nonselective herbicide with no added surfactant will be used. Treatment will not occur in wetlands where California red-legged frogs (CRLF) have been known to occur during the rainy season.
Buffer Area	A 100 foot buffer zone will be maintained outside of the wetland restoration boundaries to ensure that habitat surrounding the restoration will be of good quality and not negatively affect the restoration efforts. Refer to the Buffer Area Success Criteria and Evaluation.
Restoration and Monitoring Schedule	Refer to Attachment G-2.
Adaptive Management	<ul style="list-style-type: none"> • If the restoration monitoring indicates interim progress is substantially different from the success criteria, then the restoration approach may need to be reassessed. An adaptive management strategy will then be used to determine the cause, take remedial actions, and/or adjust the approach or methodology (refer to Section 11.2 of the WRMP). • Remedial measures to be evaluated and implemented could include but not be limited to: Changes in planting palette, propagation and/or planting techniques; Replanting or reseeding; Irrigation during the plant establishment period; or, Selection of alternative sites to achieve mitigation requirements and restoration goals and objectives. • The adaptive management process will be initiated through the initial evaluation of the circumstances and review of options for remedial actions. Unocal will communicate with the County, CDFG, CCC, USACE and USFWS to apprise them of the situation and options for remedial actions.

Success Criteria and Evaluation Criteria - B-11

Category	Success Criteria	Monitoring/ Evaluation	Criteria	Notes
Wetland Mitigation	The remediation activities at B-11 will impact approximately 0.09 acres of previously identified federal wetlands and 0.10 acres of state jurisdictional wetlands. The federal wetland will be replaced at a 1:1 ratio and the state wetland will be replaced at a 4:1 ratio (0.4 acres).	A wetland delineation will be conducted at restored wetlands at 5 years after initiation and at the end of the entire Wetland Restoration Program at the Field.	Criteria met	This criterion will be deemed complete when Field-wide the appropriate 1:1 and 4:1 mitigation ratios have been met.
Erosion Control and Soil Stabilization	Top soil shall be stable and not subject to water and wind erosion. No gullying, washouts or blowouts shall persist.	Weekly during rainy season (October 1-April 1) and during major storm until vegetation established and soil stabilized	Criteria met	Assess cause. Consider additional or alternative mitigation.
Number of wetland plant species associations	Each created or restored wetland should have at least two wetland associations	Once, upon completion of restoration	Criteria met	Continue monitoring Implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP). Complete
Revegetation of Deep Water/Low Elevation Marsh	Richness of native perennials: Range (min-max of means) 2 - 4 Richness of non-native invasive species: # of species 0 Richness of non-native species (excluding invasive species) Range (min-max of means) 0 Absolute cover of native perennials 99-100% Absolute cover of non-native species, including non-native invasive species: 0 Frequency of native perennial species The following species are present: <i>Scirpus californicus</i> , <i>Typha latifolia</i> , <i>Hydrocotyle ranunculoides</i> , <i>Lemna minima</i> , and <i>Wolffia linguata</i>	Annual	Criteria not met	At end of Field-wide restoration at least 75% of all sites must have at least 3 wetland plant species associations. If criteria not met, Field-wide restoration is not deemed complete
			Criteria met	Restoration will be considered complete and final performance monitoring will be conducted.
			Criteria not met	Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).

Success Criteria and Evaluation Criteria - B-11		Monitoring Frequency	Restoration Status
Category	Success Criteria		
Revegetation of Shallow Water/High Elevation Marsh	<p>Richness of native perennials: Range (min-max of means) 5.3 – 7.3</p> <p>Richness of non-native, invasive species: # of invasive species 0</p> <p>Richness of non-native species, excluding non-native invasive species: Range (min-max of means) 0 – 4.9</p> <p>Absolute cover of native perennials: Range (min-max of means): 92-99</p> <p>Absolute cover of non-native, invasive species: Absolute cover 0%</p> <p>Absolute cover of non-native species, excluding non-native invasive species: Absolute cover 0-17%</p> <p>Frequency of native perennial species: The following species are present: <i>Scirpus pungens</i>, <i>Eleocharis macrostachya</i>, <i>Potentilla anserina</i>, <i>Hydrocotyle ranunculoides</i>, <i>Juncus phaeocephalus</i> or <i>Hydrocotyle verticillata</i></p>	Annual	<p>Criteria met</p> <p>Restoration will be considered complete and final performance monitoring will be conducted.</p> <p>Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).</p>
	Revegetation of Open Wetland Herbaceous	<p>Richness of native perennials: Range (min-max of means) 6.3-10.0</p> <p>Richness of non-native, invasive species: # of invasive species 0</p> <p>Richness of non-native species, excluding non-native invasive species: Range (min-max of means) 0 – 7.8</p> <p>Absolute cover of native perennials: Range (min-max of means): 50-87</p> <p>Absolute cover of non-native, invasive species: Absolute cover 0%</p> <p>Absolute cover of non-native species, excluding non-native invasive species: Absolute cover 0-50%</p> <p>Frequency of native perennial species: The following species are present: <i>Carex praegracilis</i>, <i>Juncus lesueurii</i>, <i>Potentilla anserina</i>, <i>Plantago subnuda</i>, <i>Trifolium wormskloidi</i>, <i>Distichlis spicata</i>, <i>Scirpus pungens</i>, <i>Leymus triticoides</i>, <i>Jaumea carnosa</i></p>	Annual
			<p>Criteria not met</p>

Success Criteria and Evaluation Criteria - B-11				
Revegetation of Transitional Herbaceous/Scrub	<p><u>Richness of native perennials:</u> Range (min-max of means) 5.3-9</p> <p><u>Richness of non-native, invasive species:</u> # of Invasive species 0</p> <p><u>Richness of non-native species, excluding non-native invasive species:</u> Range (min-max of means) 0 - 6.3</p> <p><u>Absolute cover of native perennials:</u> Range (min-max of means): 79-98</p> <p><u>Absolute cover of non-native, invasive species:</u> Absolute cover 0%</p> <p><u>Absolute cover of non-native species, excluding non-native invasive species:</u> Absolute cover 0-19%</p> <p>Frequency of native perennial species: The following species are present: <i>Carex praegracilis</i>, <i>Juncus tesuaurii</i>, <i>Baccharis pilularis</i>, <i>Artemisia dracunculoides</i>, <i>Isocoma menziesii</i>, <i>Leymus triticoides</i>, <i>Ambrosia psilostachya</i>, <i>Solidago californica</i>, and <i>Distichlis spicata</i></p>	Annual	Criteria met	Restoration will be considered complete and final performance monitoring will be conducted.
	<p>Two plants for each impacted thistle documented to survive, flower, and set seed;</p> <p>Second generation of seedlings established without management intervention (planting, watering, weeding, etc.)</p> <p>Recruitment of newly established population is within 20% of natural population</p> <p>Site must possess either (a) documented presence for two years of 100% of the wildlife habitat elements identified as being essential and 50% of those elements identified as being beneficial or (b) documented presence for two years of the actual function or value (Refer to SSRP Wildlife Element Matrix)</p>	Qualitative monitoring in April, June, and October during monitoring period (anticipated not to exceed 5 years). A final quantitative monitoring will occur in the fifth year.	Criteria Met	LGT mitigation will be considered complete and final performance monitoring will be conducted. Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).
La Graciosa Thistle Mitigation			Criteria not met	Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).
Wildlife Habitat Restoration		Quarterly Eyeshine, Annual Wildlife Habitat Elements Survey	Criteria Met	Continue monitoring
			Criteria not met	Continue monitoring until all functions have found to be present for at least two years.

Buffer Area Success Criteria and Evaluation Criteria - B-11		Monitoring Frequency	Criteria Met	Monitoring
Erosion Control and Soil Stabilization	Topsoil within the buffer areas should be stable and not subject to water and wind erosion. No gulying or blowouts should exist that may impact the wetland restoration site or adjacent wetland areas	Weekly during rainy season (October to April) and during major storm events until soil stabilized	Criteria met	Continue monitoring
Non-Native Plant Species Control	The combined cover of invasive, non-native plant species should remain less than 5%. The combined cover of non-invasive, non-native plant species, excluding birdfoot trefoil should remain less than 20%	Annual	Criteria Met	Continue monitoring
Revegetation	The total cover in the buffer area should be comparable to similar, undisturbed plant species association at the Field. Each plant species association in the buffer area should have at least 4 species from WMRP table 12 - Buffer Area Species Mix table	Annual	Criteria Not Met	Assess cause; Implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).
			Criteria Met	Continue monitoring
			Criteria not met	Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).

SITE-SPECIFIC RESTORATION PLAN

Project Description

Project Description	Unocal proposes to excavate and remove the D-14 former oil well pad and surrounding sump material. Associated project activities include sheetpiling, excavation, hauling, and backfilling. The remediation area will impact approximately 0.37 acres of previously identified federal wetlands and 0.37 acres of state jurisdictional wetlands. The federal wetland will be replaced at a 1:1 ratio and the state wetland will be replaced at a 4:1 ratio. A total of 0.73 acres will be remediated/restored at D-14, and the remaining 0.75 acres of mitigation wetlands will be created at other locations at the Guadalupe Restoration Project (refer to Section 2.2 of the WRMP). The basis for the selection of the D-14 wetland restoration is included in Attachment I-1.
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Excavation Project Summary

Location	The D-14 project area is in the southwest corner of the Unocal Guadalupe Restoration Project, Guadalupe, County of San Luis Obispo, California. Refer to Figure I-1.
Project Schedule	The start of construction activities has not yet been determined pending project approval by federal, state, and local agencies, and completion of the Supplemental EIR for the Unocal Guadalupe Restoration project. A schedule of the ecological events required prior to construction is provided in Attachment I-2.
Previous Activity	The D-14 well pad was the location of a former oil production well, sump, and associated equipment. The D-14 Site consists of underlying roads and well pads. It also has evidence of cattle impacts.
Duration of Excavation	It is anticipated the D-14 construction activities will last four weeks. Refer to Attachment I-2.

Site Area	Refer to Figure I-2.
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D-14	Size	
	Acre	Square feet
Remediation Area (area within excavation limits of disturbance):	0.36	15,856
Restoration Area (area outside remediation area but within restoration grading daylight boundary):	0.37	15,995
Total Remediation/Restoration Area:	0.73	31,851

Pre-Excavation Site Characteristics

Topography

Site Description	The site is a former oil well pad that has residual sump and road base material and dissolved-phase diluent hydrocarbons. The site has underlying pads and roads and is relatively level.
Site Elevations	Surface elevations range from 14 to 16 ft. msl (refer to Figure I-2) with historical groundwater elevations ranging from 12.2 to 15.2 ft. msl (refer to Attachment I-3).
Approximate Pre-Excavation Topography	The site is relatively level with a slight increase in elevation from west to east. Elevations in the west are approximately 14 feet and increase to 16 feet to the east. A steep dune slope is located to the east of the project site.
Unique Natural Features	The entire site is within the Santa Maria River floodplain. To the east of the site is a steep dune slope vegetated with Coastal Dune Scrub habitat. Riparian habitat is present to the north, west and south of the site.

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Habitat Types

Habitat Types & Plant Associations Present Within Limits of Disturbance (refer to Section 4.3 of the WRMP)

Habitat Type	Limits of Remediation (square feet)	Limits of Restoration (square feet)
Open Wetland Herbaceous Native Dominated	1,220	2,618
Open Wetland Herbaceous Non-Native Dominated	12,197	10,019
Willow Woodland	1,002	1,677
Road	1,437	1,681
Total	15,856	15,995

Adjacent Habitat Types & Plant Species Associations

Coastal Dune Scrub, Willow Woodland/Riparian, Open Wetland Herbaceous and Transitional Herbaceous/Scrub. Refer to D-14 Baseline Vegetation Report in Attachment I-4.

Functions and Values

Functions and Values (refer to Section 2.5 of the WRMP)

Function or Value	Function Provided by Wetland?
Groundwater Recharge	No
Floodflow Alteration	Yes
Bank Stabilization	Yes
Sediment or Toxicant Retention	Yes
Nutrient Removal or Transformation	Yes
Bioproductivity	Yes
Aquatic Diversity and Abundance	Yes
Wildlife Diversity and Abundance	Yes
Botanical Diversity	Yes
Habitat for Sensitive Plant Species	Yes
Habitat for Sensitive Wildlife Species	Yes
Cultural Resource	No
Uniqueness	Yes
Scientific Research	Yes

Wildlife Functions (refer to Section 9.1.3 of the WRMP or the Baseline Wildlife Functions and Habitat Elements Matrix)	<ul style="list-style-type: none"> • Amphibian Cover/Refuge & Foraging Habitat • Lizard Cover/Refuge & Foraging Habitat • Terrestrial Snake Cover/Refuge & Foraging Habitat • Aquatic Snake Cover/Refuge & Foraging Habitat • Wading Bird Foraging Habitat • Waterfowl Loafing Habitat • Raptor/Owl Hunting Habitat • Ground Nesting Bird Habitat • Songbird Foraging, Cover/Refuge, & Nesting Habitat • Insectivorous Mammal Foraging, Cover/Refuge, & Breeding Habitat • Bat Foraging Habitat • Carnivore Denning, Hunting, & Cover Habitat • Herbivore Foraging & Cover Habitat • Rodent Cover, Foraging, & Burrowing Habitat • Wildlife Drinking Water Source
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Baseline Vegetation Survey

Source	May 2004. Refer to D-14 Baseline Vegetation Report in Attachment I-4.
Sampling Methods	Point Intercept sampling was conducted along two perpendicular transects that cross the lowest/deepest part of the wetland disturbance area. Data were collected at 0.5 meter intervals. Additionally, individual plant species cover data and frequency were collected from one square meter plots established within each existing wetland plant assemblage on site. Two phases of the Open Wetland Herbaceous association occur on site and each of these phases was sampled separately. A phase represents species composition variations among the association. Refer to Attachment I-4 and to Section 9.3.1 of the WRMP for in depth description of sampling methods.
Number of Samples	The point intercept transects were both approximately 75 meters long, with 150 points sampled. Thirty quadrats were sampled in both phases of the Open Wetland Herbaceous habitat (refer to Figure I-3). Fifteen, one meter quadrats were sampled in the Willow Woodland.

Plants: Absolute Percent Coverage ± Standard Deviation

Habitat Type	Native	Non-Native
Open Wetland Herbaceous Native Dominated	<i>Distichlis spicata</i> 31.1% ± 23.5	<i>Lotus corniculatus</i> 6.6%± 9.5 <i>Cynodon dactylon</i> 5.9%± 16.8
	<i>Jaumea carnosa</i> 28.7% ± 28.6	
	<i>Potentilla anserina</i> 20.8% ± 18.4	
	<i>Trifolium wormskioldii</i> 5.9% ± 8.3	
	<i>Scirpus pungens</i> 5.6% ± 7.2	
	<i>Plantago subnuda</i> 3.0% ± 5.3	
Open Wetland Herbaceous Non-Native Dominated	<i>Eleocharis acicularis</i> 2.4% ± 7.4	<i>Cynodon dactylon</i> 56.8%± 23.8 <i>Lotus comiculatus</i> 14.3%± 11.2 <i>Lolium multiflorum</i> 2.1% ± 4.5
	<i>Distichlis spicata</i> 13.9% ± 19	
	<i>Carex praegracilis</i> 9.6% ± 15.6	
	<i>Potentilla anserina</i> 7.2% ± 9.9	
	<i>Scirpus pungens</i> 3.4% ± 5.7.5	
	<i>Plantago subnuda</i> 2.3% ± 2.9	
<i>Trifolium wormskioldii</i> 2.3% ± 3.6		

Willow Woodland	<i>Salix lasiolepis</i> 65.3% ± 12.6 <i>Potentilla anserina</i> 29.0% ± 20 <i>Carex praegracilis</i> 19% ± 17.6 <i>Distichlis spicata</i> 13.3% ± 12.8 <i>Baccharis douglasii</i> 9.9% ± 11.4 <i>Scirpus cernuus</i> 7.0% ± 11.4	<i>Cynodon dactylon</i> 9.7% ± 17.3 <i>Lolium multiflorum</i> 3.9% ± 7.8 <i>Agrostis viridis</i> 2.8% ± 4.3 <i>Lotus corniculatus</i> 2.1% ± 2.2
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Sensitive Plants/Habitat

Habitat Type	Species, Percent Cover ± Standard Deviation (or numbers)	Status
Open Wetland Herbaceous	<i>Cirsium loncholepis</i> : trace cover ; 17 individuals during 2004 census	FE, ST, CNPS 1B

Baseline Wildlife Survey

Source	June 2003, April & May 2004. Refer to the Wildlife Survey Report for the D-14 Site-Specific Restoration Plan (Attachment I-5).
Sampling Methods	Eyeshine surveys, transect survey, bird surveys, small mammal trapping, and incidental observations (refer to Attachment I-5 and to Section 9.3.2 of the WRMP).
Wildlife Survey Results	A list of wildlife species observed or expected at or adjacent to the site is provided in the Wildlife Survey Report for the D-14 Site-Specific Restoration Plan (Attachment I-5).
Special Status Wildlife Species	Sensitive wildlife species that may potentially occur on-site based on available habitat (species in BOLD have been seen at or near the site):

common name	scientific name	state status	federal status
western spadefoot	<i>(Spea hammondi)</i>	CSC	-
California red-legged frog	<i>(Rana aurora draytonii)</i>	CSC	FT
coast horned lizard	<i>(Phrynosoma coronatum)</i>	CSC	-
California legless lizard	<i>(Anniella pulchra)</i>	CSC	-
two-striped garter snake	<i>(Thamnophis hammondi)</i>	CSC	-
white-tailed kite	<i>(Elanus leucurus)</i>	CFP	-
sharp-shinned hawk	<i>(Accipiter striatus)</i>	CSC	-
Cooper's hawk	<i>(Accipiter cooperii)</i>	CSC	-
merlin	<i>(Falco columbarius)</i>	CSC	-
burrowing owl	<i>(Athene cunicularia)</i>	CSC	-
long-eared owl	<i>(Asio otus)</i>	CSC	-
southwestern willow catcher	<i>(Empidonax traillii extimus)</i>	CE	FE
loggerhead shrike	<i>(Lanius ludovicianus)</i>	CSC	-
yellow warbler	<i>(Dendroica petechia)</i>	CSC	-
yellow-breasted chat	<i>(Icteria virens)</i>	CSC	-
pallid bat	<i>(Antrozous pallidus)</i>	CSC	-
Townsend's big-eared bat	<i>(Corynorhinus townsendii)</i>	CSC	-
California mastiff bat	<i>(Eumops perotis californicus)</i>	CSC	-
ringtail	<i>(Bassariscus astutus)</i>	CFP	-

CSC- "California Species of Special Concern" have declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

CFP- California Fully Protected; may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected" species, although take may be authorized for necessary scientific research.

CE- California Endangered – a native species is endangered when its prospects of survival and reproduction are in immediate jeopardy from one or more causes.

FE- Federally listed as Endangered.

FT- Federally listed as Threatened.

Proposed Restoration Activities

Objectives	<ul style="list-style-type: none"> Site wide objective is intended to create all of the functions and values at restored wetlands as described in Section 3.1 of the WRMP. Establish target zones of inundation and saturation at topographic contours that will allow for varied surface expression of wetland hydrology characteristics during below average, average and above average rainfall years. Remediate wetland habitats disturbed by remediation activities and restore wetlands in existing disturbed wetland habitat (existing roads and pads), resulting in a native dune swale wetland habitat complex similar in species composition, abundance and dispersion to those at reference sites. The following wetland plant species associations will be remediated and restored at D-14: 1) Shallow Water/High Elevation Marsh, 2) Open Wetland Herbaceous, and 3) Transitional Herbaceous/Scrub. Replace and enhance general wetland functions and values. Establish a wetland habitat complex that supports a gradient zone of soil saturation conducive to La Graciosa thistle. Furthermore, a proper number of La Graciosa thistles will be planted, monitored and remedial measures enacted to achieve the performance standard of survival of two La Graciosa thistles for each one impacted until they reproduce. Replace and enhance wildlife functions appropriate to habitats/associations of the restored site.
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Pre-Disturbance Activities

Construction and Access Boundaries	Refer to Figure I-1.
Baseline Surveys	Pre-disturbance vegetation and wildlife survey were conducted in June 2003 and in April/May 2004. The results of these surveys are attached as Attachments I-4 and I-5. If remediation of this site is not initiated within 24-months of the pre-disturbance surveys additional pre-disturbance wildlife surveys will be conducted. An additional vegetation survey of the site will be conducted during the spring/summer within six months of the site disturbance.
Proposed Permanent Photo Points (before/after photos)	There are 5 permanent photo stations (refer to Figure I-3). Pre-disturbance photos are included in Attachment I-7.

Revegetation Species Selected
Species selected to be planted and/or seeded into the recontoured dune swale complex to include:

Shallow Water/High Elevation Marsh:	% of area	lbs/acre	# plantings/acre
<i>Scirpus pungens</i>	30%	7	3150 at 2'
<i>Hydrocotyle ranunculoides</i>	15%	4.5	500 at 4'
<i>Hydrocotyle verticillata</i>	15%	3.5	375 at 4'
<i>Potentilla anserina</i>	5%	1	125 at 4'
<i>Eleocharis macrostachya</i>	10%	2.5	450 at 3'
<i>Eleocharis parishii</i>	5%	0.5	90 at 3'
<i>Juncus phaeocephalus</i>	2%	0.25	90 at 3'

<i>Juncus effusus</i>	10%	0.5	250 at 4'
<i>Anemopsis californica</i>	2%	0.25	
Open Wetland Herbaceous:	% of area	lbs/acre	# plantings/acre
<i>Carex praegracilis</i>	30%	10	1370 at 3'
<i>Potentilla anserina</i>	20%	3	500 at 4'
<i>Distichlis spicata</i>	10%	3.5	375 at 4'
<i>Juncus lesueurii</i>	5%	1	230 at 3'
<i>Trifolium wormskioldii</i>	10%	3	250 at 4'
<i>Jaumea carnosus</i>	10%	1.5	450 at 3'
<i>Scirpus pungens</i>	5%	1	525 at 2'
<i>Leymus triticoides</i>	5%	2	230 at 3'

Transitional Herbaceous/Scrub:	% of area	lbs/acre	# plantings/acre
<i>Carex praegracilis</i>	60%	17	2750 at 3'
<i>Juncus lesueurii</i>	20%	2.25	900 at 3'
<i>Baccharis pilularis</i>	2%	0.75	
<i>Solidago californica</i>	2%	0.25	
<i>Artemisia dracunculoides</i>	2%	0.25	
<i>Leymus triticoides</i>	5%	1.5	230 at 3'
<i>Distichlis spicata</i>	5%	1	125 at 3'
<i>Ambrosia psilostachya</i>	2%	1	
<i>Isocoma menziesii</i>	2%	1	

Collect, Store, and Maintain Seeds, Propagules, Cuttings, and Plant Materials	Refer to WRMP Section 7.3.2 and 7.3.3 for detailed methodology. Plugs, divisions and cuttings will be collected from the project disturbance footprint and augmented from other sources within the Field as needed. Within a year prior to disturbance, native seeds shall be collected by a seed collector/supplier with experience in site-specific, native seed collections; then dried, cleaned, and properly stored. WRMP Table 8 provides information on target collection periods.
Non-native Plant Control	The D-14 Site will be treated for non-native plants for at least one growing season prior to any remediation/restoration activities. The site will again be treated 30 days prior to initiation of remediation/restoration activities.
Special Status Plant Species Protection	All La Graciosa thistle within or adjacent to D-14 are annually mapped and censused. Construction areas and access routes have been limited to avoid impact to individuals or colonies. However, impacts to some LGT may be unavoidable. Measures, as described in the attached Salvage, Propagation and Replanting Plan (Appendix P of the WRMP) will be implemented and the CDFG 2081 Permit will be complied with. La Graciosa thistle seeds will be collected from plants within the disturbance area for at least 2 years prior to disturbance. Furthermore, any plants in the disturbance area will be salvaged prior to the disturbance. Two LGT will be planted for every LGT impacted. These plants must be documented to survive, flower, and set seed.

Sensitive Plant Species Protection	No sensitive plant species, other than the La Graciosa thistle, are found at D-14. An additional vegetation survey of the site will be conducted during the spring/summer within six months of the site disturbance to detect the presence of any sensitive plant species. If any sensitive plant species are found, seeds from these plants will be collected from the area of potential disturbance. Furthermore, plants or cuttings may be salvaged. These seeds or plants will be transplanted following completion of project activities in that area or in an alternate area possessing suitable habitat. Unocal tracks the status of sensitive plants at each restoration site. Section 6 of each Quarterly Ecological Monitoring Report (QEMR) tracks sensitive plants disturbed at each impact area and annually (in spring) provides the current coverage or density of sensitive species at these sites. (see Sensitive Species Management Plan in Appendix E of the EMP).
Sensitive Wildlife Species Protection	California red-legged frog was observed within the limits of disturbance during, however this species is known to occur within the general vicinity of D-14, therefore special protocols will be initiated prior to and during construction. These protocols are provided in Section 7.2.2 of the WRMP and in Appendix E of the Ecological Monitoring Plan.
General Wildlife Species Protection	In the week prior to the start of construction, wildlife clearance surveys will be conducted. A wildlife monitor shall be present immediately prior to and during initial ground disturbance activities to search for and relocate any wildlife that may potentially be harmed.

Soil/Vegetation Salvage Activities to Be Conducted During Remediation

Salvage Vegetated Overburden	The upper 12 inches of clean plant material and soil will be stockpiled when appropriate. Vegetated overburden contaminated with red-rock, asphalt, oil sand, excessive weed infestation, or affected material, will not be salvaged. Only clean vegetated overburden will be used. Refer to Section 7.2.3 of the WRMP.
Temporary Stockpile Location	Vegetated overburden will be stored at approved stockpile locations. Stockpile locations that could be used include E4-A, C-6/C-7, and South B Road. In some instances, smaller overburden stockpiles may be placed within the limits of disturbance.

Restoration Activities Following Remediation

Habitats and Plant Species Associations Being Restored (refer to Section 4.3 of the WRMP)	Pre-disturbance Area Size (square feet)	Post-disturbance Area Size (square feet)
Shallow Water /High Elevation Marsh	0	3,700
Open Wetland Herbaceous Native Dominated	3,838	28,100
Open Wetland Herbaceous Non-Native Dominated	22,216	Not Proposed
Transitional Herbaceous/Scrub	0	100
Willow Woodland (1)	2,679	Not Proposed
Road	3,118	Not Proposed
Total	31,851	31,900

(1) The relatively small area of Willow Woodlands were not proposed to be replaced at this site in order to maximize the habitat available to La Graciosa thistle. Furthermore, there is already considerable Willow Woodland in the surrounding habitat. Additional Willow Woodland will be restored on the Field at sites where it does not currently exist; there will be no net loss of Willow Woodland at the field.

Post Excavation Contours	Refer to Figure I-4.
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Source of Soils	A combination of clean, excavated/salvaged onsite soils, plus additional material, as needed, brought in from Q-4 or other pre-approved borrow sites. The use of Q-4 sand has been authorized by the CCC and SLO County.
Recontouring Schedule	Recontouring will occur following the completion of excavation activities and prior to demobilization of heavy equipment from the Site.
Vegetated Overburden	Available vegetated overburden will be replaced after contouring.
Revegetation Schedule	When feasible, planting will be initiated in early winter following the first heavy rains, usually in November or December, however later in winter (January or February) is acceptable.
Type of Erosion Control	If necessary, temporary silt fences may be installed at the base of unstabilized dune slopes adjacent to remediated/created wetland areas. Exclusion fencing may be installed to prevent soil destabilization. Slopes within the project area are not anticipated to warrant additional protective measures.
Revegetation Plan & Methodology	Container stock and seeds will both be used. Seed will be hand-broadcast after planting of the containers and will be raked into the soil between the container stock. Refer to Figure I-4.
Non-native Plant Control	Non-native plants will be removed through manual techniques or selective herbicide application on a regular basis to ensure successful establishment of the native plants. In wetland areas, only Aquamaster® or a similar resource agency approved herbicide will be used. Aquamaster® is an aquatic, post-emergent, a nonselective herbicide with no added surfactant. Treatment will not occur in wetlands where surface water is present and California red-legged frogs have been known to occur.
Buffer Area	A 100 foot buffer zone will be maintained outside of the wetland restoration boundaries to ensure that habitat surrounding the restoration will be of good quality and not negatively affect the restoration efforts. Refer to the Buffer Area Success Criteria and Evaluation.
Restoration and Monitoring Schedule	Refer to Attachment I-2
Adaptive Management	<ul style="list-style-type: none"> • If the restoration monitoring indicates interim progress is substantially different from the success criteria, then the restoration approach may need to be reassessed. Depending on the situation, an adaptive management strategy may be necessary to take remedial actions and/or adjust the approach or methodology (refer to Section 11.2 of the WRMP). • Remedial measures to be evaluated and implemented could include but are not limited to: changes in plant selection, propagation and/or planting techniques, replanting or reseeded, irrigation during establishment period, or selection of alternative sites to achieve mitigation requirements and restoration goals and objectives. • The adaptive management process may be initiated following the initial evaluation of the circumstances and review of options for remedial actions. Unocal will communicate with the County, CDFG, CCC, USACE and USFWS to apprise them of the situation and options for remedial actions.

Success Criteria and Evaluation Criteria - D-14			
Category	Success Criteria	Monitoring Frequency	Monitoring/Action
Wetland Mitigation	At D 14, disturbance of approximately 0.37 acres of state jurisdictional wetlands will be mitigated by 1.48 acres of wetland remediation/creation/restoration. A total of 0.73 acres of wetland habitat will be remediated/restored at D	A wetland delineation will be conducted at restored wetlands at 5 years after initiation and at the end of the entire Wetland Restoration Program at the Field.	Criteria met Criteria not met.
Erosion Control and Soil Stabilization	Top soil shall be stable and not subject to water and wind erosion. No gulying, washouts or blowouts shall persist.	Weekly during rainy season (October 1-April 1) and during major storm events until vegetation is established and soils are stabilized	Criteria met Criteria not met
Number of wetland plant species associations	Each created or restored wetland should have at least two wetland associations	Once, upon completion of restoration	Criteria met Criteria not met
Revegetation of Shallow Water/High Elevation Marsh	Richness of native perennials: Range (min-max of means) 5.3 - 7.3 Richness of non-native, invasive species: # of Invasive species 0 Richness of non-native species, excluding non-native invasive species: Range (min-max of means) 0 - 4.9 Absolute cover of native perennials: Range (min-max of means): 92-99 Absolute cover of non-native, invasive species: Absolute cover 0% Absolute cover of non-native species, excluding non-native invasive species: Absolute cover 0-17% Frequency of native perennial species: The following species are present: <i>Scirpus purgens</i> , <i>Eleocharis macrostachya</i> , <i>Potentilla anserina</i> , <i>Hydrocotyle ranunculoides</i> , <i>Juncus phaeocephalus</i> or <i>Hydrocotyle verticillata</i>	Annual	Criteria met Criteria not met

Category	Success Criteria	Monitoring Frequency	Monitoring Funding	Action
Revegetation of Open Wetland Herbaceous	<p>Richness of native perennials: Range (min-max of means) 6.3-10.0</p> <p>Richness of non-native, invasive species: # of invasive species 0</p> <p>Richness of non-native species, excluding non-native invasive species: Range (min-max of means) 0 - 7.8</p> <p>Absolute cover of native perennials: Range (min-max of means): 50-87</p> <p>Absolute cover of non-native, invasive species: Absolute cover 0%</p> <p>Absolute cover of non-native species, excluding non-native invasive species: Absolute cover 0-50%</p> <p>Frequency of native perennial species: The following species are present: <i>Carex praegracilis</i>, <i>Juncus tesuaurii</i>, <i>Potentilla anserina</i>, <i>Plantago subnuda</i>, <i>Trifolium wormskiodii</i>, <i>Distichlis spicata</i>, <i>Scirpus pungens</i>, <i>Leymus triticoides</i>, <i>Jaumea carnosa</i></p>	Annual	Criteria met	Restoration will be considered complete and final performance monitoring will be conducted.
Revegetation of Transitional Herbaceous/Scrub	<p>Richness of native perennials: Range (min-max of means) 5.3-9</p> <p>Richness of non-native, invasive species: # of Invasive species 0</p> <p>Richness of non-native species, excluding non-native invasive species: Range (min-max of means) 0 - 6.3</p> <p>Absolute cover of native perennials: Range (min-max of means): 79-98</p> <p>Absolute cover of non-native, invasive species: Absolute cover 0%</p> <p>Absolute cover of non-native species, excluding non-native invasive species: Absolute cover 0-19%</p> <p>Frequency of native perennial species: The following species are present: <i>Carex praegracilis</i>, <i>Juncus tesuaurii</i>, <i>Baccharis pilularis</i>, <i>Artemisia dracunculifolia</i>, <i>Isocoma menziesii</i>, <i>Leymus triticoides</i>, <i>Ambrosia psilostachya</i>, <i>Solidago californica</i>, and <i>Distichlis spicata</i></p>	Annual	Criteria not met	Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).
			Criteria met	Restoration will be considered complete and final performance monitoring will be conducted.
			Criteria not met	Assess cause; Implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).

Success Criteria and Evaluation Criteria - D-14			
Category	Success Criteria	Monitoring Frequency	Monitoring Finding
La Graciosa Thistle Mitigation	Two plants for each impacted thistle documented to survive, flower, and set seed;	Qualitative monitoring in April, June, and October during monitoring period (anticipated not to exceed 5 years). A final quantitative monitoring will occur in the fifth year.	Criteria Met
	Second generation of seedlings established without management intervention (planting, watering, weeding, etc.)		Criteria not met
Wildlife Habitat Restoration	Recruitment of newly established population is within 20% of natural population	Quarterly Eyeshine, Annual Wildlife Elements Survey	Criteria Met
	Site must possess either (a) documented presence for two years of 100% of the wildlife habitat elements identifies as being essential and 50% of those elements identified as being beneficial or (b) documented presence for two years of the actual function or value (Refer to SSRP Wildlife Element Matrix)		Criteria not met
Buffer Area Success Criteria and Evaluation Criteria - D-14			
Category	Success Criteria	Monitoring Frequency	Monitoring Finding
Erosion Control and Soil Stabilization	Topsail within the buffer areas should be stable and not subject to water and wind erosion. No gullying or blowouts should exist that may impact the wetland restoration site or adjacent wetland areas	Weekly during rainy season (October to April) and during major storm events until soil stabilized.	Criteria met
	The combined cover of invasive, non-native plant species should remain less than 5%. The combined cover of non-invasive, non-native plant species, excluding birdfoot trefoil should remain less than 20%		Criteria not met
Revegetation	The total cover in the buffer area should be comparable to similar, undisturbed plant species association at the Field. Each plant species association in the buffer area should have at least 4 species from WMRP table 12 - Buffer Area Species Mix table	Annual	Criteria Met
			Criteria not met.

LGT mitigation will be considered complete and final performance monitoring will be conducted.

Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).

Continue monitoring

Continue monitoring until all functions have found to be present for at least two years.

Continue monitoring

Implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).

Continue monitoring

Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).

Continue monitoring

Assess cause; implement appropriate maintenance/remedial actions (refer to Section 11.2 of the WRMP).