Revised Grassland Assessment and Vegetation Mapping Survey Report

for the

NEWPORT BANNING RANCH

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1.0 INTRODUCTION

Dudek has prepared this Grassland Assessment and Vegetation Mapping Survey Report (report) on behalf of the Newport Banning Ranch LLC (Newport Banning Ranch) to describe and graphically represent the location of grassland populations and vegetation communities found on the Newport Banning Ranch Project (Project) site. The intent of this report is to provide updated biological information in support of the project application through the Coastal Development Permit (CDP) review process. This report also provides baseline vegetation data relevant to standard operation and maintenance activities associated with the existing West Newport Oil facility, which remains an active oil production facility.

1.1 Project Location

The Project site is located in the City of Newport Beach, and unincorporated Orange County, California, on the southwestern boundary of the City of Costa Mesa and east of the City of Huntington Beach (*Figure 1*). The site is bordered by commercial and residential development in the City of Costa Mesa on the east, the Pacific Coast Highway and residential properties within Newport Beach on the south, the Santa Ana River and Santa Ana River estuary on the west, and Talbert Regional Park on the north. The Pacific Ocean is approximately 289 meters (947 feet) to the southwest of the site at its closest point.

1.2 Biological Setting

The 385.493-acre Project site is located between the westernmost portion of a coastal terrace, including adjacent bluffs, arroyos, and the Santa Ana River tide channel, salt marshes, and associated lowlands. The majority of the southern and eastern portions of the site are located on a 251.246-acre western portion of a coastal terrace, the Newport Mesa. This terrace supports areas of open grass and forb-dominated communities in the southeast, disturbed forb-dominated communities in the east-central portion of the terrace, scrub habitats in the northeastern portion of the site, and a mixture of scrub, and disturbed forb communities in the central portion of the site. An arroyo with a dense thicket of southern willow scrub bisects the southern portion of the site from east to west. The bluffs bordering the terrace to the south and east are dominated by a variety of coastal scrub communities that include California brittlebush (*Encelia californica*), California buckwheat (*Eriogonum fasciculatum*), prickly pear (*Opuntia littoralis*), and coast cholla (*Cylindropuntia prolifera*). The 134.247-acre lowlands occupy mostly the northwestern portion of the site, adjacent to the Santa Ana River and the river estuary. They consist of limited tidally influenced saltmarsh habitats, disturbed open and scrub habitats, and an extensive area of disturbed willow forest and scrub.

The West Newport Oil Company currently operates a commercial oil and gas facility on-site. Historically, oil exploration occurred in the 1930's with the initiation of commercial extraction and production of the West Newport Oil Field at Newport Banning Ranch in 1944. Therefore, nearly all portions of the site, the coastal terrace, bluffs, arroyos, and lowlands, have undergone modifications to varying degree by the installation and long-term operation and maintenance of oil well pads, roads, oil and gas pipelines, and maintenance activities associated with the oil and gas operation. Developed portions of the site consist of oil pads, oil facilities, offices, paved roads, parking lots, and storage, debris, and stockpile areas.

In addition, the oil field operation includes maintenance and security activities that are essential to efficient operations and the protection of the property, oil field employees, and persons and properties in the vicinity of the oilfield. These activities include, among others, road repairs, vegetation management, fire abatement, and weed control. Vegetation management is an integral component of the oil field maintenance program, and has been performed by oil operators since the early 1940s. The extent of vegetation clearance is limited to the amount necessary to ensure public safety, fire prevention, site security, and proper oil field functioning. Vegetation management is performed by mowing and manual removal (e.g., saws, weed whackers, and pruners) of flammable vegetation, including most open grass and weedy areas. Historically, the oil operators have performed vegetation management at least two times per year (depending upon the seasonal rainfall), and have periodically (typically annually) cleared vegetative growth along oil pipelines, gas pipelines, utilities, and well pad areas throughout the field. Pipeline clearing cannot be done by mechanical mowing; therefore, it is more difficult and labor-intensive resulting in a less frequent, but nonetheless important, component of the maintenance schedule.

Although the Project site is the location of an active oil facility and is situated within the largely urbanized coastal portion of Orange County (County), biological resources remain present on-site and on neighboring County properties. For instance, the adjacent estuarine habitat associated with the Santa Ana River is occupied by special-status bird species, including the Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), listed as endangered (SE) under the California Endangered Species Act (CESA), and the light-footed clapper rail (*Rallus longirostris levipes*), SE and listed as endangered (FE) under the federal Endangered Species Act (ESA). A mosaic of natural and restored coastal habitats is found north of the site and along the Santa Ana River, in Talbert Regional Park and Fairview Park. Coastal California gnatcatchers (*Polioptila californica californica*), a bird species listed as threatened (FT) under the ESA, is found in scrub habitats within these areas and on the Project site. Another state and federally listed bird species, the least Bell's vireo (*Vireo bellii pusillus*), occurs in habitats dominated by willows (*Salix* spp.) in the area, including in the lowlands of the Project site. Vernal pools in the undeveloped portions of Fairview Park near the Santa Ana River support the San Diego fairy shrimp (*Branchinecta sandiegonensis*), as do a number of seasonal features on the upland portion of

Project site that pond water. The open habitats within the less developed corridor associated with the Santa Ana River also provide habitat for raptor species, including the northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), red-tailed hawk (*Buteo jamaicensis*), and American kestrel (*Falco sparverius*). Trees and wooded areas provide nesting habitat for raptors and foraging habitat for species such as Cooper's hawk (*Accipiter cooperii*) and red-shouldered hawk (*Buteo lineatus*). Osprey (*Pandion haliaetus*), which feed mostly on fish, are attracted to open water beyond the Project site boundries.

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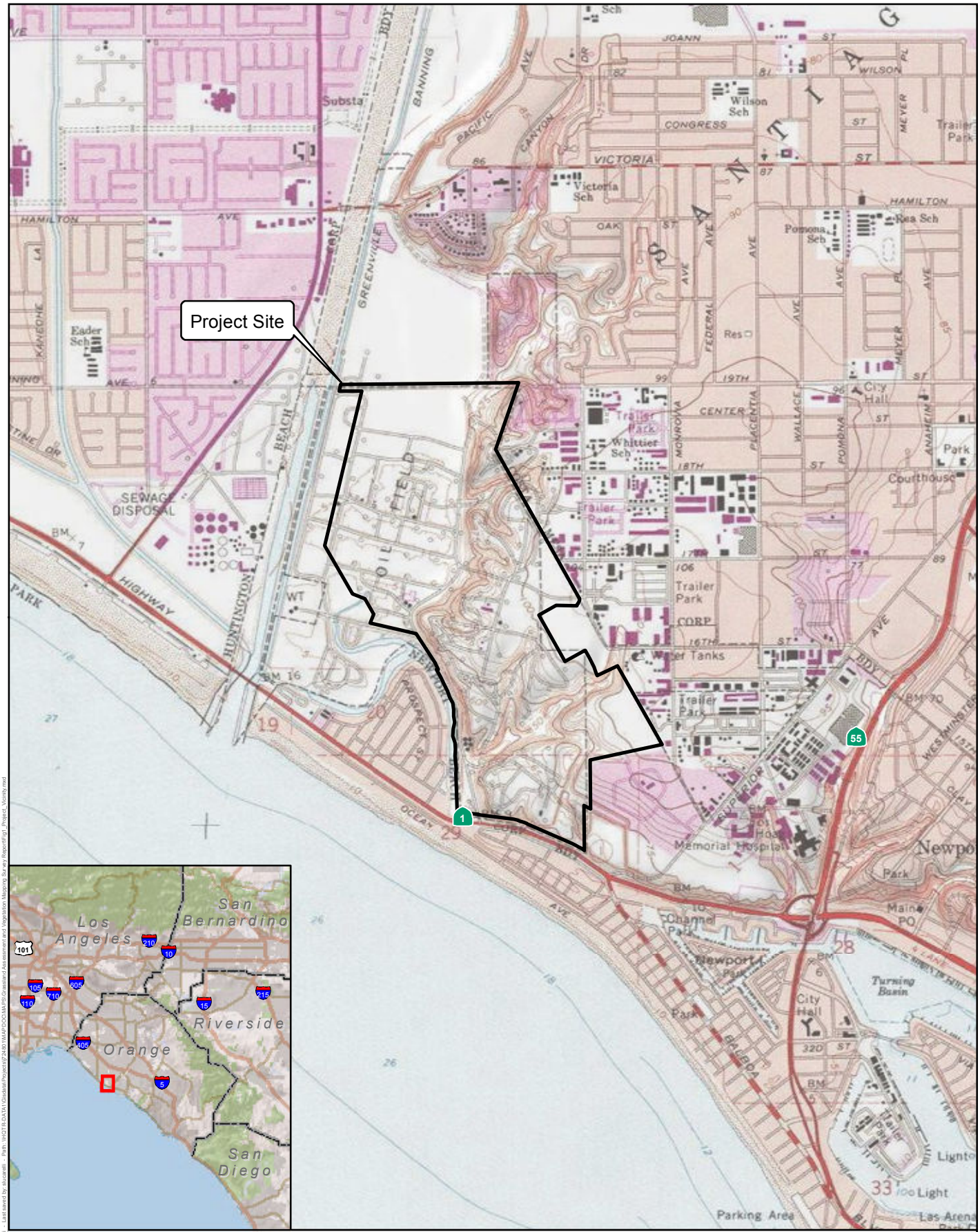

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Figure 1

Site Location

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Grassland Assessment and Vegetation Mapping Survey

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2.0 METHODOLOGY

Dudek conducted focused vegetation surveys on Newport Banning Ranch in 2012 to assess grassland composition, to analyze and describe areas of disturbed vegetation, verify previous vegetation community mapping, and update nomenclature to recently accepted standards. These surveys utilized standard methods to collect information regarding the vegetation communities on the site where previous survey information required verification and update as requested by personnel of the California Coastal Commission (CCC) and U.S. Fish and Wildlife Service (USFWS) for purposes of future permitting. The grassland assessment was performed to determine species composition and cover within areas previously mapped as annual grasslands. Vegetation community mapping was updated due to changes in nomenclature and classification requirements (i.e. membership rules), as well as site conditions. Additionally, disturbed vegetation, including areas containing the California brittlebush (*Encelia californica*), was analyzed to determine percent cover and degree of disturbance based on vegetation qualities.

2.1 Biological Survey Area

Field surveys for the Grassland Assessment and Vegetation Mapping Survey Report (report) were conducted on the coastal terrace, bluffs, arroyos, and lowland area of the Newport Banning Ranch Project site, including the existing vegetation maintenance areas required for oil operations, as shown in (*Figure 2*). Specifically, a grassland assessment and California brittlebush assessment were performed on the coastal terrace, referred to as Grassland Assessment Survey Area. Vegetation mapping was performed on the coastal terrace, bluffs, and arroyos, referred to as Vegetation Mapping Survey Area. Vegetation verification, confirming and updating vegetation community names, was performed in the lowland area, referred to as Vegetation Verification Survey Area. Previous biological studies were performed by Glenn Lukos Associates (GLA), results were documented in the *Biotechnical Report for the Newport Banning Ranch, Orange County, California* (GLA 2009), and BonTerra Consulting (BonTerra) as part of the Environmental Impact Report (EIR) for the Project (BonTerra 2011a and 2011b).

2.2 Grassland Assessment

The following describes previous grassland assessment efforts and Dudek's approach to establishing current baseline conditions relative to native grasslands occurring on the property in support the CCC's review of the Project following Coastal Development Permit Application submittal.

2.2.1 Methodology of Recent Grassland Mapping on Newport Banning Ranch

Vegetation mapping on the site was conducted by GLA beginning in October of 2006 with the majority of vegetation mapping completed by late November 2006; however, intermittent revisions and refinements to the vegetation mapping occurred during 2007 with the last revision made on January 2, 2008 (GLA 2009). GLA generally followed the County of Orange *Habitat Classification System Natural Resources Geographic Information System (GIS) Project* (OCHCS), which was specifically prepared for sites within the County of Orange to support the County's Natural Communities Conservation Planning program (NCCP) (County of Orange 1996). GLA (2009) mapped grasslands according to the definitions in the OCHCS.

During the 2006/2007 vegetation mapping, GLA detected areas containing sparse purple needlegrass (*Stipa pulchra*). These populations were found to occur in densities below the 10 percent threshold set forth in the OCHCS as the minimum necessary to be considered a Southern Coastal Needlegrass Grassland (4.3), which is defined on page 19 of the OCHCS as follows:

> *A grassland with 10% or more of the cover, composed of Stipa pulchra and/or other species of Stipa. Associated with Agrostis* [*diegonensis*] *pallens, Koeleria macrantha, Vulpia myuros and Bromus spp. Forbs include Calochortus sp., Sisyrinchium bellum, Dichelostemma* [*pulchellum*] *capitatum, Bloomeria crocea, Hypocharis glabra, and Dodecatheon clevelandii.*

In making this determination, GLA noted that the other diagnostic species of perennial grasses noted in the OCHCS, such as seashore bentgrass (*Agrostis* [*diegonensis*] *pallens*), prairie Junegrass (*Koeleria macrantha*), were completely absent from the site, as were all of the native forbs referenced including mariposa lilies (*Calochortus spp.*), western blue-eyed grass (*Sisyrinchium bellum*), bluedicks (*Dichelostemma* [*pulchellum*] *capitatum*) common goldenstar (*Bloomeria crocea*), and padre's shootingstar (*Dodecatheon clevelandii*). Given the low densities of purple needlegrass and complete absence of other diagnostic native plant species, it was determined by GLA that Southern Coastal Needlegrass Grassland (4.3) did not occur on the site.

Vegetation mapping was conducted by BonTerra Consulting (BonTerra) in September 2009 (BonTerra 2011a and 2011b), and a few select locations were revisited in January and October 2010 to update the vegetation map. Special-status plant surveys were conducted on the site in March-August 2009. As with GLA, BonTerra classified vegetation types based on the OCHCS, but also utilized the *List of California Terrestrial Natural Communities Recognized by the Natural Diversity Data Base* (CDFW 2003) where vegetation types were not represented by the OCHCS.

BonTerra mapped non-native grassland in the southern portion of the bluffs and noted the presence of native grasses intermixed with non-native grasses and forbs, with the non-native grasses constituting a larger percentage of vegetation cover than the native grasses. Species documented in the non-native grassland included foxtail chess (*Bromus madritensis* ssp. *rubens*), slender oats (*Avena barbata*), soft chess (*Bromus hordeaceus*), hare barley (*Hordeum murinum* ssp. *leporiunum*), foxtail fescue (*Fustuca myuros*), and red-stemmed filaree (*Erodium cicutarium*). As with GLA (2009), BonTerra described pockets of native grass species within the non-native grasslands, but characterized it as annual grasslands due to the dominance of the non-native grasses in the areas.

2.2.2 Grassland Assessment per CCC Staff Recommendation

Dudek's grassland assessment was conducted May through July 2012, as shown in *Table 1*. During the grassland assessment, Dudek conducted a focused assessment of all mapped grassland areas that were delineated and described during prior survey efforts and subsequent reporting. In May, June and July 2012, Dudek visited grassland areas originally mapped as non-native grassland and non-native grassland/ruderal by in GLA's *Biotechnical Report for the Newport Banning Ranch, Orange County, California* (GLA 2009) and BonTerra (2011a and 2011b). Baseline and random grassland survey transects were selected to document species diversity and relative percent cover. Timing of surveys allowed for identification of perennial plant species and most annual species. *Erodium* spp. and *Bromus* spp. had already started to desiccate, but in many cases, they were still identifiable to species. On occasions, *Bromus* spp. percent coverage may have been slightly over estimated due to high amounts of thatch, which may have been remaining from the previous year. Native grassland definition and detailed methods for each of these transects types is presented below.

2.2.3 Definition of Native Grasslands

Native grassland vegetation types are defined in *A Manual of California Vegetation, Second Edition* (MCV2; Sawyer et al. 2009). According to Sawyer et al. (2009), purple needle grass is dominant or characteristically present in the herbaceous layer of purple needle grass grasslands (Sawyer et al. 2009). Membership rules for this community include (1) greater than 10 percent relative cover of purple needle grass (*Stipa pulchra*) in the herbaceous layer or (2) greater than 5 percent absolute cover of purple needle grass as a characteristic to dominant species in the herbaceous layer (Sawyer et al. 2009).

Purple needle grass grassland received a finer examination and delineation than other vegetation communities. This native grassland is recognized State and locally as a sensitive vegetation community; therefore, based on our knowledge of this community, experience in the Coastal Zone, and previous comments on other projects by Jonna Engle, Ph.D., Coastal Staff

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Project Site Boundary

Joint Ownership Oil Facilities Areas / Consolidation Sites – Existing and Continuing Oil Operations

Grassland Assessment Survey Area

Vegetation Mapping Survey Area

Vegetation Verification Survey Area

N

Feet

0 395 790

1 inch = 500 feet

SOURCE: 2011 Aerial provided by Fuscoe Engineering,
Dudek 2012 Grassland Assessment and Vegetation Mapping Survey Data

Figure 2

Biological Survey Area

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Grassland Assessment and Vegetation Mapping Survey Report

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Ecologist, we did not apply a minimum mapping unit to areas containing purple needlegrass (*Stipa nassella*) that exceeded the MCV2 membership rule and Coastal threshold of 10% relative cover. Sensitive vegetation communities are identified in [CDFW] State Ranking for Natural Vegetation Communities, and/or treatment in the California Natural Diversity Database, the California Environmental Quality Act, the Orange County (Central/Coastal) NCCP, and other local plans.

Sawyer et al. (2009) defines salt grass flats where salt grass (*Distichlis spicata*) is dominant or co-dominant in the herbaceous layer. Membership rules for this community include (1) greater than 50 percent relative cover in the herbaceous layer; or, salt grass exhibits higher cover than any other single grass species, or (2) greater than 30 percent relative cover in the herbaceous layer, *Sarcocornia* or *Salicornia* spp. if present, less than 30 percent relative cover.

2.2.4 Baseline Grassland Assessment Surveys

A total of six baseline grassland assessment transects were initially established in areas observed by Dudek to contain individuals of purple needlegrass (*Stipa pulchra*) or areas of salt grass (*Disticilis spicata*). The percent cover of each species, along with non-native grasses and forbs encountered was recorded at intervals of 5.0 meters (16.4 feet) or 1.0 meter (3.28 feet) along each transect within a meter square plot (i.e., quadrat). The location of the quadrat sampled alternated on either side of the transect tape along the entire length of the transect to reduce bias. The beginning and end points of each transect were recorded using a GPS with sub-meter accuracy (i.e., Trimble® GeoXT). Representative photographs of each transect were recorded at the start- and end-points facing along the transect line.

Table 1
Summary of Surveys, Personnel, and Conditions for Grassland Assessment and Vegetation Community Mapping

Date / Time	Survey Type	Dudek Biologists	Site Conditions
May 17, 2012 / 8:00 am to 3:00 pm	BGA	John Davis IV, Heather Moine, Tony Bomkamp (GLA)	Overcast clearing to scattered clouds. Winds 2-7 mph out of the southwest and temperatures ranging from 60°F to 70°F.
May 23, 2012 / 8:00 am to 5:00 pm	GA	John Davis IV, Heather Moine	Overcast and clearing later to partly cloudy with winds 7-16 mph out of the south and temperatures ranging from 62°F to 73°F.
May 29, 2012 / 8:00 am to 5:00 pm	GA	Dave Compton, Heather Moine	Mostly sunny, winds variable 0-10 mph. Temperatures ranging from 63°F to 72°F.
June 12, 2012 / 7:45 am to 5:00 pm	GA	Dave Compton, Heather Moine	Overcast to partly cloudy with northwest to southwest winds at 0-7 mph. Temperatures ranging from 56°F to 58°F.
June 18, 2012 / 9:30 am to 5:00 pm	VEG	John Davis IV, Dave Compton, Heather Moine	Hazy with winds at 4-8 mph and temperatures ranging from 62°F to 68°F.

Table 1
Summary of Surveys, Personnel, and Conditions for Grassland Assessment and Vegetation Community Mapping

Date / Time	Survey Type	Dudek Biologists	Site Conditions
June 19, 2012 / 7:15 am to 5:30 pm	VEG	Dave Compton, Heather Moine	Mostly cloudy early and clearing later. Winds 2-8 mph out of the southwest and temperatures ranging from 60°F to 70°F.
June 20, 2012 / 7:20 am to 5:00 pm	VEG/GA	Dave Compton, Heather Moine	Overcast clearing to partly cloudy. Winds 3-8 mph out of the south and temperatures ranging from 63°F to 70°F.
June 21, 2012 / 8:20 am to 5:00 pm	VEG	Dave Compton, Heather Moine	Mostly cloudy early and clearing later. Winds 3-7 mph out of the south to southwest and temperatures ranging from 62°F to 72°F.
June 22, 2012 / 7:15 am to 6:00 pm	VEG	Dave Compton, Heather Moine	Overcast and clearing later with winds 0-10 mph out of the southwest and temperatures ranging from 62°F to 71°F.
July 19, 2012 / 8:00 am to 4:00 pm	VEG/BGA	John Davis IV	Sunny and clear above with slight to moderate breeze. Thin clouds to the east and temperatures approximately 65°F.
October 4, 2012 / 2:00 pm to 5:15 pm	VEG	Heather Moine	Sunny and clear with winds approximately 4 mph out of the south southwest and temperatures ranging from 72°F to 75°F.
November 9, 2012 / 9:15 am to 2:30 pm	VEG	John Davis IV, Heather Moine	Sunny to partly cloudy with winds 14-15 mph out of the west and temperatures ranging from 61°F to 64°F.
November 15, 2012 / 6:45 am to 5:00 pm	VEG	Dave Compton, Heather Moine	Overcast with winds 2-7 mph out of the south and temperatures ranging from 56°Fto 67°F.
December 11, 2012 / 7:30 am to 5:05 pm	VEG	John Davis IV, Dave Compton, Heather Moine	Clear with winds 5-8 mph out of the south. Temperatures ranging from 52°F to 69°F.

Notes:

°F – degrees Fahrenheit
BGA – Baseline Grassland Assessment
GA – Grassland Assessment
GLA – Glenn Lukos Associates
mph – miles per hour
VEG – Vegetation Community Mapping

2.2.5 Grassland Assessment Surveys

Based on the results of the initial assessment, forty 50-meter (164-foot) long transects were established across the Project site, as shown in *Figure 3*. Transect locations were selected by geographic information system (GIS) staff in a random design (transect start points and orientation), but with a more or less even distribution throughout the site in areas of "non-native grassland" and "non-native grassland/ruderal vegetation" communities previously mapped by GLA (2009) and BonTerra (2011). The percent cover of each species encountered was recorded at intervals of 5.0 meters (16.4 feet) along each transect within a meter square plot (i.e., quadrat) resulting in a total of 11 quadrats per transect. The location of the quadrat sampled alternated on

either side of the transect tape along the entire length of the transect. The start and end location of each 50-meter transect was recorded using a GPS with sub-meter accuracy (i.e., Trimble® GeoXT). Representative photographs of each transect were recorded at the start and end points.

The relative percent cover of native forbs, native shrubs, native grass species, non-native forbs, non-native shrubs, and non-native grass species recorded within the sampled quadrats along each transect was calculated. Each transect was named based on dominant thresholds established in the *Manual of California Vegetation Second Edition* (MCV2; Sawyer et al. 2009) of plant species (i.e. purple needlegrass, salt grass) or genera of plant species (i.e. brome grasses and wild oats). When a non-grass physiognomic category had the greatest relative cover (i.e. dominant), broader definitions applied such as native forbs, non-native forbs, native shrubs, and non-native shrubs. In significantly disturbed areas that contained grasses and bareground, absolute cover was applied in determining if an area exceeded the membership rule threshold(s) presented in the MCV2. Bareground was considered an exposed area of varying natural substrate, but void of vegetative cover or other biotic communities (moss, algae, lichen, cryptogrammic crust, etc.). At Newport Banning Ranch, these areas are typically "open" patches of soil that were exposed during oil operations. On occasion rock or tank bottom comprised bareground.

Transects which met the native grassland species (purple needlegrass and salt grass) dominance thresholds in MCV2, were mapped as such regardless of another grass genera or physiognomic category having a higher percent coverage (Sawyer et al. 2009). If both purple needlegrass and salt grass met MCV2 thresholds, the transect was named purple needle grass.

2.3 Vegetation Community Mapping

The following describes in detail Dudek's approach, and modifications to our approach, in an effort to capture sufficient information to establish current baseline conditions in support of review and approval by the USFWS of current O&M procedures, and the CCC's review of the Project following Coastal Development Permit Application submittal.

It is important to reiterate that previous vegetation mapping for the site, incorporated into the DEIR by BonTerra (2011a and 2011b), was conducted using the *County of Orange Habitat Classification System Natural Resources Geographic Information System (GIS) Project* (Gray and Bramlet 1992) that was specifically prepared for sites within the County of Orange in support of the County's Natural Communities Conservation Planning program (NCCP). The EIR also noted that not all the vegetation types on the site are represented by this classification system so the *List of California Terrestrial Natural Communities Recognized by the Natural Diversity Data Base* (CDFW 2003) was also utilized. Similarly, vegetation mapping performed by GLA (2009) also followed Gray and Bramlet, where appropriate. In 2009 and 2010, following completion of GLA and BonTerra's vegetation community mapping efforts, a new vegetation

classification system was introduced and accepted by the academic community (Sawyer et. al.) and the California Department of Fish and Wildlife (CDFW). In 2012, Dudek employed this new system along with CCC standards in their 2012 vegetation community mapping of the Newport Banning Ranch.

In 2003, the Vegetation Classification and Mapping Program of the CDFW, Wildlife and Habitat Data Analysis Branch, published the *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CNDDB) (CDFW 2003 [updated 2011]). In September 2010, the CDFW published the *Natural Communities List* (NCL; CDFW 2010), which uses the scientific name of the dominant species in that alliance as the alliance name, which is based on the *Manual of California Vegetation, Second Edition* (MCV2; Sawyer et al. 2009). These classification systems focus on a quantified, hierarchical approach that includes both floristic (plant species) and physiognomic (community structure and form) factors as currently observed (as opposed to predicting climax or successional stages). Nomenclature for on-site vegetation communities reflects the most current system, MCV2 and NCL. Vegetation communities were mapped based on these sources along with CCC standards.

Vegetation mapping on the coastal terrace, bluffs, and arroyos was conducted the week of June 18, 2012, with follow up surveys occurring in July, November, and December, as shown in *Table 1*. All mapping was performed in the field using standard methodology and tools. Biologists would interpret existing vegetation map (GLA 2009) maps with a high quality aerial photographic base (NAIP 2010) and then delineate vegetation communities using a Trimble Geo XT Global Position System (GPS) unit capable of sub-meter accuracy or Apple iPad (iPad) screen displaying a high-quality aerial, where hard copy aerial interpretation was challenging. In some areas, the vegetation community type and boundaries were field verified directly with the existing vegetation map. Other areas required redrawing the vegetation community boundary or renaming the vegetation community with the current nomenclature or observed vegetation community. The GPS data was downloaded into GIS ARCVIEW for placement onto an aerial figure. In combination with the GPS data, GIS technicians digitized the delineated vegetation boundaries from field maps using ARVIEW and incorporated the vegetation community names to create the vegetation community map. The lowland area of the Biological Survey Area was subject to vegetation verification by Dudek during a December site visit. GLA mapped vegetation polygons (GLA 2009) were visited and vegetation communities were updated using current MCV2 and NCL nomenclature (Sawyer et al. 2009 and CDFW 2010).

2.3.1 Overview of Vegetation Mapping, Data Collection, and Assessment

As mentioned, recent vegetation community mapping was conducted to further examine and describe areas of vegetation on Newport Banning Ranch. The primary goal was to review and revise, as appropriate, the vegetation map prepared by Glen Lukos and Associates (GLA) as part

of their Biological Technical Report (GLA 2009). The methodology for mapping vegetation communities consisted of transferring GIS shape files onto a Trimble GPS unit to verify polygon boundaries representing a particular vegetation community were accurately delineated. If GLA identified the existing vegetation within the polygon as a mature unaltered stand that correctly corresponded to Orange County Central-Coastal Natural Community Conservation Plan (NCCP) (1996) based on Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (1986), then Dudek (2013) conducted a visual estimate of relative cover of the dominant plant species. Relative coverage is the cover of a particular plant species as a percentage of total plant coverage, thus relative cover will always total 100%, even when absolute coverage is quite low (Barbour et. al 1987). For homogenous and continuous stands of native vegetation (i.e. shrubland), Dudek biologists estimated relative cover of dominant plant species for the polygon and then compared the results to the membership rules presented in *A Manual of California Vegetation, Second Edition* (MCV2). To reduce sampling error and bias, two (to three) biologists would independently estimate the cover; the mean cover of the two estimates was used in the comparison to the membership rules. In the case where Dudek concurred with GLA's delineation and the vegetation was accurately representative, only the nomenclature was updated to MCV2 classification and recognized on the *List of California Terrestrial Natural Communities recognized by the California Natural Diversity Database* (CNDDB) (CDFW 2003 [updated 2011]). If the vegetation stand had significantly expanded or contracted, Dudek remapped the boundary or entire polygon, as appropriate. This methodology was applied in areas that displayed characteristics relatively unaffected by oil operations. Additionally, it should be clear that the vegetation communities described in the MCV2 are based on data collected for vegetation communities in their natural unaltered condition. Mature shrublands that experienced low levels of disturbance also were visually quantified and assessed based on relative cover using the methodology described above.

Point line transects were applied to areas of vegetation that were apparently disturbed by standard oil facility practices including past and present oil exploration and operation and maintenance (O&M) activities. GLA originally mapped these areas as simply "Disturbed" or "D." Usually, these areas contained varying arrangements of invasive non-native forbs and grasses, native forbs and subshrubs, and recruitment of young native shrubs. Absolute cover was used to assess and classify these areas or polygons. In comparison to relative cover, absolute cover is the percent of ground surface covered by vegetation or other coverages including rocks, litter, and bareground. The vegetation assemblage assessed for the majority of disturbed areas did not comply with membership rules for alliances or stands as presented in the MCV2 and thus were classified as disturbed.

The MCV2 Membership Rules are generally based on relative cover. That is the percent cover of dominant plant species within their respective vegetation layer (i.e. grass/herbaceous, shrub, tree,

etc.). In disturbed areas, absolute cover was applied to eliminate the possibility that membership rules would be erroneously achieved due to a false positive (i.e. classifying the disturbed area as shrubland due to a high percent of a shrub species within the shrub layer, although the shrub layer is greatly underrepresented or highly altered due to the sites disturbance). As previously discussed, the MCV2 and the membership rules were established from the collection of extensive field data in natural systems. Although natural disturbance and cover limitations exist in nature (i.e. volcanoes, desert washes, serpentinite soils, etc.), the extensive anthropogenic disturbances associated with the oil operations is not comparable to natural stands of vegetation or classification based on relative cover.

Initially, Dudek's classification of vegetation communities relied strictly on standard vegetation assignments adopted by the California Department of Fish and Wildlife (CDFW) and from A Manual of California Vegetation, Second Edition (MCV2; Sawyer, Keeler-Wolf, and Evens 2009). On Newport Banning Ranch, vegetation communities were assessed by Dudek in the field and mapped based by dominant plant species utilizing the CDFW/MCV2 system. Transect and observational data was collected for each community and compared to MCV2 membership rules and supporting literature and then assigned to the appropriate alliance (i.e. vegetation community). The extensive amount of disturbed vegetation communities and especially disturbed areas facilitated a modified approach primarily for the disturbed areas that contained a mixed composition of bare ground, invasive non-native plants, maintained vegetation, tank bottom, and/or the presence of oil facilities.

2.3.2 Disturbed Vegetation and Areas

2.3.2.1 Definition of Disturbed Vegetation, Disturbed Areas, and Bare Ground

Generally, "disturbed [vegetation]" is an area that has undergone an anthropogenic modification, which has altered a natural vegetation stand. Characteristics of vegetation disturbance are typically a decrease in the percent cover of native plants, a reduction of plant diversity within a particular vegetation strata or layer (i.e. herbaceous, shrub, tree), and an increase in bare ground and non-native invasive plants. Vegetation stands or communities that retain their structure and height (i.e. shrublands) and native plant composition, but have an open canopy, bare ground, and/or invasive plant species within a defined mapping unit, were considered disturbed-shrubland. Relative percent cover was used as the quantifier in determining classification for most of these stands. In rare instances, and for all disturbed vegetation as identified in GLA's mapping, point intercepts transects were used.

Said in another fashion:

Modified vegetation stands that managed to retain an acceptable community structure with a stand or polygon were approached as a valid vegetation community consistent with literature values, albeit "disturbed." The disturbance was evident in that the stand typically contained an open canopy of shrubs with a combination of bare ground and invasive non-native annual plants located between areas of shrubs, which had obviously experienced an anthropogenic disturbance. In most cases, similar methodology as the mature unaltered vegetation stands were used to assess these modified shrubland, such as "Disturbed – California Brittle Bush Scrub (D-CBBS)."

Whereas areas significantly disturbed by anthropogenic means that currently contain a dominance of "ruderal" or invasive non-naïve plant species and retain remnants of disturbance or continued to be frequently disturbed (i.e. bare ground, maintenance, mowing, tank bottom, etc.), were categorized simply as "disturbed."

Bare ground is defined as an area void of vegetative cover. At Newport Banning Ranch, these areas are typically "open" patches of soil that were exposed during oil operations. On occasion rock or tank bottom comprised bareground. Bare ground was included in the calculation of absolute cover in disturbed areas.

2.3.2.2 Assessment of Disturbed Vegetation Communities

Areas of vegetation that were apparently disturbed by operation and maintenance (O&M) activities, but managed to retain an acceptable community structure were considered a valid vegetation community consistent with literature values, albeit "disturbed." This is most evident with shrub communities. An example is California brittlebush (*Encelia californica*) scrub that contained obvious manipulations that resulted in an open canopy (i.e. significant gaps between shrubs), low shrub diversity, and a high percentage of bare ground and/or non-native invasive plant species. In this case, the community was identified as disturbed (D)-California brittle bush scrub (D-CBBS). If, however, the disturbed area had considerable bare ground or lacked a dominant plant species or sufficient structure per the MCV2 (often height), then the mapped area (i.e. polygon) received a disturbed designation. These disturbed areas reflected obvious regular, and sometimes less regular O&M activities near well sites, pipelines, and other oil facilities. Dudek revised polygons where a significant stand of homogenous vegetation exceeded 0.5 acre and either exceeded a membership rules or fit into the species disturbance categories for the California brittle bush (*Encelia californica*).

2.3.2.3 Assessment of Disturbed Areas

In response to input from USFWS on O&M activities, Dudek further categorized disturbed areas on the Newport Banning Ranch that contain greater than 10 percent vegetation cover. To

accomplish this, representative transect data was collected and observational notes recorded for each such polygon containing disturbed vegetation. A minimum mapping unit of 0.5 acre was utilized for all disturbed areas; however, many of the previously mapped areas (GLA 2009) were much smaller in size (< 0.1 acre) and others larger (2.0 acre), so in the majority of cases, Dudek retained previously mapped boundaries, unless notable expansion or contraction of vegetation was observed. Other areas that exceeded 10 percent vegetation cover were remapped, as appropriate, based on the extent of consistent vegetation and/or disturbance definitions. Absolute cover was used in the assessment of disturbed areas. The result of this effort was the creation of two new categories to describe disturbed areas containing native vegetation: Disturbed-Maintained (D-M-) and Disturbed-Infrequently Maintained (D-I-). This primary applied to California brittle bush (*Encelia californica*), which is further presented in 2.4.1.

2.3.3 Assessment of Disturbed Areas Containing California Brittle Bush

To document species composition, percent cover, and categorize Disturbed areas mapped by GLA (2009), Dudek established 69 point-intercept transects in representative areas to document species composition, percent cover, and shrub height. The species encountered were recorded at intervals of 1 meter (3.285 feet) along each transect. The height of each shrub species was recorded where it intersected at the 1-meter intervals. The start and end location of each transect was recorded using a GPS unit with sub-meter accuracy (i.e., Trimble® GeoXT) or iPad screen displaying a high quality aerial. Representative photographs of each transect were recorded at the start and end points.

During vegetation mapping in June and July, numerous areas were mapped as Disturbed (D) since the area did not meet vegetation community membership rules defined in MCV2 or NCL (Sawyer et al. 2009 and CDFW 2010). To further document the species composition, percent cover, and categorize the Disturbed areas, additional point-intercept transects were established in November and December 2012. Since these area did not meet MCV2 or NCL vegetation community membership requirements, additional categories were defined in response to resource agency requests for more detailed mapping of disturbed areas that also contained remnant or maintained native shrubs. Two categories were defined to document the presence of California brittlebush at low percent coverage and varying heights; Disturbed-Maintained- (D-M-) and Disturbed-Infrequently Maintained- (D-I-). These disturbed categories are not recognized in the MCV2, by the California Department of Fish and Wildlife, California Native Plant Society, or other professional, academic, or regulatory agencies, nor are they a classification system developed by the mentioned using standard vegetation mapping methodologies. As mentioned above, California brittle bush (*Encelia californica*) is a common shrub on Newport Banning Ranch. While primarily dominant or co-dominant in mature stands of on-site coastal scrub, it will occupy disturbed areas in various arrangements with other opportunistic plant species, especially when adjacent to areas of higher quality scrub habitat.

Areas subject to vegetation maintenance were not representative of encelia scrub (i.e. California brittle bush scrub) per the MCV2 or the literature; therefore, they were not mapped nor described as encelia scrub by Dudek. Mowing in and around oil features and roadways is an obvious disturbance to vegetation. Per our classification this is indicated as Disturbed-Maintained-California Brittle Bush Scrub or D-M-CBBS. In areas where mowing, site clearance, or other activities have ceased and *Encelia* shrub has recolonized or grown interrupted into mature shrub, the resulting community is Disturbed-Infrequently Maintained-California Brittle Bush Scrub since it often is a monotonous shrub layer of *Encelia californica* with evidence of past disturbance, such as the presence of invasive non-native plant species and bareground.

The following provides descriptions and requirements for intact vegetation communities of California brittle bush scrub, disturbed California brittle bush scrub (1a-b) and disturbed areas containing California brittle bush (2a-b).

1. Vegetation Communities

For a stand of California brittle bush to be classified as a shrubland vegetation community, the brittle bush must occupy greater than 30% relative cover within a closed, intermittent, or open canopy of greater than 50% absolute native shrub cover (*Table 2*). Areas mapped as California Brittle Bush Scrub (CBBS) and Disturbed-California Brittle Bush Scrub (D-CBBS) meets the criteria of a shrubland community as defined in further detail below.

a. <u>California Brittle Bush Scrub (CBBS)</u>

According to A Manual of California Vegetation, Second Edition (MCV2; Sawyer et al. 2009), the *Encelia californica* shrubland alliance or California brittle bush scrub (CBBS) is dominant to co-dominant in the shrub canopy with greater than 30% relative cover. The California Brittle Bush alliance forms a mosaic with other native coastal shrubs usually forming a contiguous canopy, with a forb layer where openings exist. The shrubs in this community have an average height between 0.5 and 2.0 (1.6 to 6.6) meters (Beyers and Wirtz 1995 and MCV2). On the Project site, in areas containing a majority of brittle bush, the average height is usually around 1.0 meter, but in a diverse shrubland, when taller native shrubs or cacti are present, the average height is often greater.

Therefore, on the Newport Banning Ranch site stands of vegetation mapped as CBBS have at least 30% relative cover or greater of California brittle brush within an area dominated by shrubs, with an average shrub height exceeding 0.5 meter (1.6 feet).

These areas have minimal disturbance or less than 5% of the stand or polygon is affected by roads, trails, disked activity, scrapes, or natural events.

b. Disturbed-California Brittle Bush Scrub (D-CBBS)

On the Newport Banning Ranch, stands of vegetation mapped as Disturbed-California Brittle Bush Scrub (D-CBBS) have at least 30% relative cover or greater of California brittle bush, similar to CBBS; however, the shrub canopy is often open to intermittent with a significant forb/grass layer of invasive non-native and pioneering native plants, sometimes also including subshrubs. Additionally, due to previous disturbance, the average shrub height is less than 1 meter (3.3 feet) and 5 to 50 % of the polygon is affected by disturbance including but not limited to roads, trails, disked activity, or scrapes.

2. Disturbed Communities that Contain California Brittle Bush Shrubs

In the cases where mature California brittle bush shrubs are present in low quantities (less than 10% absolute cover) over 0.5 acre standard mapping unit or shrubs are obviously maintained to an average height of 0.5 meters, but are abundant (greater than 10% cover), non-community categories apply as described below.

a. Disturbed-Infrequently Maintained (D-IM)

Stands were mapped as Disturbed-Infrequently Maintained CBBS (D-IM-CBBS) if absolute cover of California brittle bush or other native shrub is less than 10% and herbaceous cover is continuous (≥66% absolute cover) or if shrub cover is between 5-10% absolute cover, but herbaceous cover is non-continuous (≤66% absolute cover), often with areas of bare ground. To be consistent with the MCV2, CBBS must have at least 30% relative cover in the shrub layer. Maintained areas occur around and adjacent to several oil wells, some active and others abandoned, forming islands of non-developed areas amongst well-maintained oil pads.

b. Disturbed-Maintained (D-M)

Stands were mapped as Disturbed-Maintained CBBS (D-M-CBBS) if absolute covers of California brittle bush or other native shrub greater than 10% absolute cover with a mean average native shrub height less than 0.5 meter. To be consistent with the MCV2, CBBS must have at least 30% relative cover in the shrub layer. Disturbed Maintained areas exhibit substantial variation of vegetated and non-vegetated ground surface caused by frequent maintenance activities often resulting in low-growing

vegetation with a more or less unified height. This category occurs around active oil wells and other frequently maintained structures.

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Table 2
Vegetation Category Requirements, Data Collection, and Referenced Reports and Literature

Vegetation Category[7]	Acronym	Percent Cover	Total Scrub coverage (percent)	Mean Minimum Height (meters)	Maximum Height (meters)	Data Collection Methods					
						Photograph Documentation[4]	Visual Observation[4]	Point-intercept Transects[4]	GLA 2009	BonTerra 2011	Sawyer et al. 2009
California Brittle Bush Scrub	CBBS	≥30[1,5]	>80	0.5	<2.0[1]	✓	✓		✓	✓	✓
Disturbed-California Brittle Bush Scrub	D-CBBS	≥30[1,5]	50[2] to 95	0.5	<1.0[2]	✓	✓	✓	✓	✓	
Disturbed-Infrequently Maintained-California Brittle Bush Scrub	D-I-CBBS	≥30[16]	<10	0.5	<2.0	✓	✓	✓			
Disturbed-Maintained-California Brittle Bush Scrub	D-M-CBBS	≥30[1,6]	>10[3]	0.1	<0.5	✓	✓	✓			

Notes:

1 - Sawyer et al. 2009 – Sawyer et al. 2009 (Sawyer, J.O., Keeler-Wolf, T., and Evens, J.M.) 2009. *A Manual of California Vegetation*, Second Edition. Sacramento, California: California Native Plant Society.

2 - Beyers and Wirtz 1995

3 – CCC

4 – Data collected by Dudek between June 18 and December 11, 2012

5 – Relative Cover in Shrub Layers

6 – Absolute Cover

7 - Disturbed encelia scrub over 1.0 m and a cover that was between 10 and 80% cover did not occur on the Newport Banning Ranch; therefore, no category was created for this scenario. The artificial classification of disturbed encelia scrub that Dudek created was in effort to further categorize areas of interest to the U.S. Fish and Wildlife Service and West Newport Oil in developing an operation and maintenance plan for the California gnatcatcher.

NA – Not applicable

BonTerra 2011 – BonTerra (BonTerra Consulting). 2011. Draft Environmental Impact Report, Newport Banning Ranch Project, City of Newport Beach. State Clearinghouse No. 2009031061. Prepared for City of Newport Beach. September 9. (Vegetation Mapping performed September 10 and 14-17, 2009, January 11, 2010, and October 7, 2010)

GLA 2009 – GLA (Glenn Lukos Associates, Inc.) 2009. Biotechnical Report for the Newport Banning Ranch Property, Newport Beach, California. Prepared for Mike Mohler, Newport Banning Ranch LLC. April 21. (Vegetation Mapping performed October 20, 28, November 4, and 30, 2006 and on April 26, July 16, 20, December 14, 17, 18, 2007, and January 2, 2008.)

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3. Vegetation Mapping Standards in Disturbed and Maintained Areas

a. Mapping Unit

- Standard Unit = 0.5 acre
- Range for CBBS is 0.05 – 2.2 (*Table 3*)

Table 3
California Brittle Bush Scrub (CBBS) Polygon Statistics

Summary Statistic	Acres
Minimum	0.05093398042
Maximum	2.21131832416
Average	0.40207518935
Median	0.28917113800

b. Plant Height and Percent Coverage Standards

- Record heights of *Encelia californica* to nearest 0.1 meter
- Record percent cover to nearest 5 percent

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3.0 RESULTS

This section describes results for grassland transect surveys, mapping of vegetation communities, and point-intercept transects. Grassland assessment baseline and assessment transect results are described in Section 3.1; vegetation community mapping is discussed in Section 3.2, including descriptions of each vegetation community and locations of occurrences; and, Section 3.3 describes the assessment of California brittlebush in disturbed areas of the site.

3.1 Grassland Assessment

The grassland assessment survey area covered 252.763 acres or 66 percent of the approximately 385.493-acre Project site. Data recorded during baseline grassland transect surveys and grassland transects surveys were used to document percent coverage of species and physiognomic categories to determine dominant species. Dominant species recorded in each quadrat and overall dominance by transect is described below and shown in *Figure 3*. Grassland assessment photographs and data sheets are provided in *Appendices A, B, and C.*

Two species of native grasslands defined in MCV2 were identified on the Project site during the grassland assessment; purple needlegrass (*Stipa pulchra* [Purple Needle Grass Grassland]) and salt grass (*Distichlis spicata* [Salt Grass Flats]). Purple needlegrass is more common on site than salt grass; purple needlegrass occurs in 7.7 percent of the quadrats sampled whereas salt grass occurs in 4.7 percent of the quadrats sampled. Other native species include both shrubs and forbs, such as California brittlebush (*Encelia californica*), western ragweed (*Ambrosia psilostachya*), and dove weed (*Croton setigerus*).

Non-native grassland species that were dominant in the quadrats sampled include bromes (*Bromus diandrus, B. hordeaceus, B. madritensis*), wild oat (*Avena barbata*), foxtail barley (*Hordeum murinum*), Italian rye grass (*Festuca perennis*), rattail sixweeks grass (*Festuca myuros*), and pampas grass (*Cordaderia* sp.). Of these, bromes (Annual Brome Grassland) and wild oat (Wild Oat Grassland) are recognized as dominants in vegetation communities per MCV2 (Sawyer et al. 2009) so they are considered separately in the third column of *Table 4*. Italian rye grass is also considered a dominant in vegetation communities per MCV2 (Sawyer et al. 2009), however, the percentage cover of this species was below the defined dominant threshold, thus grouped with the other non-native grasses. Other non-native species include mostly forbs, such as longbeak stork's bill (*Erodium botrys*), tocalote (*Centaurea melitensis*), shortpod mustard (*Hirschfeldia incana*), and black mustard (*Brassica nigra*), additionally some shrub species.

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Project Site Boundary
Joint Ownership Oil Facilities Areas / Consolidation Sites – Existing and Continuing Oil Operations
Grassland Assessment Survey Area
Baseline Transect
Transect
Native Grassland Populations
Stipa pulchra
Distichlis spicata
Stipa pulchra Greater than or Equal to 10%
Dominant Species by Quadrat
Avena barbata
Bare ground
Bromus sp.
Cortaderia sp.
Distichlis spicata
Festuca myuros
Hordeum murinum
Hordeum sp.
Native forbs
Native shrubs
Native succulent shrubs
Non-native forbs
Non-native shrubs
Stipa pulchra
1 - Disturbed (Native forbs)
2 - Disturbed (Native forbs)
3 - Disturbed (Non-native forbs)
4 - Annual Bromes
5 - Non-native Forbs
6 - Disturbed (Non-native forbs)
7 - Disturbed (Non-native forbs)
8 - Purple Needlegrass
9 - Disturbed (Non-native forbs)
10 - Purple Needlegrass
11 - Annual Bromes
12 - Disturbed (Non-native forbs)
13 - Disturbed (Non-native forbs)
14 - Disturbed (Native forbs)
15 - Disturbed (Non-native forbs)
16 - Purple Needlegrass
17 - Disturbed (Annual Bromes)
18 - Disturbed (Non-native forbs)
19 - Disturbed (Non-native forbs)
20 - Disturbed (Native forbs)
21 - Annual Bromes
22 - Disturbed (Non-native forbs)
23 - Disturbed (Non-native forbs)
24 - Disturbed (Non-native forbs)
25 - Annual Bromes
26 - Annual Bromes
27 - Disturbed (Non-native forbs)
28 - Annual Bromes
29 - Disturbed (Native forbs)
30 - Disturbed (Non-native forbs)
31 - Disturbed (Non-native forbs)
32 - Disturbed (Non-native forbs)
33 - Disturbed (Non-native forbs)
34 - Salt Grass
35 - Disturbed (Non-native forbs)
36 - Disturbed (Non-native forbs)
37 - Purple Needlegrass
38 - Wild Oats
39 - Disturbed (Non-native forbs)
40 - Disturbed (Annual Bromes)
B1 - Purple Needlegrass
B2 - Wild Oats
B4 - Purple Needlegrass
B5 - Purple Needlegrass
B6 - Purple Needlegrass
N
Feet
0
390
780
1 inch = 225 feet
SOURCE: 2011 Aerial provided by Fuscoe, Dudek 2012 Grassland Assessment Survey Data
NOTES: Dominant species data collected at 1 meter intervals for B1 and B4. Data available on field sheets.
DUDEK
NEWPORT BANNING RANCH
Figure 3
Grassland Assessment
Grassland Assessment and Vegetation Mapping Survey Report
Date: 1/31/2013 - Created by: slucarelli - Last saved by: slucarelli - Path: \\HOTR-DATA1\Gisdata\Projects\l\724801\MAPDOC\MAPS\Grassland Assessment and Vegetation Mapping Survey Report\Fig3_Grassland_Assessment.mxd

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Table 4 includes the dominant species present along each transect and their overall percent cover throughout the transect. The range of values recorded throughout each transect is included for the native grasses as well as the non-native grasses that comprise a specific vegetation community (i.e., *Bromus* spp. and *Avena barbata*).

Table 4
Overall Relative Percent Cover of Plant Species and Physiognomic Categories Per Quadrat for Each Transect

Transect	Relative Percent Coverage of Native Grassland Species Mean per Transect (Minimum-Maximum per Quadrat)	Relative Percent Coverage of Non-Native Grassland Species Mean per Transect (Minimum-Maximum per Quadrat)	Relative Percent Coverage of Forbs/Shrubs Mean per Transect (Minimum-Maximum per Quadrat)	Vegetation Community Determination
B_1	***Stipa pulchra* 11.4 (0–50)**	*Bromus* spp. 33.6 (0-85) *Avena barbata* 1.2 (0-10) Other non-native grasses 0.7	Non-native spp. 45.1 Native spp. 4.0	*Purple Needlegrass*
B_2	—	***Avena barbata* 28.2 (0-60)** *Bromus* spp. 23.6 (0-60) Other non-native grasses 11.4	Non-native spp. 21.8 Native spp. 13.2	*Wild Oats*
B_3	***Distichlis spicata* 33.2 (0–70)** *Stipa pulchra* 3.2 (0–35)	*Bromus* spp. 9.5 (0-35) *Avena barbata* 0.9 (0-10) Other non-native grasses 26.4	Non-native spp. 14.5 Native spp. 3.6	*Salt Grass*
B_4	***Stipa pulchra* 17.5 (0-50)** *Distichlis spicata* 13.6 (0-45)	*Bromus* spp. 22.8 (0-55) Other non-native grasses 6.7	Non-native spp. 17.3 Native spp. 3.7	*Purple Needlegrass*
B_5	***Stipa pulchra 21.2 (5-60)***	—*	—*	*Purple Needlegrass*
B_6	***Stipa pulchra* 21.7 (5–45)**	—*	—*	*Purple Needlegrass*
1	—	Other non-native grasses 6.4	**Native spp. 13.6** Non-native spp. 1.4	*Disturbed (Native Forbs)*
2	—	*Bromus* spp. 21.2 (0-60) Other non-native grasses 9.1	**Native spp. 34.5** Non-native spp. 24.1	*Disturbed (Native Forbs)*
3	—	*Bromus* spp. 18.6 (0-75)	**Non-native spp. 72.4** Native spp. 11.8	*Disturbed (Non-Native Forbs)*
4	*Stipa pulchra* 1.4 (0-15)	***Bromus* spp. 62.3 (0-100)**	Non-native spp. 34.5 Native spp. 1.3	*Annual Bromes*
5	*Stipa pulchra* 5.5 (0-15)	*Bromus* spp. 36.4 (0-45)	**Non-native spp. 44.1** Native spp. 7.3	*Non-Native Forbs*
6	—	*Bromus* spp. 16.4 (0-85) *Avena barbata* 5.0 (0-40)	**Non-native spp. 30.9** Native spp. 29.1	*Disturbed (Non-Native Forbs)*
7	—	*Bromus* spp. 9.1 (0-40)	**Non-native spp. 39.1** Native spp. 20.5	*Disturbed (Non-Native Forbs)*
8	***Stipa pulchra* 24.5 (0-70)**	*Bromus* spp. 28.6 (0-55) *Avena barbata* 22.3 (0-80)	Native spp. 1.4 Non-native spp. 15.9	*Purple Needlegrass*
9	—	*Bromus* spp. 5.9 (0-40)	**Non-native spp. 45.0**	*Disturbed (Non-*

Table 4
Overall Relative Percent Cover of Plant Species and Physiognomic Categories Per Quadrat for Each Transect

Transect	Relative Percent Coverage of Native Grassland Species Mean per Transect (Minimum-Maximum per Quadrat)	Relative Percent Coverage of Non-Native Grassland Species Mean per Transect (Minimum-Maximum per Quadrat)	Relative Percent Coverage of Forbs/Shrubs Mean per Transect (Minimum-Maximum per Quadrat)	Vegetation Community Determination
			Native spp. 40.5	*Native Forbs)*
10	***Stipa pulchra* 15.0 (0-50)**	*Bromus* spp. 45.5 (0-75)	Non-native spp. 14.1 Native spp. 8.2	*Purple Needlegrass*
11	*Stipa pulchra* 6.4 (0-35)	***Bromus* spp. 44.1 (0-85)** *Avena barbata* 13.2 (0-30)	Non-native spp. 41.4 Native spp. 1.8	*Annual Bromes*
12	*Distichlis spicata* 14.5 (0–35) *Stipa pulchra* 3.2 (0-20)	*Bromus* spp. 36.4 (0-70)	**Non-native spp. 53.6** Native spp. 0.9	*Disturbed (Non-Native Forbs)*
13	*Distichlis spicata* 17.7 (0–50) *Stipa pulchra* 0.5 (0-5)	*Bromus spp.* 23.6 (0-100) *Avena barbata* 5.9 (0-50)	**Non-native spp. 24.5** Native spp. 22.3	*Disturbed (Non-Native Forbs)*
16	*Distichlis spicata* 14.5 (0–45) ***Stipa pulchra* 13.6 (0-40)**	*Bromus* spp. 38.6 (0-65)	Non-native spp. 25.0	*Purple Needlegrass*
17	*Distichlis spicata* 0.5 (0–5)	***Bromus* spp. 24.5 (0-45)** *Avena barbata* 1.4 (0-15) Other non-native grasses 23.1	Non-native spp. 23.6 Native spp. 9.5	*Disturbed (Annual Bromes)*
19	*Distichlis spicata* 3.2 (0–20)	*Bromus* spp. 13.2 (0-50)	**Non-native spp. 34.1** Native spp. 18.2	*Disturbed (Non-Native Forbs)*
21	—	***Bromus* spp. 53.6 (0-80)** Other non-native grasses 0.9	Non-native spp. 31.8 Native spp. 1.4	*Annual Bromes*
22	*Distichlis spicata* 0.5 (0–5)	*Bromus* spp. 25.0 (0-40) Other non-native grasses 0.5	**Non-native spp. 49.5** Native spp. 12.3	*Disturbed (Non-Native Forbs)*
23	—	*Bromus* spp. 1.4 (0-10) Other non-native grasses 0.5	**Non-native spp. 75.9** Native spp. 20.5	*Disturbed (Non-Native Forbs)*
24	—	*Bromus* spp. 24.5 (0-60) *Avena barbata* 0.5 (0-5)	**Non-native spp. 40.0** Native spp. 16.4	*Disturbed (Non-Native Forbs)*
25	*Stipa pulchra* 4.5 (0-35)	***Bromus* spp. 50.0 (0-85)** *Avena barbata* 0.5 (0-5)	Non-native spp. 28.2 Native spp. 10.5	*Annual Bromes*
28	—	***Bromus* spp. 27.3 (0-80)**	Native spp. 14.5 Non-native spp. 13.2	*Annual Bromes*
29	—	*Bromus* spp. 19.1 (0-45)	**Native spp. 31.8** Non-native spp. 21.8	*Disturbed (Native Forbs)*

Table 4
Overall Relative Percent Cover of Plant Species and Physiognomic Categories Per Quadrat for Each Transect

Transect	Relative Percent Coverage of Native Grassland Species Mean per Transect (Minimum-Maximum per Quadrat)	Relative Percent Coverage of Non-Native Grassland Species Mean per Transect (Minimum-Maximum per Quadrat)	Relative Percent Coverage of Forbs/Shrubs Mean per Transect (Minimum-Maximum per Quadrat)	Vegetation Community Determination
30	*Stipa pulchra* 0.9 (0-10)	*Bromus* spp. 27.3 (0-50) *Avena barbata* 2.7 (0-15)	**Non-native spp. 36.8** Native spp. 23.2	*Disturbed (Non-Native Forbs)*
32	—	*Bromus* spp. 24.1 (0-40)	**Non-native spp. 43.6** Native spp. 10.9	*Disturbed (Non-Native Forbs)*
33	—	*Bromus* spp. 28.2 (0-45)	**Non-native spp. 62.3** Native spp. 1.4	*Disturbed (Non-Native Forbs)*
35	*Stipa pulchra* 1.4 (0-5)	*Bromus* spp. 28.2 (0-50)	**Non-native spp. 28.2** Native spp. 24.1	*Disturbed (Non-Native Forbs)*
37	*Distichlis spicata* 5.9 (0–30) ***Stipa pulchra* 10.9 (0-65)**	*Bromus* spp. 27.3 (0-50) *Avena barbata* 1.8 (0-20) Other non-native grasses 4.1	Non-native spp. 31.8 Native spp. 4.5	*Purple Needlegrass*
38	*Stipa pulchra* 5.0 (0-30)	***Avena barbata* 35.0 (0-65)** *Bromus* spp. 27.3 (0-55)	Native spp. 6.8 Non-native spp. 23.2	*Wild Oats*
39	*Distichlis spicata* 15.0 (0–60) *Stipa pulchra* 3.6 (0-15)	*Bromus* spp. 8.2 (0-20)	**Non-native spp. 29.1** Native spp. 18.2	*Disturbed (Non-Native Forbs)*
40	*Distichlis spicata* 1.8 (0–45)	***Bromus* spp. 23.6 (0-50)** *Avena barbata* 6.8 (0-10) Other non-native grasses 33.2	Non-native spp. 16.4 Native spp. 10.4	*Disturbed (Annual Bromes)*

NOTE: Percentages across do not sum to 100 percent for each transect because bare ground, litter, and species with minimal coverage were not recorded.
*Other plant species were not in identifiable condition.

Table 5 includes the percentage of quadrats within each transect dominated by a certain indicator grass species or group of species (i.e., other non-native grasses, native forb/shrubs, non-native forbs/shrubs). Dominant species within each quadrat was/were determined by which species or group of species accounted for the highest relative percent cover. The determination for the entire transect was based on the highest percentage of quadrats dominated by a certain indicator species or group of species. However, MCV2 (2009) and CDFW (2010) defines purple needlegrass grassland as having greater than 10 percent relative cover within the herbaceous layer. Therefore, purple needlegrass grassland was determined to be present where this species is dominant in more than 10 percent of quadrats. Areas where purple needlegrass exceeds the 10 percent cover within each quad are depicted on *Figure 3*. Additionally, MCV2 (2009) and

CDFW (2010) defines salt grass flats as exhibiting greater than 50 percent relative cover within the herbaceous layer. Therefore, an area was determined to consist of salt grass flats where this species is dominant in more than 50 percent of quadrats. Transects where salt grass exceeds 50 percent relative cover within each quadrat is shown in *Figure 3*.

Table 5
Transect Evaluation of Dominant Plant Species and the Percentage of Quadrat Occupied

	Percentage of Quadrats Occupied by Grass Species or Physiognomic Category								
	Percentage of Quadrats Occupied by Native Grasses		Percentage of Quadrats Occupied by Non-Native Grasses			Percentage of Quadrats Occupied by Forbs/Shrubs			
Transect	*Stipa pulchra*	*Distichlis spicata*	*Avena barbata*	*Bromus* spp.	Other	Native	Non-native	Bare ground	Vegetation Community Determination
B_1	**14.0**	—	—	42.0	—	—	44.0	—	*Purple Needlegrass*
B_2	—	—	**36.4**	27.3	—	9.1	27.3	—	*Wild Oats*
B_3	9.1	**54.5**	—	—	27.3	—	9.1	—	*Salt Grass*
B_4	**27.5**	21.6	—	—	3.9	5.9	9.8	—	*Purple Needlegrass*
1	—	—	—	—	27.3	**36.4**	9.1	27.3	*Disturbed (Native Forbs)*
2	—	—	—	27.3	9.1	**45.5**	18.2	—	*Disturbed (Native Forbs)*
3	—	—	—	18.2	—	9.1	**72.7**	—	*Disturbed (Non-Native Forbs)*
4	—	—	—	**81.8**	—	—	18.2	—	*Annual Bromes*
5	—	—	—	45.5	—	—	**54.5**	—	*Non-Native Forbs*
6	—	—	9.1	18.2	—	27.3	**45.5**	—	*Disturbed (Non-Native Forbs)*
7	—	—	—	—	—	27.3	**54.5**	18.2	*Disturbed (Non-Native Forbs)*
8	**27.3**	—	9.1	**54.5**	—	—	9.1	—	*Purple Needlegrass*
9	—	—	—	—	—	**45.5**	54.5	—	*Disturbed (Non-Native Forbs)*
10	**18.2**	—	—	**72.7**	—	9.1	—	—	*Purple Needlegrass*
11	—	—	—	**72.7**	—	—	27.3	—	*Annual Bromes*
12	—	—	—	27.3	—	—	**72.7**	—	*Disturbed (Non-Native Forbs)*
13	—	18.2	9.1	18.2	—	27.3	**27.3**	—	*Disturbed (Non-Native Forbs)*
16	**18.2**	—	—	**45.5**	—	—	36.4	—	*Purple Needlegrass*
17	—	—	—	**36.4**	27.3	9.1	27.3	—	*Disturbed (Annual Bromes)*
19	—	—	—	9.1	—	36.4	**54.5**	—	*Disturbed (Non-Native Forbs)*
21	—	—	—	**72.7**	—	—	27.3	—	*Annual Bromes*

Table 5
Transect Evaluation of Dominant Plant Species and the Percentage of Quadrat Occupied

	Percentage of Quadrats Occupied by Grass Species or Physiognomic Category								
	Percentage of Quadrats Occupied by Native Grasses		Percentage of Quadrats Occupied by Non-Native Grasses			Percentage of Quadrats Occupied by Forbs/Shrubs			
Transect	*Stipa pulchra*	*Distichlis spicata*	*Avena barbata*	*Bromus* spp.	Other	Native	Non-native	Bare ground	Vegetation Community Determination
22	—	—	—	—	—	9.1	**90.9**	—	*Disturbed (Non-Native Forbs)*
23	—	—	—	—	—	9.1	**90.9**	—	*Disturbed (Non-Native Forbs)*
24	—	—	—	27.3	—	18.2	**54.5**	—	*Disturbed (Non-Native Forbs)*
25	9.1	—	—	**54.5**	—	9.1	27.3	—	*Annual Bromes*
28	—	—	—	**45.5**	—	9.1	9.1	36.4	*Annual Bromes*
29	—	—	—	9.1	—	**36.4**	18.2	36.4	*Disturbed (Native Forbs)*
30	—	—	—	27.3	—	18.2	**45.5**	9.1	*Disturbed (Non-Native Forbs)*
32	—	—	—	18.2	—	—	**63.6**	18.2	*Disturbed (Non-Native Forbs)*
33	—	—	—	—	—	—	**100**	—	*Disturbed (Non-Native Forbs)*
35	—	—	—	9.1	—	27.3	**45.5**	18.2	*Disturbed (Non-Native Forbs)*
37	9.1	—	—	**45.5**	—	—	36.4	9.1	*Purple Needlegrass**
38	—	—	**54.5**	27.3	—	—	18.2	—	*Wild Oats*
39	—	18.2	—	—	—	18.2	**45.5**	18.2	*Disturbed (Non-Native Forbs)*
40	—	—	9.1	**36.4**	**36.4**	18.2	—	—	*Disturbed (Annual Bromes)*

Notes:
Transects B5 and B6 were not included in the table since no other species were recognizable given survey timing so a relative percent cover could not be calculated. However, purple needlegrass exceeded 10 percent cover in 88.9 percent of the quadrats within Transect B5 and 71.4 percent of the quadrats within Transect B6. Therefore, a determination for purple needlegrass can still be made.
* - Transect 37 determination Purple Needlegrass since overall percent cover of purple needlegrass (*Stipa pulchra*) throughout the transect was over 10 percent, as shown in *Table 5*.

The cover of native forb species within the grassland communities did not meet or exceed membership rules per the MCV2 or is not documented as a herbaceous alliance. Even in comparison to other classifications such as R. Holland (1986) and V. L. Holland and D. Keil's (1995) *California Vegetation*, the annual grassland composition at Newport Banning Ranch was not indicative of native grass or forb communities.

The native forbs that were observed at low quantities include common deerweed (*Acmispon glaber*), Cuman ragweed (*Ambrosia psilostachya*), fringed redmaids (*Calandrinia ciliata*), common sandaster (*Corethrogyne filaginifolia*), dove weed (*Croton setigerus*), clustered tarweed (*Deinandra fasiculata*), Canadian horseweed (*Erigeron canadensis*), alkali seaheath (*Frankenia salina*), Great Valley gumweed (*Grindelia camporum*), seaside heliotrope (*Heliotropium curassavicum*), telegraphweed (*Heterotheca grandiflora*), shining pepperweed (*Lepidium nitidum*), dotseed plantain (*Plantago erecta*), greenspot nightshade (*Solanum douglasii*), salt sandspurry (*Spergularia marina*), and rod wirelettuce (*Stephanomeria virgata*) (Appendices E and F).

To further document purple needlegrass, the number of individuals was counted in quadrats where purple needlegrass was found. *Table 6* includes the total number of individuals of purple needlegrass within each transect (note that transect lengths are not all the same). It also provides the mean number of purple needlegrass individuals per quadrat and the minimum and maximum number of individuals recorded within each quadrat for each transect.

Table 6
Number of Purple Needlegrass Individuals in Each Transect

Transect	Total Number of Purple Needlegrass Individuals within the Transect	Number of Purple Needlegrass Individuals per Quadrat *Mean (Minimum-Maximum)*
B_1	193	3.9 (0-24)
B_2	0	—
B_3	8	0.7 (0-8)
B_4	321	6.3 (0-50)
B_5	117	6.5 (1-17)
B_6	73	10.4 (1-24)
1	0	—
2	0	—
3	0	—
4	8	0.7 (0-8)
5	27	2.5 (0-27)
6	0	
7	0	—
8	67	6.1 (0-13)
9	0	—
10	54	4.9 (0-21)
11	32	2.9 (0-20)
12	14	1.3 (0-7)
13	1	0.09 (0-1)

Table 6
Number of Purple Needlegrass Individuals in Each Transect

Transect	Total Number of Purple Needlegrass Individuals within the Transect	Number of Purple Needlegrass Individuals per Quadrat *Mean (Minimum-Maximum)*
16	63	5.7 (0-19)
17	0	—
19	0	—
21	0	—
22	0	—
23	0	—
24	0	—
25	14	1.3 (0-11)
28	0	—
29	0	—
30	3	0.3 (0-3)
32	0	—
33	0	—
35	3	0.3 (0-1)
37	34	3.1 (0-17)
38	17	1.5 (0-9)
39	9	0.8 (0-3)
40	0	—

3.2. Assessment of Disturbed and Maintenance Areas

A disturbed qualifier (D) was placed on any native vegetation community where there was evidence of vegetation modification by mechanical disturbance or significant establishment of non-native plant species within the vegetation community. *Figure 4* displays transects and operation point used to categorize disturbed and maintained areas on-site.

3.2.1 Presence and Height of California brittlebush

Based on the transect data collected in June and July 2012, a total of 172 California brittlebush shrubs were included in the sample. Heights ranged from 5 cm (2.0 inches) to 115 cm (45.2 inches) with a mean height of approximately 36.7 cm (14.4 inches). *Table 7* provides the percentage of points within the transect sampled that included California brittlebush, as well as minimum, maximum, and mean height of the California brittlebush along each transect. Areas mapped as California brittle bush scrub had a closed canopy with shrub heights greater than or equal to approximately 40 cm. Of the 30 point-intercept transects recorded in various vegetation

communities and disturbed areas, nine transects were recorded to have a mean California brittlebush height greater than or equal to 40 cm.

Table 7
Presence and Height of California Brittlebush Based on Point-Intercept Transect Data

Transect Label	Percent of Point Intercepts with California Brittlebush	Minimum California Brittlebush Height (cm)	Maximum California Brittlebush Height (cm)	Mean California Brittlebush Height (cm)
D_01	2.4	14	14	14.0
D_02	0.0	—	—	—
D_03	**13.0**	**35**	**80**	**55.0**
D_04	6.1	15	25	20.0
D_05	**3.4**	**40**	**40**	**40.0**
D_07	0.0	—	—	—
D_08	0.0	—	—	—
D_12	25.0	5	20	10.0
D_14	0.0	—	—	—
D_16	17.2	10	40	23.0
D_17	0.0	—	—	—
D_18	21.4	15	40	23.3
D_20	0.0	—	—	—
D_23	21.4	10	50	24.4
D_28	16.7	10	30	17.0
D_33	16.7	5	30	15.0
D_35	**26.1**	**40**	**65**	**49.6**
D_39	0.0	—	—	—
D_40	10.0	5	25	16.7
D_41	14.3	15	25	20.0
D_46	**9.1**	**30**	**50**	**40.0**
D_ABG_01	**9.7**	**10**	**70**	**49.3**
D_CBBS_03	**36.8**	**25**	**70**	**43.6**
D_CBBS_04	40.5	5	35	22.9
D_CBBS_05	**78.6**	**30**	**95**	**54.1**
D_CBBS_06	53.3	10	65	35.0
D_CBBS_07	40.0	10	40	26.4
D_CBBS_09	**55.6**	**40**	**75**	**51.0**
D_CBBS_13	47.6	25	100	45.0
D_CBBS_14	**63.2**	**54**	**115**	**79.5**
Total	**16.9**	**5**	**115**	**36.7**

Note:

Bold text identifies transects with a mean California brittlebush height greater than or equal to 40 cm.

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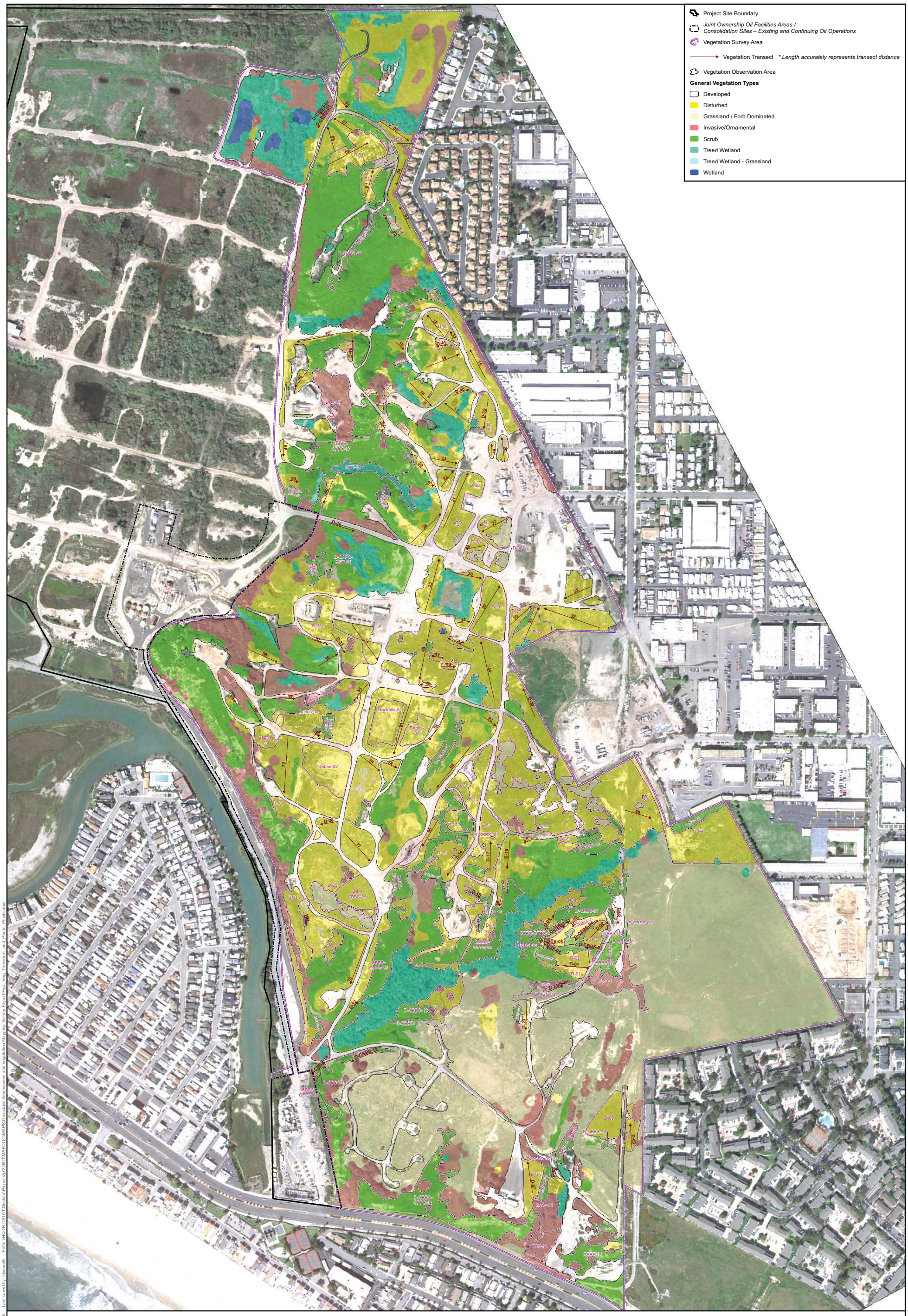

N

Feet
0 385 770

1 inch = 222 feet

SOURCE: 2011 Aerial Provided by Fuscoe Engineering, Vegetation - Baselayer (GLA 2009), Update (Dudek 2013),

DUDEK

NEWPORT BANNING RANCH

Figure 4

Vegetation Transect and Observation Areas

Grassland Assessment and Vegetation Mapping Survey Report

Date: 2/1/2013 - Created by: slucarelli - Last saved by: slucarelli - Path: \\HOTR-DATA1\Gisdata\Projects\7249011\MAPDOC\MAPS\Grassland Assessment and Vegetation Mapping Survey Report\Fig4_Veg_Transects_and_Photo_Points.mxd

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3.2.2 Disturbed Transect and Categories

A total of four D-CBBS vegetation communities and 13 D-M-CBBS, 1 D-I-CBBS, and 52 Disturbed categories were identified as shown in Figure 5. *Table 8* provides the absolute cover of shrubs, absolute cover of California brittlebush, average California brittlebush height, and polygon category determination.

Table 8
Point-Intercept Transect of Disturbed Areas

Transect	Absolute Cover of Shrubs (percent)	Absolute Cover of California Brittlebush (percent)	Average Height of California Brittlebush (cm)	Determination
1	29.27	7.32	31.33	D
2	23.81	23.81	8.20	D-M-CBBS
3	33.33	30.95	40.77	D-CBBS
4	4.08	4.08	7.00	D
5	1.67	1.67	12.00	D
6	20.00	4.00	12.00	D
7	23.08	10.26	26.75	D-M-CBBS
8	4.76	4.76	17.50	D
9	18.42	6.58	43.00	D
10	25.40	4.76	53.67	D
11	31.82	31.82	66.71	D-CBBS
12	7.14	7.14	10.00	D
13	0.00	0.00		D
14	5.00	1.67	10.00	D
15	0.00	0.00		D
16	7.55	7.55	15.00	D
17	23.40	14.89	22.14	D-M-CBBS
18	19.05	9.52	29.50	D
19	0.00	0.00		D
20	0.00	0.00		D
21	4.95	1.98	10.50	D
22	2.78	2.78	14.00	D
23	0.00	0.00		D
24	18.57	11.43	23.75	D-M-CBBS
25	3.30	1.10	7.00	D
26	0.00	0.00		D

Table 8
Point-Intercept Transect of Disturbed Areas

Transect	Absolute Cover of Shrubs (percent)	Absolute Cover of California Brittlebush (percent)	Average Height of California Brittlebush (cm)	Determination
27	0.00	0.00		D
28	0.00	0.00		D
29	0.00	0.00		D
30	8.33	0.00		D
31	0.00	0.00		D
32	0.00	0.00		D
33	10.20	0.00		D
34	4.76	4.76	3.00	D
35	4.05	2.70	32.00	D
36	32.43	29.73	21.82	D-CBBS
37	21.05	21.05	19.38	D-M-CBBS
38	2.00	2.00	10.00	D
39	5.56	5.56	31.00	D
40	0.00	0.00		D
41	0.00	0.00		D
42	2.38	2.38	9.00	D
43	0.00	0.00		D
44	2.97	2.97	31.33	D
45	9.90	8.91	48.11	D
46	24.24	0.00		D
48	13.79	6.90	61.00	D
49	22.73	22.73	17.00	D-M-CBBS
50	11.90	7.14	22.33	D
51	15.00	15.00	7.00	D-M-CBBS
52	17.86	17.86	15.00	D-M-CBBS
53	11.54	0.00		D
55	12.82	7.69	15.00	D
56	7.69	0.00		D
58	31.82	31.82	41.07	D-CBBS
59	15.00	15.00	23.33	D-M-CBBS
61	7.14	3.06	22.67	D
62	18.18	2.27	5.00	D
63	0.00	0.00		D
64	13.48	13.48	19.33	D-M-CBBS

Table 8
Point-Intercept Transect of Disturbed Areas

Transect	Absolute Cover of Shrubs (percent)	Absolute Cover of California Brittlebush (percent)	Average Height of California Brittlebush (cm)	Determination
65	7.02	7.02	25.75	D
66	5.26	5.26	31.00	D
68	11.11	5.56	22.00	D
69	27.66	8.51	50.25	D
71	18.18	16.67	22.27	D-M-CBBS
72	6.19	5.15	9.40	D
74	14.29	14.29	9.50	D-M-CBBS
75	4.65	2.33	21.00	D
76	11.39	10.13	14.00	D-M-CBBS

3.3 Vegetation Communities

A total of four general physiognomic vegetation communities were mapped during field surveys identified by the *Manual of California Vegetation,* Second Edition (MCV2; Sawyer et al. 2009) and *Natural Communities List* (NCL; CDFW 2010): 1) grass and forb; 2) coastal scrub; 3) riparian scrub; and, 4) woodland and tree cluster dominated communities. These vegetation communities are summarized in *Table 9* and displayed on *Figure 5*. In this survey, non-vegetated areas (mudflats) are equivalent to a general physiognomic and physical location type, and are described at the end of the following section. Other site features associated with West Newport Oil Company standard operations and maintenance were also identified and mapped, and are described in the following section; these areas do not correspond to natural vegetation communities per the MCV2. Vegetation community mapping photographs and data sheets are provided in *Appendices D, E, and F*.

Table 9
Summary of Vegetation Communities and Maintained Areas within the Survey Area

Physiognomic Category	General	Vegetation Communities	Abbreviation
Herbaceous Alliances and Stands	Grassland	Annual Brome Grassland	ABG
		Purple Needle Grass Grassland	PNG
		Rabbitsfoot Grassland	RFG
		Salt Grass Flats	SGF
		Wild Oats Grassland	WOG
	Forb Dominated	Alkali Heath Marsh	ASH

Table 9
Summary of Vegetation Communities and Maintained Areas within the Survey Area

Physiognomic Category	General	Vegetation Communities	Abbreviation
		California Bulrush Marsh	CBM
		Giant Reed Breaks	GRB
		Ice Plant Mats	IPM
		Pampas Grass Patches	PGP
		Pickleweed Mats	PWM
		Poison Hemlock Patches	PHP
		Upland Mustard	UM
		Woolly Marbles	WM
Shrubland Alliances and Stands	Coastal Scrub	California Brittle Bush Scrub	CBBS
		California Buckwheat Scrub	CBS
		California Sagebrush Scrub	CSS
		Coastal Prickly Pear Scrub	CPPS
		Coyote Brush Scrub	CYS
		Menzies's Golden Bush Scrub	MGBS
		Quailbush Scrub	QS
Shrubland Alliances and Stands	Riparian Scrub	Arroyo Willow Thickets	ARWT
		Mulefat Thickets	MFT
Woodlands and Tree Clusters	Woodlands and Tree Clusters (Planted or Naturally Occurring)	Black Willow Thickets	BWT
		Eucalyptus Groves	EG
		Golden Wattle Acacia	GWA
		Myoporum Groves	MYP
		Pepper Tree Stand	PT
Non-Vegetated Areas		Mudflats	MDFT
West Newport Oil Facilities and Operations and Maintenance Areas		Debris	Debris
		Developed	DVLP
		Disturbed	D
		Disturbed Infrequently Maintained California Brittle Bush Scrub	D-I-CBBS
		Disturbed Maintained California Brittle Bush Scrub	D-M-CBBS
		Stock Pile	Stock Pile
Restored		Restored California Brittle Bush Scrub	R-CBBS

Vegetation communities identified in MCV2 have specific membership rules, which quantitatively define dominant and co-dominant species (Sawyer et al. 2009). During vegetation mapping surveys, MCV2 definitions were consulted against observed percent coverage, then assigned a community name accordingly. Membership rules of the identified vegetation communities within the survey area are described in *Table 10*.

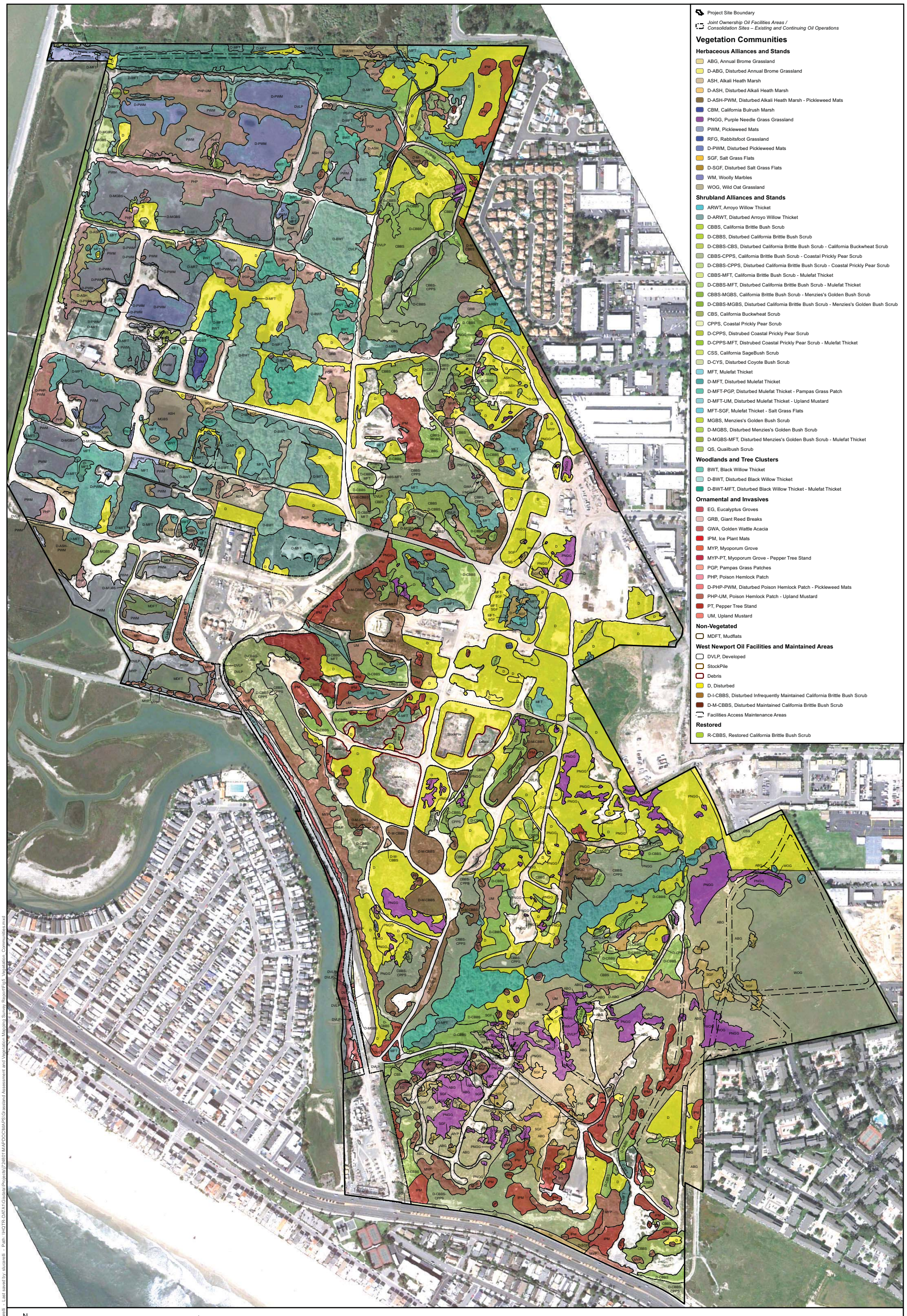
Table 10
Vegetation Community Membership Rules

Vegetation Community	Species Scientific Name	Membership Rules
Herbaceous Alliances and Stands - Grassland		
Annual Brome Grassland	*Bromus diandrus, B. hordeaceus – Brachypodium distachyon*	*Brachypodium distachyon* > 50 percent relative cover in the herbaceous layer.
		Bromus diandrus > 60 percent relative cover with other non-natives in herbaceous layer with a variety of annuals at low cover.
		***Bromus diandrus, B. hordeaceus*, and/or *Brachypodium distachyon* > 80 percent relative cover separately or co-dominant with non-natives; natives usually with low or insignificant cover.**
		Bromus hordeaceus > 50 percent relative cover in the herbaceous layer.
Purple Needle Grass Grassland	*Stipa pulchra* (*Nassella pulchra*)	***Stipa pulchra* (*Nassella pulchra*) usually > 10 percent relative cover of the herbaceous layer.**
		Stipa pulchra (*Nassella pulchra*) > 5 percent absolute cover as a characteristic to dominant species in the herbaceous layer.
Rabbitsfoot Grassland	*Polypogon monspeliensis*	♦
Salt Grass Flats	*Distichlis spicata*	***Distichlis spicata* > 50 percent relative cover in the herbaceous layer; *D. spicata* has higher cover than any other single grass species.**
		Distichlis spicata > 30 percent relative cover in the herbaceous layer, *Sarcocornia* or *Salicornia* spp. if present, < 30 percent relative cover.
Wild Oats Grassland	*Avena barbata, A. fatua*	*Avena* spp. > 75 percent relative cover; other non-native or native plants < 5 percent absolute cover, if present, in the herbaceous layer.
		Avena fatua > 50 percent relative cover, and native herbs relatively low in cover in the herbaceous layer.
		***Avena* spp. > 50 percent relative cover, and native herbs < 10 percent relative cover in the herbaceous layer.**
Herbaceous Alliances and Stands – Forb Dominated		
Alkali Heath Marsh	*Frankenia salina*	***Frankenia salina* > 30 percent relative cover in the herbaceous layer, sometimes co-dominant with *Distichlis spicata* or other herbs and shrubs.**
California Bulrush Marsh	*Schoenoplectus californicus*	***Schoenoplectus californicus* ≥ 10 percent absolute cover in the herbaceous layer; *Schoenoplectus acutus*, if present, < 50 percent relative cover, though it can be co-dominant with *Schoenoplectus californicus***
Giant Reed Breaks	*Arundo donax*	***Arundo donax* > 60 percent relative cover in the herbaceous and shrubs layer.**
Ice Plant Mats	*Carpobrotus edulis* or other ice plants	*
Pampas Grass Patches	*Cortaderia jubata, C. selloana*	***Cortaderia jubata or C. selloana* > 80 percent relative cover in the shrub or herbaceous layer.**
Pickleweed Mats	*Sarcocornia pacifica*	***Saracocornia pacifica* > 10 percent absolute cover and sometimes over a high cover of short annual or perennial grasses; if *Distichlis spicata* ≥ 50 percent relative cover, stands are in the *Distichlis spicata* alliance**
		Sarcocornia pacifica > 50 percent relative cover in the herbaceous layer
		Sarcocornia pacifica > 50 percent relative cover and *Distichlis spicata* < 30 percent relative cover in the herbaceous layer.
Poison Hemlock Patches	*Conium maculatum*	*Conium maculatum* > 50 percent relative cover in the herbaceous layer.
Upland Mustard	*Brassica nigra* and other mustards	*
Woolly Marbles	*Psilocarphus brevissimus*	♦
Shrubland Alliances and Stands – Coastal Scrub		
California Brittle Bush Scrub	*Encelia californica*	***Encelia californica* at least 30 percent relative cover in the shrub canopy.**
California Buckwheat Scrub	*Eriogonum fasciculatum*	*Eriogonum fasciculatum* > 5 percent absolute cover in the shrub canopy.

Table 10
Vegetation Community Membership Rules

Vegetation Community	Species Scientific Name	Membership Rules
		Eriogonum fasciculatum > 2 percent absolute cover or > 50 percent relative cover in the shrub canopy; other shrubs, if present, < half its cover, but *Hyptis emoryi* or *Salvia dorrii* may be higher.
		***Eriogonum fasciculatum* > 50 percent relative cover in the shrub canopy; other shrubs, if present, < 50 percent relative cover except in some cases with *Rhus ovata*.**
California Sagebrush Scrub	*Artemisia californica*	***Artemisia californica* > 60 percent relative cover in the shrub canopy.**
		Artemisia californica > 3 times cover of *Baccharis pilularis* and other shrub species.
		Artemisia californica > 60 percent relative cover in the shrub canopy, or *Malosma laurina* or *Diplacus aurantiacus* > 30 percent relative cover.
Coastal Prickly Pear Scrub	*Opuntia littoralis*	***Opuntia littoralis* and/or other cacti (such as *Cylindropuntia prolifera* and *O. oricola*) are > 50 percent relative cover in the shrub canopy.**
		Opuntia littoralis is > 30 percent relative cover as a dominant or co-dominant with other coastal sage scrub species.
Coyote Brush Scrub	*Baccharis pilularis*	***Baccharis pilularis* > 50 percent absolute cover in the shrub layer.**
		Baccharis pilularis > 15 percent shrub cover over grassy understory; *B. pilularis* relative cover > 50 percent than other shrub species.
		Both *Artemisia californica* and *Baccharis pilularis* between 30 percent and 60 percent relative cover in the shrub canopy.
Menzies's Golden Bush Scrub	*Isocoma menziesii*	***Isocoma menziesii* > 50 percent relative cover in the shrub canopy.**
Quailbush Scrub	*Atriplex lentiformis*	***Atriplex lentiformis* is > 50 percent relative cover in the shrub canopy.**
Shrubland Alliances and Stands – Riparian Scrub		
Arroyo Willow Thickets	*Salix lasiolepis*	***Salix lasiolepis* > 50 percent relative cover in the shrub or tree canopy.**
		Salix lasiolepis ≥ 25 percent absolute cover in the shrub or tree canopy.
Mulefat Thickets	*Baccharis salicifolia*	***Baccharis salicifolia* > 50 percent relative cover in shrub canopy.**
		Baccharis salicifolia > 30 percent relative cover in the shrub canopy with *Sambucus nigra*.
Woodlands and Tree Clusters - Woodlands and Tree Clusters (Planted or Naturally Occurring)		
Black Willow Thickets	*Salix gooddingii*	***Salix gooddingii* > 50 percent relative cover in the canopy; if other willows are present, willows may co-dominate and *S. gooddingii* > 30 percent relative cover in the canopy.**
		Salix gooddingii > 50 percent relative cover in the canopy; if *Populus fremontii* present, trees may co-dominate and *S. gooddingii* > 30 percent relative cover, as a rule for the Central Valley.
Eucalyptus Groves	*Eucalyptus globulus, E. camaldulensis*	***Eucalyptus* species > 80 percent relative cover in the tree layer.**
Golden Wattle Acacia	*Acacia pycnantha*	♦
Myoporum Groves	*Myoporum laetum*	***Myoporum laetum* > 60 percent relative cover in the tree layer.**
Pepper Tree Stand	*Schinus molle, S. terebinthifolius*	***Schinus molle* > 80 percent relative cover in the tree layer. *S. molle* > 60 percent relative cover in the tree layer.**

Note:
Bold text – Membership rule met on Newport Banning Ranch site.
* - No membership rules noted in MCV2 (Sawyer et al. 2009)
♦ - Not listed in MCV2 (Sawyer et al. 2009).



N

0 400 800 Feet

1 inch = 229 feet

SOURCE: 2011 Aerial provided by Fuscoe Engineering, Vegetation - Baselayer (GLA 2009), Update (Dudek 2013)

DUDEK

NEWPORT BANNING RANCH

Figure 5

Vegetation Communities

Grassland Assessment and Vegetation Mapping Survey Report

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3.3.1 Grassland and Forb-Dominated Communities

The survey area includes four grassland-dominated (annual brome grassland, purple needle grass grassland, rabbitsfoot grassland, salt grass flats, and wild oat grassland) and eight forb-dominated (alkali heath marsh, California bulrush marsh, giant reed breaks, ice plant mats, pampas grass patches, pickleweed mats, poison hemlock patches, and upland mustard) vegetation communities.

3.3.1.1 Grassland Communities

Annual brome grasslands contain ripgut brome (*Bromus diandrus*) and soft chess brome (*Bromus hordeaceus*) as dominant or co-dominant species in the herbaceous layer. Annual brome grasslands are typically found on seasonally dry hillsides and valleys in the Central Valley, interior valleys of the Coast Ranges, and along the coast of central and southern California as well as some of the offshore islands. This mix of grasses and forbs is often found on gravelly to deep, fine-grained soils well suited for annual growth (Sawyer et al. 2009). Annual brome grasslands have open to continuous cover less than 0.75 meters (2.5 feet) in height; low cover of emergent trees and shrubs may be present. This community occurs from sea level to 2,200 meters (7,218 feet) above mean sea level (amsl) (Sawyer et al. 2009).

The on-site annual brome grassland is composed primarily of non-native annual grasses and native and non-native broad-leafed forbs. Noxious weeds are also present in disturbed areas adjacent to this habitat type. Dominant grasses include soft chess brome, ripgut brome, foxtail chess (*Bromus madritensis*), Italian rye grass, and rattail sixweeks grass. Flowering herbs include western verbena (*Verbena lasiostachys*), scarlet pimpernel (*Anagallis arvensis*), common catchfly (*Silene gallica*), coast morning-glory (*Calystegia macrostegia* ssp. *cyclostegia*), and dove weed.

Annual brome grasslands predominantly occur throughout the southern portion of the site, especially in areas south of the arroyo willow and black willow thickets. The site contains a total of 22.806 acres of annual brome grasslands or approximately 44 percent of the grassland throughout the Project site. The annual brome grasslands dominate the mesas, which are also occupied by purple needle grass grassland, wild oats grassland, and salt grass flats. A total of 0.439 acres of disturbed annual brome grassland occur throughout the Project site.

Purple needle grass grassland occurs along the entire coast of California, the Central Valley, and the western Mojave. It includes the perennial bunchgrass purple needlegrass (*Stipa pulchra*) as a dominant or co-dominant grass. These communities are mid-height grasslands, typically up to 2 feet tall. According to Holland (1986), native and introduced annuals grow between bunches of purple needlegrass and often exceed it in cover. Trees or shrubs may also be present within the

grassland (NatureServe 2009). Purple needle grass grassland usually occurs on deep soils that have a high clay content. Sites that are moist or waterlogged during winter and very dry during summer are favorable (Holland 1986). Serpentine soils often support purple needle grass grassland since introduced annual species (except *Avena barbata*) are unable to grow on serpentine soils (Holland 1986).

Table 11
Summary of Vegetation Communities and Acres

Vegetation Category and Vegetation Community		MCV2 Global Rank/State Rank	Mesa Acres	Lowland Acres
NATIVE AND NATURALIZED VEGETATION COMMUNITIES				
Grassland/Forb Dominated				
Alkali Heath Marsh	Undisturbed (ASH)	G4/S3	0.156	3.160
	Disturbed (D-ASH)	-/-	0.000	2.401
Alkali Heath Marsh – Pickleweed Mats	Disturbed (D-ASH-PWM)	-/-	0.000	1.153
Annual Brome Grassland	Undisturbed (ABG)	-/-	22.806	0.000
	Disturbed (D-ABG)	-/-	0.439	0.000
California Bulrush Marsh	Undisturbed (CBM)	G5/S4?	0.000	0.211
Pickleweed Mats	Undisturbed (PWM)	G4/S3	0.000	16.857
	Disturbed (D-PWM)	-/-	0.000	6.710
Purple Needle Grass Grassland	Undisturbed (PNGG)	G4/S3?	10.027	0.000
Rabbitsfoot Grassland	Undisturbed (RFG)	-/-	0.023	0.000
Salt Grass Flats	Undisturbed (SGF)	G5/S4	3.797	0.236
	Disturbed (D-SGF)	-/-	0.105	0.000
Wild Oats Grassland	Undisturbed (WOG)	-/-	14.086	0.000
Woolly Marbles	Undisturbed (WM)	-/-	0.021	0.000
		Subtotal	**51.460**	**30.728**
Scrub				
Arroyo Willow Thicket	Undisturbed (ARWT)	G4/S4	3.803	0.000
	Disturbed (D-ARWT)	-/-	0.000	0.009
California Brittle Bush Scrub	Undisturbed (CBBS)	G4/S3	7.445	0.023
	Disturbed (D-CBBS)	-/-	16.258	0.436
	Restored (R-CBBS)	G4/S3	0.133	0.000
California Brittle Bush Scrub – California Buckwheat Scrub	Disturbed (D-CBBS-CBS)	-/-	1.133	0.000
California Brittle Bush Scrub – Coastal Prickly Pear Scrub	Undisturbed (CBBS-CPPS)	-/-	14.188	0.000
	Disturbed (D-CBBS-CPPS)	-/-	6.084	0.000
California Brittle Bush Scrub – Mulefat Thicket	Undisturbed (CBBS-MFT)	-/-	0.721	0.000
	Disturbed (D-CBBS-MFT)	-/-	1.960	0.000
California Brittle Bush Scrub – Menzies's Golden Bush Scrub	Undisturbed (CBBS-MGBS)	-/-	0.125	0.000
	Disturbed (D-CBBS-MGBS)	-/-	0.047	0.000

Table 11
Summary of Vegetation Communities and Acres

Vegetation Category and Vegetation Community		MCV2 Global Rank/State Rank	Mesa Acres	Lowland Acres
California Buckwheat Scrub	Undisturbed (CBS)	G5/S5	0.911	0.000
California Sagebrush Scrub	Undisturbed (CSS)	G5/S5	1.081	0.000
Coastal Prickly Pear Scrub	Undisturbed (CPPS)	G3/S3	0.158	0.000
	Disturbed (D-CPPS)	-/-	0.048	0.139
Coastal Prickly Pear Scrub – Mulefat Thicket	Disturbed (D-CPPS-MFT)	-/-	0.259	0.000
Coyote Brush Scrub	Disturbed (D-CYS)	-/-	0.095	0.305
Menzies's Golden Bush Scrub	Undisturbed (MGBS)	G4?/S4?	0.030	1.133
	Disturbed (D-MGBS)	-/-	0.282	2.661
Menzies's Golden Bush Scrub – Mulefat Thicket	Disturbed (D-MGBS-MFT)	-/-	0.341	0.000
Mulefat Thicket	Undisturbed (MFT)	G5/S4	2.135	5.809
	Disturbed (D-MFT)	-/-	4.803	20.172
Quailbush Scrub	Undisturbed (QS)	G4/S4	0.320	0.063
		Subtotal	**62.360**	**30.750**
Scrub-Grassland/Forb Dominated				
Mulefat Thicket-Salt Grass Flats	Undisturbed (MFT-SGF)	-/-	0.134	0.000
		Subtotal	**0.134**	**0.000**
Scrub-Invasive and Ornamental				
Mulefat Thicket – Pampas Grass Patch	Disturbed (D-MFT-PGP)	-/-	0.000	0.458
Mulefat Thicket – Upland Mustard	Disturbed (D-MFT-UM)	-/-	0.000	0.193
		Subtotal	**0.000**	**0.651**
Woodlands and Trees				
Black Willow Thicket	Undisturbed (BWT)	G4/S3	2.435	4.570
	Disturbed (D-BWT)	-/-	0.000	11.535
		Subtotal	**2.435**	**16.105**
Woodlands and Trees-Scrub				
Black Willow Thicket – Mulefat Thicket	Disturbed (D-BWT-MFT)	-/-	0.000	3.698
		Subtotal	**0.000**	**3.698**
Non-Vegetated				
Mudflats	MDFT	-/-	0.000	1.401
		Subtotal	**0.000**	**1.401**
INVASIVE AND ORNAMENTAL VEGETATION				
Eucalyptus Groves	EG	-/-	0.985	0.000
Giant Reed Breaks	GRB	-/-	0.244	1.126
Golden Wattle Acacia	GWA	-/-	0.954	0.000
Ice Plant Mats	IPM	-/-	11.587	0.495
Myoporum Stand	MYP	-/-	5.397	1.222
Myoporum Stand – Pepper Tree	MYP – PT	-/-	0.000	0.867
Pampas Grass Patches	PGP	-/-	0.464	5.510
Pepper Tree Stand	PT	-/-	0.379	0.000
Poison Hemlock Patch	PHP	-/-	0.000	3.452

Table 11
Summary of Vegetation Communities and Acres

Vegetation Category and Vegetation Community		MCV2 Global Rank/State Rank	Mesa Acres	Lowland Acres
Poison Hemlock Patch – Upland Mustard	PHP – UM	-/-	0.000	4.904
Upland Mustard	UM	-/-	2.517	0.883
Poison Hemlock Patch – Pickleweed Mats	Disturbed (D-PHP-PWM)	-/-	0.000	0.876
		Subtotal	**22.527**	**19.335**
WEST NEWPORT OIL FACILITIES AND OPERATION AND MAINTENANCE AREAS				
Debris	Debris	-/-	3.240	0.000
Developed	DVLP	-/-	44.142	21.719
Disturbed	D	-/-	52.919	9.800
Disturbed – Infrequently Maintained – California Brittle Bush Scrub	D-I-CBBS	-/-	0.445	0.000
Disturbed – Maintained – California Brittle Bush Scrub	D-M-CBBS	-/-	10.739	0.063
Stock Pile	StockPile	-/-	0.846	0.000
		Subtotal	**112.331**	**31.582**
		TOTAL*	**251.247**	**134.250**

Global Ranking - The global rank (G-rank) is a reflection of the overall condition of an element throughout its global range.
State Ranking - The state rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank.
G1, S1 = Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals OR less than 2,000 acres.
G2, S2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres.
G3, S3 = 21-80 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres.
G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
S4 = Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some threat, or somewhat narrow habitat. NO THREAT RANK.
G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world.
S5 = Demonstrably secure to ineradicable in California. No Threat Rank.
Notes:
* - Total acreage is slightly different from Project site due to rounding.
Uncertainty about the rank of an element is expressed in two major ways:

- By expressing the rank as a range of values: e.g., S2S3 means the rank is somewhere between S2 and S3.
- By adding a ? to the rank: e.g., S2? This represents more certainty than S2S3, but less than S2.

According to Holland (1986), Valley Needlegrass Grassland has the following characteristic species; common yarrow (*Achillea millefolium*), blow wives (*Achyrachaena mollis*), mountain dandelion (*Agoseris heterophylla*), wild oat (*Avena fatua*), common goldenstar (*Bloomeria crocea*), ripgut brome, soft chess brome, red brome (*Bromus rubens*), wavyleaf soap plant (*Chlorogalum pomeridianum*), winecup clarkia (*Clarkia purpurea*), Sierra shootingstar (*Dodecatheon jeffreyi*), California melicgrass (*Melica californica*), smallflower melicgrass (*Melica imperfecta*), Indian paintbrush (*Castilleja attenuata*), California plantain (*Plantago hookeriana*), Sandberg bluegrass (*Poa secunda*), nodding needlegrass (*Stipa cernua*), and purple needlegrass. Similar to Holland, the MCV2 (Sawyer et. al. 2009) also identified several associate native forbs and grasses and naturalized annual grasses that co-occur with purple needlegrass as part of the purple needlegrass grassland vegetation community.

On-site purple needle grass grasslands were defined based on the MCV2 (Sawyer et al. 2009) vegetation community membership rules: *Stipa pulchra* usually greater than 10 percent relative cover of the herbaceous layer. The California Coastal Commission (CCC) guidance requires the same relative coverage threshold, but does not provide a lower threshold on patch size. Per the MCV2/CCC definition, purple needle grass grassland was observed and mapped in multiple patches on-site, particularly in the southern portion of the site, where the larger patches occurs. Several smaller patches occur north of the arroyo willow and black willow thickets (i.e., the Large Arroyo). A few patches also occur near developed areas near the West 17th Street property entrance. The purple needle grass grasslands found throughout the Newport Banning Ranch contain characteristic grasses; purple needlegrass, bromes, and wild oats, however, they typically only contain a low diversity of non-native forbs including tocalote, filaree, smooth cat's ears, etc. Native characteristic forb species identified by the MVC2 are rare on-site and not often associated with patches or areas containing purple needlegrass. The native forb clustered tarweed (*Deinandra fasciculata*), a forb adapted to disturbance, was occasionally observed in bloom within this community during summer months. The low diversity of native forbs in the purple needle grass grassland is likely due to oil field activities, including but not limited to exploration, drilling, and operation and maintenance activities.

Purple needle grass grassland is the most common native grass species found on Newport Banning Ranch. The site contains a total of 10.027 acres of purple needle grass grassland or 19 percent of the total grassland coverage. Areas mapped as purple needle grass grassland range from 10.9 to 24.5 percent relative coverage, as shown in *Table 11*. The mean number of purple needlegrass individuals within areas mapped as purple needle grass grassland have a range of 3.1 to 10.4 individuals per quadrat and are found to occur in 7.7 percent of the transect quadrats sampled, as shown in *Table 12*.

Areas of purple needle grass grasslands, as defined by MCV2 (Sawyer et al. 2009), and greater than 0.25 acres, have the potential to be good quality habitat in situations where anthropogenic

disturbance is limited and/or when located in serpentine soils, presumably based on the presence of other native grasses and forbs as noted by the MCV2 and Holland (1986). The areas (greater than 0.25 acre) or patches (less than 0.25 acres) of purple needlegrass grassland on the Newport Banning Ranch do not contain associate forbs or native grasses that distinguish this community as good quality habitat. In fact, invasive and naturalized grasses and forbs dominant all portions of the site that contain grasslands, even when purple needlegrass is present.

Rabbitsfoot grassland contain rabbit patches of rabbitsfoot grass (*Polypogon monspeliensis*). Rabbitsfoot grassland is not recognized by MCV2 (Sawyer et al. 2009) as an herbaceous alliance. However, patches of rabbitsfoot grassland within the survey are were mapped due to the size and extent of their presence. Rabbitsfoot grass is a non-native grass from southern Europe typically found in disturbed wetland-riparian areas. Approximately 0.023 acre of rabbitsfoot grassland occur throughout the Project site.

Salt grass flats contain salt grass as the dominant or co-dominant species in the herbaceous layer. There are two membership rules for the salt grass flats alliance: 1) salt grass flats are areas where salt grass provides greater than 50 percent relative cover in the herbaceous layer and has a higher cover than any other single grass species; 2) salt grass flats are areas where salt grass provides greater than 30 percent relative cover in the herbaceous layer and *Sarcocornia* or *Salicornia* spp. if present, occurs in less than 30 percent relative cover (Sawyer et al. 2009).

Salt grass flats have an open to continuous canopy less than 1 meter (3 feet) in height within the herbaceous layer. Throughout California, the salt grass flats alliance occurs in coastal marshes and in inland habitats including swales, playas, and terraces, and along washes that are typically intermittently flooded. Soils are alkaline, often deep, and have an impermeable layer making them poorly drained. Ground surfaces often have salt accumulations when the soil is dry (Sawyer et al. 2009).

The salt grass flats alliance occurs throughout most of temperate North America. In California, salt grass flats are found in alkaline or saline environments from the coast to mountains and deserts. Salt grass flats occur from sea level to 1,500 meters (4,921 feet) amsl (Sawyer et al. 2009). Saltgrass is also a well-documented phreatophyte capable of extending roots to depths of 11 feet and as such, is oftentimes an indicator of shallow aquifers or seasonally perched groundwater and not indicative of wetland conditions (Young and Blaney 1942). It is also important to note that *The National Wetland Plant List* was recently updated and the wetland indicator status of saltgrass changed from facultative wet (FACW) to facultative (FAC [Lichvar 2012]). This means that saltgrass has essentially an equal probability of occurring in uplands as in wetlands, and as such, is not a reliable indicator of wetlands in the absence of indicators of wetland hydrology or hydric soils.

Some species typically associated with the salt grass flats alliance include water beard grass (*Polypogon viridis*), beach bur (*Ambrosia chamissonis*), yerba mansa (*Anemopsis californica*), fat-hen (*Atriplex prostrata*), saltwort (*Batis maritima*), ripgut brome, brass buttons (*Cotula coronopifolia*), common spikerush (*Eleocharis palustris*), alkali heath (*Frankenia salina*), meadow barley, foxtail barley, marsh jaumea (*Jaumea carnosa*), arctic rush (*Juncus arcticus*), Cooper's rush (*Juncus cooperi*), broadleaved pepperweed (*Lepidium latifolium*), creeping rye grass (*Leymus triticoides*), California sealavender (*Limonium californicum*), scratchgrass (*Muhlenbergia asperifolia*), strigose sicklegrass (*Parapholis strigosa*), western wheat grass (*Elymus smithii*), Sandberg bluegrass (*Poa secunda*), Nuttall's alkaligrass (*Puccinellia nuttalliana*), pickleweed (*Sarcocornia pacifica*), alkali sacaton (*Sporobolus airoides*), and seaside arrowgrass (*Triglochin maritima*) (Sawyer et al. 2009). With the exception of brome grasses, none of these species occur within the areas mapped as saltgrass flats and as noted for the alkali heath, none of these areas should be considered wetlands in the absence of a wetland determination for the area.

In the Project site, 4.033 acres or 7.8 percent of grassland of salt grass flats occur in stands of variable sizes on mesa areas and adjacent to slightly depressed areas. Salt grass was observed growing in patchy areas within purple needle grass grassland and annual brome grassland, which are upland communities. The salt grass flats observed on the mesas were often near areas containing a thin layer of surface tar. It is thought that the impermeable tar makes the area drain poorly, thus allowing for rain water evaporation and salt accumulations. The physiological adaptation of salt grass allows it to occupy saline environments, thus occupying these tar areas. In addition, one disturbed salt grass flat area was observed along the southern boundary adjacent to Highway 1. A total of 0.105 acre of disturbed salt grass flats occur throughout the Project site.

Wild oats grassland includes wild oats (*Avena barbata* or *A. fatua*) as dominant or co-dominant species in the herbaceous layer (Sawyer et al. 2009). Wild oats are annual grasses from Eurasia that have a Cal-IPC rank of Moderate, indicating they have a substantial and apparent, but generally not severe, ecological impact (Sawyer et al. 2009; Cal-IPC 2012). This community forms an open to continuous herbaceous layer less than 1.2 meters (3.9 feet) and may include emergent trees and shrubs at low cover. It occurs in waste places, rangelands, and openings in woodlands from 10 to 1,200 meters (33 to 3,937 feet).

Wild oats grassland occurs in the south eastern portion of the site surrounded by annual brome grasslands, salt grass flats, and purple needle grass grassland. This community comprises 14.086 acres or 27 percent of the grasslands and is dominated by wild oat (*Avena barbata*) and includes ripgut brome, soft brome, longbeak stork's bill, and scattered Italian rye grass. Wild oat grasslands are known to have some ecological distinctions from annual brome grasslands. Wild oat grasslands dominate grassland areas with years of accumulated thatch. Wild oats grow slower

and produce less seed under high-frequency clipping (or grazing) regimes than do the shorter bromes (Sawyer et al. 2009).

3.3.1.2 Forb-Dominated Communities

Alkali heath marsh contains alkali heath (*Frankenia salina*) as the dominant or co-dominant species in the herbaceous and subshrub layers. Alkali heath marshes occur where alkali heath is greater than 30 percent relative cover in the herbaceous layer, and sometimes where it is co-dominant with salt grass or other herbs or subshrubs (Sawyer et al. 2009).

Alkali heath marshes occur in western California in coastal salt marshes, brackish marshes, alkali playas, and alkali meadows. These marshes have an open to continuous canopy with the herbaceous and subshrub layers less than 0.6 meter (20 feet) in height. Alkali heath marshes occur at elevations less than 300 meters (984 feet) amsl (Sawyer et al. 2009).

Some species typically associated with the alkali heath marsh alliance, as defined by Sawyer et. al. 2009, include Parish's glasswort (*Arthrocnemum subterminale*), saltbush (*Atriplex* spp.), Pacific bentgrass (*Agrostis avenacea*), saltwort (*Batis maritima*), alkali weed (*Cressa truxillensis*), salt grass, foxtail barley, goldfields (*Lasthenia* spp.), pepper grass (*Lepidium* spp.), California sealavender, shore grass (*Distichlis littoralis*), and pickleweed.

In the Project site, alkali heath marshes occur in stands of variable sizes on flat or in slightly depressed areas. A total of 3.316 acres of alkali heath marsh occurs within the Project site. On the mesas, alkali heath grows in patchy areas surrounded by disturbed habitat dominated by predominately upland non-native grass and forb species. Large areas of alkali heath marsh occur throughout the lowlands, where it is more likely to be associated with wetlands associated with the Santa Ana River floodplain and adjacent depressed areas. A total of 2.401 acres of disturbed alkali heath marsh occur throughout the Project site. Additionally, 1.153 acres of co-dominant disturbed alkali heath marsh and pickleweed mats occur in the Vegetation Verification Survey Area.

California bulrush marsh contains California bulrush (*Schoenoplectus californicus*) as the dominant or co-dominant species in the herbaceous layer. It has a continuous or intermittent herb canopy of less than 4 meters (13 feet) in height. The California bulrush marsh alliance is California bulrush marsh greater than or equal to 10 percent absolute cover in the herbaceous layer. If present, hardstem bulrush (*Schoenoplectus acutus*) occurs in less than 50 percent relative cover, although it can be co-dominant with California bulrush (Sawyer et al. 2009).

The California bulrush marsh alliance often occurs in brackish to fresh water marshes, bars, shores, and channels of river mouth estuaries. California bulrush marsh is widespread throughout

California in emergent marshes. Soils have a high organic presence and are poorly aerated. This alliance occurs between sea level and 200 meters (656 feet) amsl (Sawyer et al. 2009).

Species associated with the California bulrush marsh alliance include Indian hemp dogbane (*Apocynum cannabinum*), salt marsh bulrush (*Bolboschoenus maritimus*), common water hyacinth (*Eichhornia crassipes*), western goldentop (*Euthamia occidentalis*), floating primrose willow (*Ludwigia peploides*), dotted smartweed (*Persicaria punctata*), common reed (*Phragmites australis*), hardstem bulrush, narrowleaf cattail (*Typha angustifolia*), southern cattail (*Typha domingensis*), and broadleaf cattail (*Typha latifolia*). Emergent species may include common buttonbush (*Cephalanthus occidentalis*), California wildrose (*Rosa californica*), or arroyo willow (*Salix lasiolepis*) (Sawyer et al. 2009).

In the survey area, California bulrush marshes are found in lowland areas. A total of 0.211 acre of California bulrush marsh occurs within the Project site. The marshes are dominated by California bulrush with some cattails and alkali bulrush (*Bolboschoenus maritimus*).

Giant reed breaks include giant reed (*Arundo donax*) as the dominant species in the herbaceous layer. In addition, giant reed breaks include giant reed as greater than 60 percent relative cover in the herbaceous and shrub layers (Sawyer et al. 2009).

Throughout California, the giant reed break alliance occurs along low-gradient streams, riparian areas, ditches, and coastal marshes. This species is an introduced aggressive perennial grass that forms massive thickets of vegetation that can cover several hectares. Giant reed out-competes native plants, forms dense stands, and chokes riverbanks and stream channels. Giant reed breaks have a continuous canopy less than 8 meters (26 feet) in height. They grow to a height of approximately 6 meters (20 feet) and occur from sea level to 500 meters (1,641 feet) amsl (Sawyer et al. 2009). A total of 1.370 acres of giant reed break occurs throughout the Project site.

Ice plant mats contain hottentot fig (*Carpobrotus edulis*), sea fig (*Carpobrotus chilensis*), or other ice plant taxa as the dominant or co-dominant species in the herbaceous layer. These species invade coastal bluff scrub, dune mat, dune scrub, and coastal prairies and compete with native plants (Sawyer et al. 2009).

Ice plant semi-natural herbaceous stands have an intermittent to continuous canopy within the herbaceous layer less than 0.5 meter (1.6 feet) in height. Shrubs and emergent trees may be present at low cover. Ice plant mats occur on disturbed land, bluffs, coastal sand dunes, and coastal and alkaline terraces from sea level to 100 meters (328 feet) amsl (Sawyer et al. 2009).

In the Project site, ice plant mats occur in stands of variable sizes in disturbed areas near access roads and oil production work areas. This community forms stands throughout the Project site and covers 12.082 acres. Ice plant was likely planted for either soil stabilization (erosion control)

or landscaping. Ice plant is known to spread and invade coastal bluff scrub and compete with native plants for moisture, nutrients, and space (Sawyer et al. 2009).

Pampas grass patches invade maritime chaparral and coastal scrub habitats along the coast in the Southern California Coast region, but also occurs elsewhere up to 800 meters (2,625 feet). Pampas grass patches are dominated by purple pampas grass (*Cortaderia jubata*) or Uruguayan pampas grass (*C. selloana*) in the herbaceous and shrub layers with greater than 80 percent relative cover (Sawyer et al. 2009). Both of these species have a California Invasive Plant Council (Cal-IPC) rank of High, indicating they are highly invasive with severe ecological impacts (Sawyer et al. 2009; Cal-IPC 2012). Emergent shrubs and trees may be present within this perennial grassland at low cover. Pampas grass patches occur in coastal land, disturbed areas, estuaries, grasslands, urban areas, and wetlands (Sawyer et al. 2009). In the Project site, 5.974 acres of pampas grass patches occur in disturbed areas, along developed access roads, and in lowlands.

Pickleweed mats contain pickleweed (*Sarcocornia pacifica*) as the dominant or co-dominant species in the subshrub and herbaceous layers. There are three membership rules for the pickleweed mat alliance: 1) pickleweed mats are areas where pickleweed occurs in greater than 10 percent absolute cover and sometimes where a higher cover of short annual or perennial grasses is present (if salt grass is greater than or equal to 50 percent relative cover, stands are in the salt grass flats alliance); 2) pickleweed mats are areas where pickleweed occurs in greater than 50 percent relative cover in the herbaceous layer; 3) pickleweed mats are areas where pickleweed occurs in greater than 50 percent relative cover and salt grass occurs in less than 30 percent relative cover in the herbaceous layer (Sawyer et al. 2009).

Pickleweed mats have an intermittent to continuous canopy less than 1.5 meters (4.9 feet) in height. Throughout California, the pickleweed mats alliance occurs from coastal marshes to inland alkaline seeps (Sawyer et al. 2009). The pickleweed mat alliance inhabits coastal California from the Mexico border, to depressions of the San Francisco Bay region, to the Oregon border. Pickleweed mats occur from 0.15 to 2.5 meters (0.49 to 8.2 feet) amsl (Sawyer et al. 2009).

Species associated with the pickleweed mats alliance include spear orache (*Atriplex patula*), fat-hen, saltwort (*Batis maritima*), salt marsh bulrush, brass buttons, swamp pricklegrass (*Crypsis schoenoides*), saltmarsh dodder (*Cuscuta salina*), salt grass, watergrass, alkali heath, Oregon gumweed (*Grindelia stricta*), marsh jaumea, *Juncus* spp., broadleaved pepperweed, California sealavender, shore grass, gray willow weed (*Persicaria lapathifolia*), verrucose seapurslane (*Sesuvium verrucosum*), cordgrass (*Spartina foliosa*), seaside arrowgrass, cocklebur (*Xanthium strumarium*), and algae.

In the Project site, 16.857 acres of pickleweed mats occur in lowland areas, previously tidal areas, and occasionally on the sloped banks of tidal areas. Pickleweed mats occur in large stands with approximately 95 to 100 percent cover of pickleweed. Intermittent, low-lying, pickleweed areas contain low percentages of alkali heath and bare ground. Pickleweed on sloped banks within the lowland area contain herbaceous cover of salt grass and alkali heath. A total of 6.710 acres of disturbed pickleweed mats occur throughout the Project site.

Poison hemlock patches include poison hemlock (*Conium maculatum*) or other non-native invasive plants of the *Umbelliferae* are dominant or co-dominant with other non-native plants in the herbaceous layer. Poison hemlock patches include poison hemlock with greater than 50 percent relative cover in the herbaceous layer (Sawyer et al. 2009).

Poison hemlock patches have an open to continuous canopy less than 2 meters (7 feet) tall in the herbaceous layer. Throughout California, the poison hemlock alliance occurs in moist locations of various topography and is tolerant of semi-shaded areas. Poison hemlock patches occurs from sea level to 1,000 meters (3,281 feet) amsl (Sawyer et al. 2009).

In the Project site, 3.452 acres of poison hemlock patches occur in stands in the lowlands near moist disturbed locations. Additionally, 0.876 acre of disturbed poison hemlock patch co-dominate with pickleweed mats occur in the Vegetation Verification Survey Area.

Upland mustard contains black mustard (*Brassica nigra*), common mustard (*Brassica rapa*), Saharan mustard (*Brassica tournefortii*), shortpod mustard, Dyer's woad (*Isatis tinctoria*), or wild radish (*Raphanus sativus*) as the dominant species in the herbaceous layer (Sawyer et al. 2009).

Upland mustard has an open to continuous canopy less than 3 meters (9.8 feet) in height in the herbaceous layer. Throughout California, upland mustard occurs in fallow fields, roadsides, grasslands, levee slopes, riparian areas, disturbed scrublands, and waste places from sea level to 1,500 meters (4,922 feet) amsl (Sawyer et al. 2009).

In the Project site, 3.400 acres of upland mustard occur along developed access roads, at the edge of riparian areas, within California prickly pear scrub, and California sagebrush scrub. The mustard in this community grows in very dense stands, overtop most other plants, and exclude other herbaceous species whether native or non-native. Mustard thrives under regular frequent disturbance (fire, heavy grazing, or disking) and readily spreads throughout these areas (Sawyer et al. 2009). Upland mustard is also co-dominant with poison hemlock and covers 4.904 acres on the Project site.

Woolly marbles contain individual patches of woolly marbles (*Psilocarphus brevissimus*). Woolly marbles is not recognized by MCV2 (Sawyer et al. 2009) as an herbaceous alliance.

However, stands of woolly marbles within the survey area were mapped due to the size and extent of their presence. Woolly marbles is a native annual herb commonly found in wetland riparian areas. Approximately 0.021 acre of woolly marbles occur throughout the Project site.

3.3.2 Scrub Communities

Coastal scrub communities and riparian scrub communities, are general habitat types in the more general scrub community physiognomic group. Coastal scrub within the survey area includes seven individual vegetation communities: California brittle bush scrub, California buckwheat scrub, California sagebrush scrub, coastal prickly pear scrub, coyote brush scrub, Menzies's golden bush scrub, and quailbush scrub. Riparian scrub within the survey area includes two individual vegetation communities: arroyo willow thickets and mulefat thickets. Each vegetation community is described below.

3.3.2.1 Coastal Scrub Communities

California brittle bush scrub occurs in coastal Southern California up to 1,200 meters (3,937 feet) (Sawyer et al. 2009). California brittle bush scrub includes California brittlebush (*Encelia californica*) as the dominant or co-dominant in the shrub canopy with at least 30 percent relative cover in the shrub canopy. California brittle bush scrub has an intermittent to continuous shrub canopy less with a variable herbaceous layer (Sawyer et al. 2009). Some species typically associated with the California brittle bush scrub alliance include California sagebrush (*Artemisia californica*), coyote brush (*Baccharis pilularis*), black sage (*Salvia mellifera*), and bush monkeyflower (*Diplacus aurantiacus*) (Sawyer et al. 2009). California brittle bush scrub occurs on sunny, steep slopes on sandstone, volcanic, or shale substrates (Sawyer et al. 2009).

California brittle bush scrub, disturbed California brittle bush scrub, California brittle bush scrub with co-dominant shrub species, and disturbed California brittle bush scrub with co-dominant species occur in various size patches throughout the survey area. A total of 7.468 acres of good quality (non-disturbed) shrubland of California brittle bush scrub dominated by California brittlebush with a relative cover of 30 percent or greater with an intermittent to closed canopy occur of 50 percent or greater associate shrubs or succulents. Mean California brittlebush shrubs ranged from 60 cm to 80 cm in height. An associated shrub species occurring at lower cover includes Menzies' goldenbush (*Isocoma menziesii*).

A total of 16.695 acres of disturbed California brittle bush scrub occur throughout the Project site. This community occurs adjacent to developed roads, adjacent to active oil operations, and adjacent to disturbed areas with high percentages of non-native species. Within the community, California brittlebush has an open canopy with high percentages of bare ground and non-native species including mustard, bromes, tocalote, sweet fennel (*Foeniculum vulgare*), and iceplant

(*Carpobrotus* sp.). Some of these areas were previously mapped (GLA 2009) as Coyote brush scrub, ruderal, non-native grassland, and maritime succulent scrub, thus the recent survey documents regrowth of California brittlebush in these areas. Additionally, 10.802 acres of disturbed maintained California brittle bush scrub occur throughout the Project site. A total of 0.445 acre of disturbed infrequently maintained California brittle bush scrub occur throughout the Project site. A total of 0.133 acre of restored California brittle bush scrub occur in the northeast corner of the Project site.

Additionally, California brittle bush scrub and disturbed California brittle bush scrub occur with co-dominant communities including coastal prickly pear scrub (14.188 acres undisturbed and 6.084 acres disturbed), Menzies's golden bush scrub (0.125 acre undisturbed and 0.047 acre disturbed), mulefat thickets (0.721 acres undisturbed and 1.960 acres disturbed), and California buckwheat scrub (1.133 acres disturbed). The undisturbed California brittle bush scrub community occurs with the co-dominant community with a closed canopy and lacks significant percent cover of non-native species. Disturbed California brittle bush scrub and co-dominant communities have high percent cover of bare ground from anthropogenic disturbances or soil erosion and a high percent cover of non-native species.

California buckwheat scrub inhabits the broadest elevation range and extends the farthest inland of all coastal scrub alliances (Borchert et al. 2004). The alliance occurs in California from the Central Coast south to Baja California, Mexico and in the Mojave Desert from sea level to 2,300 meters (7,545 feet) (NatureServe 2010). California buckwheat scrub alliance communities include California buckwheat (*Eriogonum fasciculatum*) as the dominant or co-dominant shrub in the canopy. California buckwheat scrub has a continuous or intermittent shrub canopy less than 2 meters (7 feet) in height with a variable ground layer that may be grassy (Sawyer et al. 2009).

Species associated with the California buckwheat scrub alliance typically include California sagebrush, chaparral mallow (*Malacothamnus fasciculatus*), Menzies's goldenbush, coyote brush, deerweed (*Acmispon glaber*), black sage (*Salvia mellifera*), and white sage (*S. apiana*) (Sawyer et al. 2009). The California buckwheat scrub alliance occurs on dry slopes, washes, and canyons as well as coastal bluffs (Gordon and White 1994). The alliance occurs on relatively gentle, south-facing lower slopes and toe-slopes. The California buckwheat scrub alliance occupies mostly shallow and moderately deep, well-drained and somewhat excessively drained soils. Soils range from coarse sand to moderately fine sandy clay loam (Klein and Evens 2005). A total of 0.911 acre of California buckwheat scrub occurs along the steep western slopes of the coastal bluff and the south-facing slope of the Middle Arroyo.

California sagebrush scrub contains California sagebrush (*Artemisia californica*) as the sole or dominant shrub species. It has a continuous or intermittent shrub canopy of less than 2 meters (7

feet) in height with a variable ground layer. There are three membership rules for the California sagebrush scrub alliance: 1) California sagebrush scrub is present where California sagebrush occurs in greater than 60 percent relative cover in the shrub canopy; 2) California sagebrush scrub is present where California sagebrush is three times the cover of coyote brush and other shrub species; 3) California sagebrush scrub occurs where California sagebrush provides greater than 60 percent cover in the shrub canopy, although laurel sumac (*Malosa laurina*) or bush monkey flower sometimes occurs in greater than 30 percent relative cover (Sawyer et al. 2009).

The California sagebrush scrub alliance often occurs on steep, north-facing slopes and rarely in flooded low-gradient deposits along streams in shallow alluvial or colluvial-derived soils. Soils are alluvial or colluvial derived and shallow (Sawyer et al. 2009). California sagebrush scrub generally grows in areas with a long summer dry season with approximately 35 centimeters (14 inches) of annual precipitation that generally falls between November and April (NatureServe 2009).

California sagebrush scrub occurs along the central and south coast of California, as well as on the Channel Islands. Inland, this alliance occurs along the base of the Transverse and Peninsular ranges. In San Benito County, California, sagebrush scrub occurs in the central coastal interior mountains (NatureServe 2009). This alliance occurs between sea level and 1,200 meters (3,937 feet.

Species typically associated with the California sagebrush scrub include chamise (*Adenostoma fasciculatum*), bush monkey flower, California brittlebush, goldenhills (*Encelia farinosa*), California buckwheat, chaparral yucca (*Hesperoyucca whipplei*), Menzies's goldenbush, heartleaf keckiella (*Keckiella cordifolia*), coyote brush, deerweed, coastal prickly pear (*Opuntia littoralis*), white sage, black sage, purple sage (*Salvia leucophylla*), and poison oak (*Toxicodendron diversilobum*) (Sawyer et al. 2009).

California sagebrush scrub occurs in two areas within the property for a total of 1.081 acres. Associated shrubland species within the community include California buckwheat and coyote brush.

Coastal prickly pear scrub occurs along the coasts of Southern California, Baja California, and Mexico. This alliance can also be found on the Channel Islands (NatureServe 2010). Coast prickly pear scrub extends from sea level up to 1,200 meters (3,937 feet) (Sawyer et al. 2009; NatureServe 2010). Coast prickly pear scrub alliance communities include coastal prickly pear (*Opuntia littoralis*) and/or other cacti as dominant or co-dominant in the canopy. Coast prickly pear scrub has a two-tiered intermittent or continuous shrub canopy less than 2 meters (7 feet) in height with an open to continuous, diverse ground layer (Sawyer et al. 2009).

Species typically associated with the coast prickly pear scrub alliance include California sagebrush, California brittlebush, California buckwheat, and black sage. Emergent individuals of taller shrubs or trees, including lemonade berry (*Rhus integrifolia*) and blue elderberry (*Sambucus nigra*), may occur within this alliance (Sawyer et al. 2009). The coast prickly pear scrub alliance occurs on headlands and on steep slopes that are often south-facing (Sawyer et al. 2009; NatureServe 2010). This alliance occupies mostly shallow loamy or clay soils with a very low water-holding capacity that may be rocky (NatureServe 2010; Sawyer et al. 2009).

Coastal prickly pear scrub, disturbed coastal prickly pear scrub, and coastal prickly pear scrub with co-dominant shrub species, and disturbed coastal prickly pear scrub with co-dominant species occur in various size patches throughout the survey area. A total of 0.158 acre of coastal prickly pear scrub dominated by coastal prickly pear and coast cholla (*Cylindropuntia prolifera*) with a relative cover of 50 percent or greater with continuous closed canopy occur within the Project site. Associated shrub species occurring at lower cover include California sagebrush and California brittlebush. A total of 0.186 acre of disturbed California prickly pear scrub occur throughout the Project site.

Additionally, coastal prickly pear scrub and disturbed coastal prickly pear scrub occur with co-dominant communities including California brittle bush scrub (14.1883 acres undisturbed and 6.084 acres disturbed) and mulefat thickets (0.259 acre disturbed). The undisturbed coastal prickly pear scrub community occurs with the co-dominant community with a closed canopy and lacks significant percent cover of non-native species. Disturbed coastal prickly pear scrub and co-dominant communities have high percent cover of bare ground from anthropogenic disturbances or soil erosion and a high percent cover of non-native species.

Coyote brush scrub includes coyote brush as the dominant species (greater than 50 percent absolute cover) in the shrub layer. In addition, coyote brush scrub includes coyote brush as greater than 15 percent shrub cover over a grassy understory with coyote brush relative cover greater than 50 percent among shrub species. Coyote brush scrub also includes both quailbush and coyote brush with relative cover of both species between 30 percent and 60 percent in the shrub canopy (Sawyer et al. 2009).

Coyote brush scrub has a variable shrub canopy less than 3 meters (10 feet) in height with a variable herbaceous ground layer. Throughout California, the coyote brush scrub alliance occurs on streamsides, stabilized dunes of coastal bars, river mouths, spits along the coastline, coastal bluffs, open slopes, ridges, and terraces. Soils are variable, from relatively heavy clay to sandy (Sawyer et al. 2009).

The coyote brush scrub alliance inhabits the entire coast of California and extends into southern Oregon. Inland, this alliance occurs in the interior of the Coast Ranges and in the Transverse

Ranges of the Los Padres National Forest in southern California. Coyote brush scrub occurs from sea level to 1,500 meters (4,921 feet) above mean sea level (amsl) (Sawyer et al. 2009).

Some species often associated with the coyote brush scrub alliance include California sagebrush, blueblossom (*Ceanothus thyrsiflorus*), beaked hazelnut (*Corylus cornuta*), bush monkey flower, California buckwheat, seaside woolly sunflower (*Eriophyllum staechadifolium*), California coffeeberry (*Frangula californica*), coast silktassel (*Garrya elliptica*), salal (*Gaultheria shallon*), oceanspray (*Holodiscus discolor*), deerweed, yellow bush lupine (*Lupinus arboreus*), California wax myrtle (*Morella californica*), California blackberry (*Rubus ursinus*), white sage, purple sage, and poison oak (Sawyer et al. 2009). In the Project site, 0.400 acre of disturbed coyote brush scrub occurs in stands surrounded by disturbed areas with high percentages of non-native species.

Menzies's golden bush scrub includes Menzies's goldenbush (*Isocoma menziesii*) as the dominant or co-dominant species (greater than 50 percent relative cover) in the shrub layer (Sawyer et al. 2009). Menzies's golden bush scrub occurs in southern California along the coast and in the southern California mountains and valleys. It often occurs in sandy areas, including alluvial fans, arroyos, and stream terraces, with frequent disturbance. Menzies's golden bush scrub has an open to intermittent shrub canopy less than 1 meter (3 feet) in height with an open to continuous, diverse, and grassy herbaceous layer (Sawyer et al. 2009). It occurs from sea level to 1,200 meters (3,937 feet) amsl (Sawyer et al. 2009). Some species typically associated with the Menzies's golden bush scrub alliance include California sagebrush, broom baccharis (*Baccharis sarathroides*), California matchweed (*Gutierrezia californica*), and Virginia glasswort (*Salicornia depressa*) (Sawyer et al. 2009).

Menzies's golden bush scrub, disturbed Menzies' golden bush scrub, Menzies's golden bush scrub with co-dominant shrub species, and disturbed Menzies's golden bush scrub with co-dominant species occur in various size patches throughout the survey area. A total of 1.163 acres of Menzies's golden bush scrub dominated by Menzies' goldenbush with a relative cover of 50 percent or greater with continuous closed canopy occur within the Project site. Associated shrub species occurring at lower cover include Eastwood's goldenbush (*Ericameria fasciculata*) and California brittlebush.

A total of 2.943 acres of disturbed Menzies' golden bush scrub occurs throughout the Project site. This community occurs adjacent to developed roads, adjacent to active oil operations, and adjacent to disturbed areas with high percentages of non-native species. Within the community, Menzies' goldenbush has an open canopy with high percentages of bare ground and non-native species.

Additionally, Menzies' golden bush scrub and disturbed Menzies' golden bush scrub occur with co-dominant communities including California brittle bush scrub (0.047 acre disturbed) and mulefat thickets (0.341 acre disturbed). The undisturbed Menzies' golden bush scrub community occurs with the co-dominant California brittle bush scrub community with a closed canopy and lacks significant percent cover of non-native species. Disturbed Menzies' golden bush scrub and co-dominant communities have high percent cover of bare ground from anthropogenic disturbances or soil erosion and a high percent cover of non-native species.

Quailbush scrub includes quailbush as greater than 50 percent of the relative cover in the shrub canopy. Quailbush scrub has an open to intermittent shrub canopy less than 5 meters (16 feet) in height with a variable herbaceous ground layer. Throughout southern California, the quailbush scrub alliance occurs on gentle to steep slopes from coastal shrublands, as alkali meadows, flats, washes, and wetlands, and inland at desert washes and oases. It is often found in disturbed areas where soils are alkaline or saline clays (Sawyer et al. 2009).

Some species often associated with the quailbush scrub alliance include California sagebrush, coyote brush, mulefat, California sunflower, green molly (*Kochia americana*), laurel sumac, myoporum (*Myoporum laetum*), arrowweed (*Pluchea sericea*), honey mesquite (*Prosopis glandulosa*), lemonade berry, and tamarisk (*Tamarix* spp.). In the Project site, a total of 0.383 acre of quailbush scrub occurs in isolated patches.

3.3.2.2 Riparian Scrub Communities

Arroyo willow thickets include arroyo willow (*Salix lasiolepis*) as the dominant or co-dominant shrub or tree in the canopy. Arroyo willow thickets have an open to continuous canopy less than 10 meters (33 feet) in height with a variable herbaceous ground layer. Arroyo willow thickets occur along stream banks and benches, on slope seeps, and on stringers along drainages (Sawyer et al. 2009).

Some species often associated with the arroyo willow thickets alliance include big leaf maple (*Acer macrophyllum*), coyote brush, mulefat (*Baccharis salicifolia*), common buttonbush (*Cephalanthus occidentalis*), American dogwood (*Cornus sericea*), wax myrtle (*Morella californica*), California sycamore (*Platanus racemosa*), black cottonwood (*Populus trichocarpa*), Fremont cottonwood (*Populus fremontii*), willows (*Salix* spp.), and blue elderberry (Sawyer et al. 2009).

Arroyo willow thickets occur in the riparian areas within the Large Arroyo within the southern portion of the property and along the eastern property boundary. In the Project site, this community covers 3.803 acres and is dominated by arroyo willow and sometimes includes a low

cover of coyote brush, mulefat, and black willows (*Salix gooddingii*). A total of 0.009 acre of disturbed arroyo willow thickets occur throughout the Project site.

Mulefat thickets include mulefat (*Baccharis salicifolia*) as the dominant or co-dominant species in the shrub canopy. There are two membership rules for the mulefat thicket alliance: 1) mulefat thickets occurs where mulefat comprises greater than 50 percent relative cover in the shrub canopy; 2) mulefat thicket occurs where mulefat comprises greater than 30 percent relative cover in the shrub canopy with blue elderberry (Sawyer et al. 2009).

Throughout California, the mulefat thickets alliance occur in canyon bottoms, irrigation ditches, floodplains, lake margins, and stream channels. It has a continuous two-tiered shrub canopy at less than 2 meters (7 feet) in height, or less than 5 meters (16 feet) with a sparse herbaceous layer. This alliance occurs on mixed alluvium soils between sea level and 1,250 meters (4,101 feet) amsl (Sawyer et al. 2009).

Species often associated with mulefat thickets include California sagebrush, willow baccharis (*Bacharis salicina*), coyote brush, tree tobacco (*Nicotiana glauca*), laurel sumac, arrowweed, blackberry (*Rubus* spp.), narrowleaf willow (*Salix exigua*), arroyo willow, blue elderberry, and tamarisk. Sparse emergent trees, such as California foothill pine (*Pinus sabiniana*), California sycamore, Fremont cottonwood, oaks (*Quercus* spp.), and willows, may occur (Sawyer et al. 2009).

Mulefat thickets, mulefat thickets with co-dominant shrub species, and disturbed mulefat thickets with co-dominant species occur in various size patches throughout the survey area. A total of 7.944 acres of mulefat thickets dominated by mulefat with a relative cover of 50 percent or greater with continuous closed canopy occur within the Project site. Mulefat shrubs had a mean of 3 meters in height. A total of 24.975 acres of disturbed mulefat thickets occur throughout the Project site.

Additionally, disturbed mulefat thickets occur with co-dominant communities including black willow thicket (3.698 acres disturbed), California brittle bush scrub (0.721 acre undisturbed and 1.960 acres disturbed), coastal prickly pear scrub (0.259 acre undisturbed), salt grass flats (0.134 acre undisturbed), pampas grass patch (0.458 acre disturbed), and upland mustard (0.193 acre disturbed). Disturbed mulefat thickets with co-dominant communities have high percent cover of bare ground from anthropogenic disturbances or soil erosion and a high percent cover of non-native species including bromes, mustard, and iceplant.

3.3.3 Woodlands and Tree Clusters

The tree-dominated physiognomic group in the survey area includes two general habitat types: woodlands and tree clusters. Within these two general habitat types in the survey area are five communities: black willow thickets, eucalyptus groves, golden wattle acacia, myoporum groves, and pepper tree stand. The vegetation communities are described below.

Black willow thickets occur in the inner North Coast, the Central Valley, the foothills of the Cascade Ranges, the foothills of the Sierra Nevada, South Coast, montane Penninsular Ranges, and the Mojave and Colorado Deserts. The alliance extends from sea level up to 500 meters (1,640 feet) (Sawyer et al. 2009). Black willow thicket alliance communities include black willow (*Salix gooddingii*) as the dominant or co-dominant tree in the canopy. Black willow thickets have an open to continuous tree canopy less than 30 meters (98 feet) in height with an open to continuous shrub canopy, and variable ground layer (Sawyer et al. 2009).

Species often associated with the black willow thickets alliance include white alder (*Alnus rhombifolia*), Fremont cottonwood, blue elderberry, and willows (*Salix laevigata*, *S. lasiolepis*, *S. lucida* ssp. *lasiandra*). Associated shrubs include coyote brush, mulefat, and American dogwood (Sawyer et al. 2009). The black willow thickets alliance occurs on terraces along large rivers and along rocky floodplains of small, intermittent streams, seeps, and springs, as well as in canyons (Sawyer et al. 2009). A total of 7.005 acres of black willow thickets occur throughout the Project site. A total of 11.535 acres of disturbed black willow thickets occur throughout the Project site. Additionally, 3.698 acres of disturbed black willow thicket with co-dominant mulefat thicket occur within the Project site.

Eucalyptus groves contain blue gum (*Eucalyptus globulus*), red gum (*Eucalyptus camaldulensis*), or other gum species as the dominant species in the tree canopy. Eucalyptus groves include *Eucalyptus* species with greater than 80 percent relative cover in the tree layer. The groves have an intermittent to continuous tree canopy less than 50 meters (164 feet) in height. Understory shrub and herbaceous layers are sparse to intermittent. Throughout California, the eucalyptus grove semi-natural woodland stands occur on naturalized upland and stream courses as planted trees, groves, and windbreaks. Eucalyptus groves occur from sea level to 300 meters (984 feet) amsl (Sawyer et al. 2009).

Eucalyptus groves occur along the eastern boundary of the survey area, adjacent to commercial building. This community comprises approximately 0.985 acre of the vegetation cover in the Project site. Plant species occurring in the understory of this community include mustard and non-native grasses such as bromes.

[Sydney] Golden wattle acacia contain individual trees or stands of Sydney golden wattle (*Acacia longifolia*) trees. Golden wattle acacia is not recognized by MCV2 (Sawyer et al. 2009) as a woodland alliance. However, stands of golden wattle within the survey area were mapped due to the size and extent of their presence. Golden wattle is a non-native tree from New South Wales, Southern Australia, and Victoria. Approximately 0.954 acre of golden wattle occur in various stand sizes throughout the Project site.

Myoporum groves contain myoporum (*Myoporum laetum*) as the dominant species in the tree canopy. Myoporum groves occur where Myoporum comprises greater than 60 percent relative cover in the tree layer. The groves have an open to continuous tree canopy less than 18 meters (59 feet) in height. Understory shrubs are infrequent or common and the herbaceous layer is simple to diverse. Throughout central and southern California, myoporum grove semi-natural woodland stands occur in coastal canyons, washes, slopes, riparian areas, and roadsides. Myoporum trees form dense single-species stands in coastal areas (Sawyer et al. 2009). Approximately 6.619 acres of myoporum groves occur in scattered stands of various sizes throughout the survey area. Additionally, 0.867 acres of myoporum groves co-dominated with pepper tree stands occur within the Project site.

Pepper tree stands contain pepper trees (*Schinus molle, S. terebinthifolius*) as the dominant species in the tree canopy with greater than 60 percent relative cover in the tree layer. Pepper tree groves form an open to continuous canopy less than 18 meters (59 feet) high with infrequent to common shrubs and a simple to diverse herbaceous layer. Both Peruvian peppertree (*S. molle*) and Brazilian peppertree (*S. terebinthifolius*) have a Cal-IPC rating of limited, indicating they are invasive, but have minor ecological impacts (Cal-IPC 2012). Throughout central and southern California, pepper tree semi-natural woodland stands occur in coastal canyons, washes, slopes, riparian areas, and along roadsides. Peruvian trees occur in riparian areas in Southern California sometimes with Canary Island date palm (*Phoenix canariensis*) and Washington fan palm (*Washingtonia robusta*) as associated species (Sawyer et al. 2009). Approximately 0.379 acre of pepper tree groves occur in scattered stands of various sizes throughout the survey area. Additionally, 0.867 acres of pepper tree stands co-dominated with myoporum groves occur within the Project site.

3.3.4 Non-Vegetated Areas

Mudflats are not recognized in MCV2 or NCL. They are characterized as un-vegetated areas containing fine-grained sediment (mud) that are sometimes flooded and occupy 1.401 acres of the Project site. Mudflats occur in tidal areas and in freshwater lake and river systems. Mudflats are considered "special aquatic sites" and are protected under the Clean Water Act. Although mudflats are characterized in part by their absence of vegetation, some plant species do occur there, including around the margins.

3.3.5 West Newport Oil Facilities and Operation and Maintenance Areas

Debris areas contain concrete pieces, metal pipes, rebar, and piled soil with scattered vegetation including mustard, castor bean (*Ricinus communis*), tree tobacco, mulefat, giant reed, California brittlebush, bromes, myoporum, Menzies's goldenbush, hottentot fig, sweet fennel, coyote brush, clustered tarweed, and telegraph weed (*Heterotheca grandiflora*). Three of the four debris areas contained California brittlebush with a maximum 10 percent cover. Representative photographs of each debris area are provided in Appendix D. Debris covers 3.240 acres of the Project site.

Developed areas within the Project site are disturbed areas that did not contain elements of natural vegetation and occupy 65.861 acres. Within the survey area, developed areas included anthropogenic disturbances for dirt access roads, impervious roads, graded areas, parking areas, built structures, oil field operations facilities, and associated infrastructure. Some areas characterized as developed within the survey area include a small amount of vegetation, however these areas have been graded or otherwise physically altered such that conditions are improbable for reestablishing a vegetation community. Developed areas are not recognized in MCV2 or NCL (Sawyer et al. 2009 and CDFW 2010).

A total of 62.719 acres of **Disturbed** areas were mapped within the survey area. These areas are adjacent to oil production facilities, within oil production facilities, abandoned oil production facilities, adjacent to dirt access roads and paved roads, show evidence of maintenance mowing in recent years, high percentage of non-native species, and high percentages of bare ground from erosional features and anthropogenic impacts. Disturbed areas have been physically disturbed or invaded by non-native species, such that few or no native plant species remain. Disturbed was also used as a qualifier for any native vegetation community with disturbance and/or non-native species presence (such as D-CBBS). However, a disturbed area (when not used as a qualifier) is no longer recognizable as a native or naturalized vegetation community, *with the exception of **D-M-CBBS** and **D-I-CBBS**, which are maintained and are not representative on a vegetation community*. Non-native plant species can out compete native vegetation in disturbed areas, thus altering the composition of the vegetation community. The presence of non-native species can lessen the habitat quality and reduce a vegetation community from a recognized MCV2 or NCL vegetation community to no longer meeting the vegetation community membership rules (Sawyer et al. 2009 and CDFW 2010).

Some of the disturbed areas had evidence of California brittlebush reestablishment. The individuals were observed as low growing California brittlebush shrubs with recent evidence of maintenance/mowing activities. A more detailed analysis of California brittlebush occurrence and height was performed with point-intercept transects with the results provided in Section 4.3.

The **Stock pile** area contains a soil pile surrounded by silt fencing and a soil berm covered with Visqueen plastic and occupies 0.846 acre. The stock pile is vegetated with species including mustard, rod wirelettuce (*Stephanomeria virgata*), Menzies's goldenbush, tree tobacco, coyote brush, telegraphweed, clustered tarweed, western ragweed, common iceplant (*Mesembryanthemum crystallinum*), mulefat, and hottentot fig. Stock piles are not recognized in MCV2 or NCL (Sawyer et al. 2009 and CDFW 2010).

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