Plants of the Colonet Region, Baja California, Mexico, and a Vegetation Map of Colonet Mesa

Alan B. Harper  
*Terra Peninsular, Coronado, California*

Sula Vanderplank  
*Rancho Santa Ana Botanic Garden, Claremont, California*

Mark Dodero  
*Recon Environmental Inc., San Diego, California*

Sergio Mata  
*Terra Peninsular, Coronado, California*

Jorge Ochoa  
*Long Beach City College, Long Beach, California*

Follow this and additional works at: [http://scholarship.claremont.edu/aliso](http://scholarship.claremont.edu/aliso)

Part of the [Biodiversity Commons](https://scholarship.claremont.edu/biodiversity-commons), [Botany Commons](https://scholarship.claremont.edu/botany-commons), and the [Ecology and Evolutionary Biology Commons](https://scholarship.claremont.edu/evolutionary-biology-commons)

Recommended Citation

Harper, Alan B.; Vanderplank, Sula; Dodero, Mark; Mata, Sergio; and Ochoa, Jorge (2011) "Plants of the Colonet Region, Baja California, Mexico, and a Vegetation Map of Colonet Mesa," *Aliso: A Journal of Systematic and Evolutionary Botany*: Vol. 29: Iss. 1, Article 4.

Available at: [http://scholarship.claremont.edu/aliso/vol29/iss1/4](http://scholarship.claremont.edu/aliso/vol29/iss1/4)
PLANTS OF THE COLONET REGION, BAJA CALIFORNIA, MEXICO, AND A VEGETATION MAP OF COLONET MESA

ALAN B. HARPER, SULA VANDERPLANK, MARK DODERO, SERGIO MATA, AND JORGE OCHOA

Terra Peninsular, A.C., PMB 189003, Suite 88, Coronado, California 92178, USA (alan@alanharper.com);
Rancho Santa Ana Botanic Garden, 1500 North College Avenue, Claremont, California 91711, USA;
Recon Environmental Inc., 1927 Fifth Avenue, San Diego, California 92101, USA;
Long Beach City College, 1305 East Pacific Coast Highway, Long Beach, California 90806, USA

ABSTRACT
The Colonet region is located at the southern end of the California Floristic Province, in an area known to have the highest plant diversity in Baja California. A preliminary list of vouchered specimens is developed for the area, and a vegetation map for Colonet Mesa is presented. The Colonet region has at least 435 vascular plant taxa, of which 383 are native to Baja California, and 52 are endemic or nearly endemic. This list includes five local endemic taxa known only from the Colonet region, 18 taxa on the California Native Plant Society List 1B of taxa that are "rare, threatened, or endangered in California and elsewhere," and three on the Mexican NOM 059 list of protected taxa. The Mexican federal government has proposed to build a major port and a new city at Colonet. To understand the potential impact of the port on the regional biodiversity, we examine three areas—a Footprint area which will presumably be highly affected by the port, the Mesa area which contains all the known vernal pools, and a Buffer area surrounding the other two areas. The large Buffer shows the greatest number of native and endemic taxa, followed by the Mesa. The Footprint has two species of high conservation concern that are not represented elsewhere in the study area. The vegetation map of Colonet Mesa confirms the presence of large vernal pools and shows extensive maritime chaparral, neither of which has been reported from elsewhere in northwest Baja California. This report documents the high plant diversity of the region and highlights the rare and unique species and vegetation types of Colonet Mesa.

RESUMEN
La región de Colonet se localiza al limite sureste de la Provincia Florística de California, en un área reconocida por contar con una alta diversidad de plantas en Baja California. Una lista preliminar de especies colectadas se elaboró para el área y se presenta un mapa de vegetación para la mesa de Colonet. La región de Colonet cuenta con por lo menos 435 taxas de plantas vasculares, de las cuales 383 son nativas de Baja California y 52 son endémicas o casi endémicas. Este listado incluye cinco taxas de endemismos locales solo conocidos en la región de Colonet, 18 taxas en el listado 1B de la Sociedad de Plantas Nativas de California que son “rara, amenazada o en peligro en California y otros sitios” y tres enlistadas en la NOM 059 de las especies de protección en México. El Gobierno Federal Mexicano ha propuesto la construcción de un puerto de gran escala y una nueva ciudad en Colonet. Para entender el impacto POTencial del puerto en la biodiversidad regional, examinamos tres áreas—un área de influencia la cual presumiblemente será altamente afectada por el puerto, el área de la Mesa en donde se localizan todas las charcas temporales y un área de amortiguamiento que rodea las otras dos áreas. La zona de amortiguamiento muestra el mayor número de taxas nativas y endémicas, seguida por la zona de la Mesa. La zona de influencia cuenta con dos especies de alto interés para la conservación que no se encuentran representadas en otros sitios dentro del área de estudio. El mapa de vegetación de la Mesa de Colonet confirma la presencia de grandes charcas temporales y muestra grandes extensiones de Chaparral Marítimo, no reportado en ningún otro sitio en el noroeste de Baja California. Este reporte documenta la alta diversidad de plantas de la región y resalta las especies raras y únicas, así como los tipos de vegetación de la Mesa de Colonet.

Key words: coastal development, Colonet, conservation, endemic plants, flora, maritime chaparral, maritime succulent scrub, rare plants, vegetation, vernal pool.

INTRODUCTION
The California Floristic Province (CFP) is an area of high floral biodiversity with about 4500 plant species, including a large percentage of endemic and threatened taxa (Myers et al. 2000; Brooks et al. 2002). The CFP is usually defined as the Pacific drainages extending from the Klamath Mountains in Oregon, USA, to El Rosario, Baja California, Mexico, at 30° N latitude (Hickman 1993). The Mexican part of the CFP has lower rainfall than areas to the north, transitioning to desert at about 30°N (Minnich and Franco-Vizcaíno 1998; González-Abraham et al. 2008).

The CFP of coastal Baja California can be broadly classified as consisting of three scrub communities (Garcillán et al. in press). (1) Coastal sage scrub consists of a mixture of evergreen and summer-deciduous species and is a common coastal community from Santa Barbara County, California, to Santo Tomás, Baja California (Rundel 2007). (2) Maritime succulent
Hazardia ferrisiae
Centromadia perennis
var. is a vernal pool parishii Fugate), provide breeding habitat for amphibians discussed below. The early plant collector Moran (1982). Spea hammondii Berberis claireae is a monotypic genus restricted to Orcuttia (Baird)), of vernal pool habitat has been destroyed (U.S. and Dudleya [SD]), and was thought to be Navarretia fossalis. of many taxa listed by the US Endangered Species Act and the

BACKGROUND

Vernal pools are seasonal wetlands. Underlain by an impermeable layer, the pools fill during the wet winters and dry up during the summer (Solomeshch et al. 2007). The standing water in the spring excludes flooding-intolerant generalists, resulting in a unique flora with many endemic plants. Vernal pools also support a number of rare and endangered animals such as fairy shrimp (Branchinecta sandiegoensis Fugate), provide breeding habitat for amphibians such as the western spadefoot (Spea hammondii (Baird)), and are important habitat for migratory wading birds (Skinner 1994; Solomeshch et al. 2007; Clark et al. 2009). Loss of vernal pools has been high throughout California, and the most significant loss of habitat has been in San Diego County, where 95–97% of vernal pool habitat has been destroyed (U.S. Fish and Wildlife Service 1998; Bauder and McMillan 1998).

The only list of vernal pool plants of Baja California, and one of the few papers describing the region, was published by Moran (1984). The original extent and subsequent anthropogenic loss of vernal pools in Baja California have not been quantified, but even in 1984, a number of the known pools had been lost. Moran noted that Colonet Mesa harbors Orcuttia californica in “undoubtedly its largest stands,” as well as Eryngium aristulatum var. parishii and Navaretia fossalis. Since that time, there seemingly has been no effort to track any of these populations (U.S. Fish and Wildlife Service 2005), in spite of the potential importance of these populations to the genetic diversity of each species (Griggs 1984). All three taxa are listed under the US Endangered Species Act.

Three “local endemic” plant species have been described from the Colonet region. They are confined to the coast near or on Colonet Mesa (additional undescribed locally endemic taxa in Dudleya are discussed below). The early plant collector T. S. Brandegee discovered Centromadia perennis (Greene 1896; Lindsay 1955). Centromadia perennis is a vernal pool specialist known from the southern tip of Punta Colonet to ca. 2 km north of San Antonio del Mar. Historically, it occurred near San Quintin (Moran 23516 [SD]), and was thought to be extirpated there, but a small population has recently been rediscovered (Vanderplank 2010). Reid Moran collected extensively in the study area from 1946 to 1983 and documented the distribution of many species in the area, including the discovery of Berberis claireae (Moran 1982). Berberis claireae was known (before the collection noted below) only from arroyos and watercourses from Arroyo Hediondo (5 km north of the study area) to near San Antonio del Mar within a few km of the coast. Hazarda ferrisiae is a local endemic species (with a larger distribution than the foregoing) that is known from hills a few kilometers from the coast from Punta Cabras to Camalú (Clark 1979).

Adenothamnus validus is a monotypic genus restricted to Baja California from Rosarito to Colonet. The type specimen was collected by T. S. Brandegee in 1893 at Johnson Ranch (Keck 1935), a few kilometers north of San Antonio del Mar

scrub (also known as succulent coastal matorral) is the common coastal community to the south of coastal sage scrub and consists of a higher proportion of succulent species, often widely spaced; maritime succulent scrub can be found in southern San Diego County, California, and extends to the southern limit of the Province (Rundel 2007). (3) Chaparral, characterized by evergreen sclerophyllous shrubs, is primarily an inland community, but is also found in isolated patches on the coast, for example at Torrey Pines State Park in San Diego County, where it is called maritime chaparral (Keeler and Davis 2007). It is commonly agreed that, among the scrub communities of the southern CFP, plant species diversity is highest in the maritime succulent scrub of Baja California, with a peak in the southern part of this community from 31° to 30°N (Peinado et al. 1995; Riemann and Ezcurra 2007; Rundel 2007). No part of the coastal CFP in Baja California has been given legal protection under federal or local laws (Riemann and Ezcurra 2005).

The town of Colonet (31°5’N, 116°12’W) is about 180 km south of the border with the United States (US) on Mexican Federal Highway 1 on the Pacific coast of Baja California. Bahía Colonet (Colonet Bay) is formed at the mouths of two rivers, the Rio San Rafael and—just a few miles to the south—the Rio San Telmo (Roberts 1984; Baja Almanac Publishers n.d.). Punta Colonet (Colonet Point) is a coastal basalt mesa along the north bank of Rio San Rafael, surrounded on three sides by sheer cliffs ca. 80 m high. Punta Colonet is more or less congruent with Colonet Mesa; the latter is defined here as the area south of the road to San Antonio del Mar, which passes along the southern limit of Johnson Ranch (a site name used in many early collections). Colonet Mesa forms the southern limit of an area of spectacular botanical diversity extending to at least Enrídina, about 25 km to the north (Fig. 1).

In 2006, the Mexican government announced plans for a container port at Colonet, with an associated town, infrastructure, and railroad following the Arroyo Seco/Río San Rafael pass and continuing on to the US (F. Ochoa Pineda, M. Carignan, C. O. García Zendejas, and J. Gleason, Report on the proposal to develop a port at Punta Colonet, Baja California, Mexico. ELAW & Defensa Ambiental del Noroeste, unpubl. report [2008]). The primary purpose of this port is to add capacity to US–Asian trade; initial capacity is estimated at 1–2 million TEUs (twenty-foot equivalent units), with construction of a city of up to 200,000 inhabitants (Dibble 2008; F. Ochoa Pineda et al., unpubl. report [2008]). The outline of the port as authorized (Secretaría de Comunicaciones y Transportes 2006, 2008) will span the coast from approximately the southern tip of Punta Colonet, past Rio San Rafael, to the mouth of Rio San Telmo (Fig. 1). The published outline of the port does not address or authorize any terrestrial impacts. The recent contraction of world trade has made this port less economically viable, at least in the short-term, but government officials continue to insist the port will be built (Anonymous 2009; Madrigal 2009).

Punta Colonet is known for its vernal pools and associated flora (Moran 1984; Bauder and McMillan 1998; Clark et al. 2009), including the largest vernal pools known from the CFP in Mexico (Moran 1984). The area also contains a number of local endemic plant species, as well as significant populations of many taxa listed by the US Endangered Species Act and the California Endangered Species Act (Moran 1984; Clark et al. 2009). Little has been published about the flora or fauna of the region. The goal of this paper is to develop a preliminary list of the vascular plants of the region and a map of the vegetation of Punta Colonet.
Another highly threatened taxon in the study area is *Mammillaria louisae*. This species is known from only a few locations near San Quintín; the most northerly collection is from the “mouth of the Arroyo San Telmo” in 1960 (*Moran 8261* [SD]). Because the other known populations have been reduced or extirpated (J. Rebman, pers. comm.), this population—if it still survives—may be very important to the persistence of this species in the wild.

The most narrowly restricted taxa known from the region are two (possibly three) morphologically distinct *Dudleya* that occur only on Colonet Mesa. These populations, probably related to *D. blochmaniae*, are distinct and restricted to specific areas on the mesa (Dodero 1995). Pending formal description, we refer to these populations here as *Dudleya* Species 1 and *Dudleya* Species 2. Species 1 has only been collected at a few localized areas of the mesa, in an area of perhaps 100 ha. Species 2 is known from an area of perhaps less than 10 ha in heavy clay soils. Although the exact taxonomic rank of these taxa within *Dudleya* has not been determined, they are obviously highly threatened due to their limited distribution.
METHODS

This study is intended to document the known flora and vegetation of the Colonet region in relation to the potential threat from the proposed port development project. Because the scope of the proposed port and associated infrastructure is currently unknown, we compiled information reported in public documents (newspapers, web sites, and local planning documents) that would shed light on the size and potential impact of the port. Published news articles have spoken of a port the size of the ports of Long Beach and Los Angeles, with a town of 200,000 inhabitants or more and a road connecting the port with the US. Because of limited resources and infrastructure in the area, the port will presumably have to generate electricity, produce desalinated water, and dispose of municipal waste on-site or nearby. Some news reports have spoken of housing being built on Mesa San Telmo (to the west of Highway 1 between Rio San Rafael and Rio San Telmo) and Mesa San Jacinto (the next mesa to the south). Municipal planning documents show planned “low density” development for the mesa, presumably housing and recreation (golf), with a narrow strip on the unbuildable cliffs left as a protected area. A summary of project alternatives has been published (Secretaría de Comunicaciones y Transportes 2002).

Preliminary Flora of the Colonet Region

To develop the list of vascular plants that could potentially occur in the area, we drew on four main sources: (1) a list maintained by M. Dodero and colleagues; (2) various field trips, including a collecting trip in June 2008; (3) the field collection journals of Reid Moran, Robert Thorne and Frank Gander; and (4) plant associates listed on herbarium labels from the area. Preliminary searches were made of the databases at the Mexican Biodiversity Information Network (CONABIO 2008), by taxon, and at San Diego Natural History Museum (Rebman 2008), by taxon, latitude-longitude, locality, and collector. For taxa not found in these databases, we searched in the herbaria at Rancho Santa Ana Botanic Garden (RSA), California Academy of Sciences (CAS, including the Dudley Herbarium, DS), San Diego Natural History Museum (SD), and The Huntington Botanical Garden (HNT). When we had access to the label text (i.e., all except some specimens accessed online), we georeferenced the locations or confirmed the georeferencing already made. Georeferencing was facilitated using maps (Baja Almanac Publishers n.d.), a database of place names provided by the Bajaflora database (Rebman 2008), and the “Google Earth” application. No attempt was made to confirm the identification of species on specimen sheets. Nomenclature was updated to that used by the Bajaflora database and the Checklist of the Vascular Plants of San Diego County (Rebman and Simpson 2008), using treatments found at Flora of North America (Efloras 2008), Jepson Interchange (Consortium of California Herbaria 2008), IPNI (International Plant Names Index 2008), and Tropicos (Missouri Botanical Garden 2008). We include synonyms for those taxa that have been changed since the publication of The Jepson Manual (Hickman 1993) or The Flora of Baja California (Wiggins 1980).

We used our knowledge of local occurrence, previous classifications (Bauder and McMillan 1998; Riemann and Ezcurra 2005), the SD database (Rebman 2008), the Jepson Interchange (Consortium of California Herbaria 2008), and other online databases (e.g., California Native Plant Society 2010 and CONABIO 2008) to classify each taxon as: vernal pool specialist, local endemic, (Baja) peninsular endemic, near-state endemic, listed by the California or US Endangered Species Acts, listed on the Mexican NOM 059 list of protected species, and included on the California Native Plant Society Inventory of Rare and Endangered Plants of California (“CNPS Inventory”). Near-state endemics are taxa whose Mexican range is within the state of Baja California, and extends slightly into San Diego or Imperial Counties, California.

Only taxa currently represented in herbarium specimens are included in the list that follows. Several non-native and weedy species were observed but not vouchered, including: Atriplex semibaccata R.Br., Brassica tournefortii Gouan, Bromus madritensis L. subsp. rubens (L.) Husn., Chenopodium murale L., and Nicotiana glauca Graham.

Delimitation of Regions

In order to determine the possible impact of a port on the flora of the region, we defined three areas of interest within an overall study area (Fig. 1). These areas are defined by prominent geographic features (escarpments and roads).

Footprint.—The Footprint of the port consists of the area where reports have described possible development of a town (Secretaría de Comunicaciones y Transportes 2002): Mesa San Telmo and Mesa San Jacinto, extending from the coast inland to Highway 1 and including the riparian areas of the San Telmo and San Rafael rivers west of the highway. While this area is presumably much larger than that necessary for development (ca. 2–3 times the current area of Ensenada), it contains the areas most amenable to development, many of which are currently extensively farmed, with little native vegetation in upland areas.

Mesa.—The Mesa is the part of Punta Colonet south of the road from Colonet to San Antonio del Mar, including the dunes and lagoon around San Antonio del Mar. This area is often referred to as Mesa de Colonet (Moran 1984). This area contains almost all of the vernal pools and sandstone outcrops in the region, and was an area of particular interest to biologists before the port was announced. The Mesa is rather flat, underlain by basalt, about 80 m above sea level, and hydrologically isolated from the rivers and arroyos to the south and north. While the center and east sides of the Mesa have been extensively altered by grazing and agriculture, much of the southern and northern parts harbor seemingly intact native vegetation with few introduced species.

Buffer.—To understand the possible impact of the port, and to include species from the area that had not been collected from the two above areas, we defined a Buffer area that extends ca. 10 km to the north and east of the Mesa and Footprint, excluding areas south of San Vicente that are intensively farmed. The surface areas of the Footprint, Mesa, and Buffer areas are ca. 190 km², 130 km², and 480 km², respectively.

Vegetation Map

A photomosaic of the peninsula was obtained from Terra Peninsular, AC. This is a true-color image made during late
Table 1. Taxa occurring in three study areas of the Colonet region in Baja California, Mexico.

<table>
<thead>
<tr>
<th>Category</th>
<th>Footprint</th>
<th>Mesa</th>
<th>Buffer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>All species and subspecies</td>
<td>17</td>
<td>99</td>
<td>182</td>
<td>435</td>
</tr>
<tr>
<td>Native</td>
<td>12</td>
<td>64</td>
<td>159</td>
<td>383</td>
</tr>
<tr>
<td>Local endemics</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Endemics and near-state</td>
<td>2</td>
<td>14</td>
<td>21</td>
<td>52</td>
</tr>
<tr>
<td>NOM059</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CNPS Lists 1–4</td>
<td>2</td>
<td>17</td>
<td>13</td>
<td>52</td>
</tr>
<tr>
<td>CNPS List 1B</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td>18</td>
</tr>
</tbody>
</table>

For each study area, the number of species, subspecies or varieties that occur uniquely in that area, and the total number of taxa known from that area, are shown as “unique” and “total”, respectively. The first number for each area represents the number of taxa that could be lost from the study region if that area were destroyed, and the second number represents the number of taxa that would be included if that area were completely protected. The final column is the total number, for the study region, of taxa for each classification. Local endemics are species found only in the Colonet region and include two undescribed taxa. Endemics are species endemic to the Baja California peninsula; near-state endemics are species endemic to the state of Baja California that extend slightly into San Diego or Imperial Counties in California. CNPS Lists 1–4 include plants listed in the California Native Plant Society’s Inventory of Rare and Endangered Plants. CNPS List 1B taxa are those considered globally endangered, threatened or rare.

RESULTS AND DISCUSSION

Preliminary Flora of the Colonet Region

We found 1180 plant specimens in the study region that we could georeference to one of the three areas of interest: Footprint, Mesa, or Buffer. These specimens were used as the primary data for the flora presented here.

The preliminary vascular flora of the Colonet region (Appendix 1) shows the 435 distinct taxa (species, subspecies, varieties, and hybrids) occurring within the study area. Of these taxa, 383 are native. Excluding subspecies, varieties and hybrids, the flora has 424 distinct species, of which 373 are native. The list includes 35 taxa endemic to the Baja California peninsula—of which five are local endemics—and 17 taxa that are near-state endemics.

A number of taxa found in the study area are listed as rare or protected. The CNPS Inventory lists 52 taxa, including 18 taxa on the list 1B (“Plants rare, threatened, or endangered in California and elsewhere”). Ten taxa are listed under either the US or California Endangered Species Acts (California Native Plant Society 2010). The Mexican NOM 059 “list of species at risk” (Secretaría de Medio Ambiente y Recursos Naturales 2002) includes three species from the study region. These species, and their classification status, are: Calitroopsis forbesii (listed as Cupressus forbesii, protected); Cylindropuntia californica var. rosarica (listed as Opuntia rosarica, protected); and Ferocactus viridescens var. viridescens (listed as F. viridescens, threatened). A fourth listed species, Pinus muricata D. Don, in danger of extinction, occurs just to the north of the study region (e.g., Moran 29467 [SD]; Minnich 1987).

We subdivided the results by species found in the Footprint, Mesa and Buffer (Table 1). This analysis gives us a very rough idea of the proportion of biodiversity attributable to each of the three areas. Note that these numbers must be taken as only a rough estimate—sources of error include different collection efforts for the areas, the fact that an exhaustive search for specimens was not made, and changes in habitat and land use since the collections were made (note that some taxa are vouchered with very old specimens, some over 100 years ago). But, even with these caveats, much of the biodiversity of the region is found in the Mesa and Buffer regions; indeed, the only region in which all five local endemic species are known to occur is the Mesa. The Footprint has a distinctly less diverse flora, as measured by this list, which may be surprising given the large riparian area encompassed by the Footprint. Possible reasons for these differences include edaphic factors, the larger area of the Buffer (about 2.5–3.5 times larger), unknown differences in collecting effort, and—we believe—the extensive areas already converted to agriculture in the Footprint. However, between two and 21 endemic or near-endemic taxa are unique to one—and not the other two—areas and would be threatened by development.

In June 2008, we spent two days collecting in the Colonet region. We found a specimen of Berberis claireae in a canyon at the south end of the Mesa (30°57.750’N, 116°17.807’W). This is the first population known from south of San Antonio del Mar, and expands the north–south range of this species from ca. 12 km to ca. 35 km. This collection suggests that there may be other novel plants to be found in the region.

Vegetation Map

It is inherently difficult to classify coastal scrub vegetation (Rundel 2007), in part because of a large number of local endemics with limited range. Our classification is based on regionally-developed descriptions of maritime succulent scrub, coastal sage scrub, and maritime chaparral (Keeley and Davis
2007; Rundel 2007), which attempt to create broad classifications, in part by combining dominant congeners (such as *Salvia* spp.) that share structural and phenological characteristics.

The communities we mapped include:

1. **Maritime succulent scrub.**—This vegetation type is dominated by *Agave shawii* subsp. *shawii*, *Dudleya engins*, *Euphorbia misera*, and *Rosa minutifolia*, with less dominant *Aesculus parryi*, *Artemisia californica*, *Bergerocactus emoryi*, *Encelia californica*, and *Rhus integrifolia*. In the field, what we classify as maritime succulent scrub is obviously a mixture of at least three vegetation types, which we could not resolve on the aerial photos. These three (unmapped) subtypes consist of drained soils with more *Agave shawii* subsp. *shawii*, *Dudleya engins*, and *Euphorbia misera*; clayey soils with *Deinandra fasciculata* and *Rosa minutifolia*; and linear sandy hummocks or stabilized dunes that are dominated by the larger shrubs such as *Aesculus parryi*, *Rhus integrifolia*, and *Salvia brandegeei*. These sandy areas have a rich concentration of shells, presumably from the Native American population that inhabited the region (Moore 1999). Maritime succulent scrub was further classified according the degree of disturbance: “intact” refers to areas with low levels of disturbance, or where grazing has reduced but not eliminated native vegetation, while “low quality” describes areas in which the vegetation has been highly impacted by bulldozers or anthropogenic fire. Our experience is that even the low quality areas will restore themselves, and are already undergoing that process.

2. **Chaparral.**—Chaparral on the Mesa is dominated by *Adenostoma fasciculatum*, *Cneoridium dumosum*, *Hazardia squarrosa* var. *grindelioides*, *Rhus integrifolia*, and *Salvia brandegeei*. *Agave shawii* subsp. *shawii* and *Dudleya engins* also occur here but are less conspicuous than the larger shrubs. Maritime chaparral occurs only on sandstone outcrops, and, as far as we know, the major extent of this vegetation in Baja California is limited to Colonet Mesa.

3. **Coastal sage scrub.**—This vegetation type is dominated by *Artemisia californica* and *Salvia m uncii* with *Adenostoma fasciculatum*, *Aesculus parryi*, *Dudleya engins*, *Encelia californica*, *Simmondsia chinesis*, and *Stenocereus g omnusus*; *Agave shawii* subsp. *shawii* is nearly absent. Although a number of endemics and near-state endemics occur here, the dominance of *Artemisia* and *Salvia* make this vegetation similar to the coastal sage scrub of southern California. Coastal sage scrub is found here only on north- and east-facing canyon walls.

4. **Vernal pools.**—Vernal pools were recognized by their morphology and as large areas of sparse vegetation. Species that occur here include *Centromadia perennis*, *Deinandra fasciculata* (shallow pools), *Eryngium aristulatum* var. *parishii*, *La sthenia gracilis* (shallow pools), and *Orcuttia californica* (deeper pools). Some of the pools have been plowed and sown and have scarce native vegetation. Vernal pools in the Colonet region range from small pools <50 m in diameter to the largest pools known from NW Baja California, up to 1.4 km along the major diameter. Intermittent riparian areas also often support vernal pool species, but were not so mapped.

5. **Dunes.**—The study area has both active dunes and mostly stabilized dunes. The stabilized dunes support *Abronia umbellata* var. *umbellata*, *Helianthus niveus*, and *Lotus nuttaliamus*, while the active dunes have sparse vegetation with *Abronia maritima* var. *maritima*, *A. umbellata*, *Cressa truxillensis*, *Distichlis spicata*, *Lotus argophyllus*, and—surprisingly—*Tamarix ramosissima* growing through the sand.

6. **Riparian and lagoon.**—Arroyo San Antonio and Arroyo El Salado join and flow to San Antonio del Mar, where they form a lagoon behind the beach. We included approximately the last 2 km of the arroyo and the lagoon in Fig. 1. Salt marsh was not mapped.

The vegetation map for Punta Colonet is shown in Fig. 2. It must be noted that land use has changed since this map was made (Jun 2008), and there has been additional destruction of native vegetation. The major native vegetation types shown on the map are maritime succulent scrub and maritime chaparral, the latter dominating the south-central part of the peninsula. We believe that this is the largest extent of maritime chaparral in the CFP in Mexico.

A study of vegetation along a transect from Colonet to the Sierra San Pedro Mártir has been conducted using phytosociological methods (Peinado et al. 1994). This study reported one mid-elevation and three low-elevation vegetation types that seem comparable to our classification. Although we used different methods to identify vegetation types, our coastal sage scrub appears to be identical with their *Salvia mucnii*-*Artemisietum californicae*, and our maritime succulent scrub includes their classifications *Bergerocacto emoryi*-Agavetum shawii and *Rosa minutifoliiap-Aesculetum parryi*. Our maritime chaparral is similar to their *Adenostometum fasciculati*, which they recognized as an upland, transitional, fire-maintained vegetation occurring no lower than 150 m elevation. We cannot evaluate the role of fire in the maritime chaparral in the Colonet region (see Van Dyke and Holl 2001), but many of the co-occurring species of the presumed inland climax vegetation type were absent. Because of the different species composition, we expect that the dynamics of *Adenostoma fasciculatum*-dominated chaparral differs between coastal and inland locations, emphasizing the regional uniqueness of maritime chaparral.

The dimensions and distribution of vernal pools are apparent from Fig. 2, with four large pools located in the middle of the Colonet peninsula. These pools are unique in Mexico, and probably in the CFP south of Santa Rosa Plateau (Riverside County, California), by virtue their depth and size. Even though they are heavily impacted by agriculture and grazing, these pools still maintain a number of vernal pool species, including the locally endemic *Centromadia perennis*. These pools support the only known extant population of *Orcuttia californica* in Baja California. Other notable vegetation areas are the active dunes and lagoon system around San Antonio del Mar, and the large stabilized dune on the southwest side of the mesa.

The number of taxa documented for the region is large—435 in total, 383 native—but perhaps not surprising. Two comparable floras have been reported from the CFP of Baja California. One is that of Punta Banda near Ensenada (Mulroy et al. 1979), with 258 taxa—208 native—observed in a much smaller area of study. The other is for Greater San Quintin, 60 km south of our study area, with 429 taxa, of which 351 are native (Vanderplank 2010). The area of Greater San Quintin is less than 50% of the area studied here, and the degree of disturbance and urbanization is much higher.
Fig. 2. Vegetation map of Colonet Mesa. Vegetation areas were determined from aerial photographs of the region taken in 2004 and verified and updated by field observations in 2008. The large vernal pools and the extensive areas of maritime chaparral are apparent.
efforts for both these studies were more intense than for the results presented here. We feel sure that continued collection will reveal many more species in the vascular flora of the Colonet region.

This paper points out some of the possible impacts that development could have on the flora of the Colonet region. The two sub-areas of highest floristic biodiversity are the Buffer, followed by the Mesa, although the Mesa with its vernal pools has a larger number of CNPS Inventory 1B plants and harbors all five of the local endemic taxa. Colonet is at the center of an area of “high species richness and endemism,” which has also been identified by gap analysis as important for vascular plant conservation in the Baja California peninsula (Riemann and Ezcurra 2005, 2007). Given the high floral diversity found, and the large number of endemics and threatened taxa in this limited area, we recommend that Colonet Mesa (Punta Colonet) be declared a protected area.

ACKNOWLEDGMENTS

Scott McMillan, Brenda McMillan, and Kim Marsden helped develop the initial list of plants of the Mesa. Kevin Clark also contributed to this initial list and to the authors’ understanding of the importance of the Colonet region. Judy Gibson and John Sanborn graciously helped with database searches at SD. Lourdes Mexicano spent many hours stitching the images used as a base for the vegetation map. Jiro Shirota created the kml file at http://fremontia.info/kml/ for the elevation relief in Fig. 1. Jon Rebman made extensive and crucial comments on a draft; Kevin Clark, Fred Roberts, and Sarah Ratay also made helpful comments. Two anonymous reviewers pointed out a number of areas that needed improvement. Sean Lahmeyer and Paul Meyers helped find specimens at The Huntington. The field assistance of Suzanne Robinson, Gonzalo Rodriguez, and Nick Seldon was appreciated. We thank Juan Manuel García Caudillo for the support by Terra Peninsular of this project.

LITERATURE CITED


PRELIMINARY FLORA OF COLONET

Notes and symbols: * = non-native; vernal pool = vernal pool specialist; local endemic = known only within ca. 50 km from Colonet mesa; peninsular endemic = known only from Baja California and Baja California Sur; near-state endemic = known only from Baja California and limited range in Southern California; A/Pr = NOM 059 Amenizada (threatened)/Protegida (protected); FC/FT/FE = U.S. Candidate/Threatened/Endangered; Ca/R/Ca/E = California Rare/Threatened/Endangered.

LYCOPHYTES [~ LYCOPODS]

SELAGINELLACEAE


MARSILEACEAE


POLYPodiACEAE

POLYPodium CalIFornIICum Kauf. Buffer: 100 m, 25 Mar 1979, Moran 26822 (SD).

PteridACEAE

ADIANThUM jORDANII C.H.Mull. Buffer: 50 m, 23 Apr 1972, Moran 19091 (SD).

ASPIDOTIS CaLIFORNICA (Hook.) Nutt. ex Copel. Buffer: 1 Jan 1925, Jones s.n. (SD).

MELICA IMPERFECTA Trim. Buffer: 10 m, 4 Mar 1979, Moran 26602 (SD).
MUEHLENBERGIA MICROSPERMA (DC.) Kunth. Buffer: 107 m, 15 Feb 1988, Sanders 7672 (SD).
MUEHLENBERGIA RIGENS (Benth.) Hitchc. Buffer: 80 m, 12 Oct 1977, Moran 25084 (SD).
NASELLA LEPIDA (Hitchc.) Barkworth. Synonym: Stipa lepida. Mesa & Buffer: 35 m, 6 Mar 1982, Ruinell 821 (SD).
ORCUTTIA CALIFORNICA Vasey. Vernal pool; CNPS list 1B.1; FE; CaE. Footprint & Mesa: 21 Jun 2008, Vanderplank C64 (RSA).
PASCUCUM CAPILLARE L. Buffer: 50 m, 21 Sep 1983, Thorne 57361 (BCMEX).
*PHAELARIS PARADOXO L. Mesa: 80 m, 4 May 1980, Moran 28444 (SD).
POA SECUNDA J.Presl. Footprint: 40 m, 25 Mar 1979, Moran 26833 (SD).
*SCHISSIMUS BARBATUS (L.) Thell. Buffer: 5 m, 4 Mar 1979, Moran 26580 (SD).
*Sorghum bicolor (L.) Moench. Footprint: 70 m, 12 Aug 1977, Moran 24508 (SD).
SPOROBOLUS AROIDES (Torr.) Torr. Mesa & Buffer: 30 m, 11 Jun 1980, Reeder 7232 (SD).
*Vulpia myuros (L.) C.C.Gmel. var. hirsuta Hack. Buffer: 80 m, 10 May 1978, Moran 25812 (SD).
*Vulpia myuros (L.) C.C.Gmel. var. myuros. Buffer: 80 m, 25 Mar 1979, Moran 26803 (SD).
Vulpia octoflora (Walter) Rydb. var. hirtella (Piper) Henrard. Buffer: 180 m, 5 Apr 1938, Raven 12216 (CAS).

POTAMOGETONACEAE

RUPPIA MARITIMA L. Buffer: 50 m, 25 Apr 1984, Thorne 58133 (RSA).

THYMIDACEAE

MUILLA MARITIMA (Torr.) S.Watson. Mesa: 80 m, 4 May 1980, Moran 28434 (SD).

TYRPHACEAE


ZANNICHELLIACEAE

ZANNICHELLIA PALUSTRIS L. Buffer: 50 m, 25 Apr 1984, Thorne 58136 (SD).

ANGIOSPERMS: EUDICOTS

ADIXACEAE

SAMBUCUS NIGRA L. subsp. CAERULEA (Raf.) J. Bolli. Synonyme: Sambucus nigra subsp. canadensis; S. mexicana. Buffer: 35 m, 10 Jun 1979, Moran 27631 (SD).

AZOACEAE

*CARPOTRUTUS CHILENIS (Molina) N.E.Br. Mesa & Buffer: 5 m, 1 Jun 1980, Moran 26854 (SD).
*MESEMBRYANTHEMUM NOIDIFLORUM L. Mesa: 5 m, 16 Jul 1967, Moran 14062 (SD).

AMARANTHACEAE


ARTHROCNEMUM SUBTERMINALE (Parish) Standl. Synonym: Salicornia subterminalis. All areas: 5 m, 1 Jun 1980, Moran 26858 (SD).

ATRIPLEX CALIFORNICA Moq. Buffer: 60 m, 4 Apr 1982, Moran 30236 (SD).


ATRIPLEX LUCOPELLYLLA (Moq.) D.Dietr. Buffer: 3 Mar 1979, Moran 26555 (SD).

*ATRIPLEX LINDELEYI Moq. Footprint: 80 m, 5 Sep 1978, Moran 26284 (SD).

ATRIPLEX PACIFICA A.Nelson. CNPS list 1B.2. Mesa: 30 m, 5 Jun 1984, Dice 456 (SD).

*ATRIPLEX ROSEA L. Buffer: 70 m, 5 Sep 1978, Moran 26264 (SD).

*ATRIPLEX SEMIBACCATA R.Br. Buffer: 70 m, 5 Sep 1978, Moran 26279 (SD).


*ATRIPLEX SUBRECTA I.Ver. Footprint: 80 m, 5 Sep 1978, Moran 26283 (SD).

ATRIPLEX WATSONII A.Nelson. Footprint & Mesa: 5 m, 1 Jun 1980, Moran 26850 (SD).

*BASSIA HYSSOPIFOLIA (Pall.) Kuntze. Buffer: 50 m, 21 Sep 1983, Thorne 5738 (BCMEX).

*Beta vulgaris L. Mesa: 80 m, 1 Apr 1985, Thorne 58889 (RSA).

MONOLEPS NUTTALLIANA (Schult.) Greene. Mesa: 80 m, 25 Feb 1973, Moran 20285 (SD).

*SALSOLA TRAGUS L. Buffer: 70 m, 5 Sep 1978, Moran 26260 (SD).


SUAEDEA NIGRA (Raf.) J.F.Macbr. Buffer: 70 m, 5 Sep 1978, Moran 26263 (SD).

SUAEDEA TAXBIFOLIA (Standl.) Standl. CNPS list 4.2. Synonyms: Suadea californica var. taxifolia; Suadea californica var. pubescens; Suadea pubescens. Footprint & Buffer: 3 Mar 1979, Moran 26557 (SD).

ANACARDIACEAE


APIACEAE

APISTRUM ANGUSTIFOLIUM Nutt. Mesa & Buffer: 225 m, 12 May 1978, Moran 25995 (SD).

*AURUM GRAVEOLENS L. Buffer: 70 m, 5 Sep 1978, Moran 26276 (SD).

BOWLEA ISCANIA Ruiz & Pav. Buffer: 60 m, 4 Apr 1982, Moran 30220 (SD).

DACCIUS PULULIS Michx. Buffer: 80 m, 10 May 1978, Moran 25817 (SD).
ERYNGIUM ARISTATUM var. parishii (J.M. Coulter & R.) Mathias & Constance. Vernal pool; CNPS list 1B.1; FE; Ca. Mesa: 80 m, 4 May 1980, Moran 28431 (SD).

YABEA MICROCARPA (Hook. & Arn.) Kosso-Pol. Buffer: 60 m, 4 Apr 1982, Moran 30212 (SD).

APOCYNACEAE

ASCLEPIAS SUBULATA DCene. Buffer: 150 m, 31 May 1977, Moran 24216 (SD).

ASTERACEAE


AMBROSIA CHAMISOIS (Less.) Greene. Mesa & Buffer: 5 m, 1 Jun 1980, Moran 28562 (SD).

AMBROSIA CHENOPODIIFORMIA (Benth.) W.W.Payne. CNPS list 2.1. All areas: 24 Aug 1993, Howe 523 (SD).

AMBROSIA CONFERTIFLORA DC. Buffer: 35 m, 10 Jun 1979, Moran 27630 (SD).

AMBROSIA PUMILA (Nutt.) A.Gray. Near-state endemic; CNPS list 1B.1; FE; Mesa: 80 m, 9 Jun 1979, Moran 27615 (SD).

ARTEMISIA CALIFORNICA Less. Mesa: 100 m, 29 May 1965, Moran 12146 (SD).

ARTEMISIA DRACUNCULUS L. Buffer: 80 m, 12 Oct 1977, Moran 25089 (SD).

ARTEMISIA TREDENTATA Nutt. Buffer: 70 m, 5 Sep 1978, Moran 26274 (SD).


*CENTAUREA MELITENSIS L. Footprint & Mesa: 15–30 m, 5 Jun 1988, Boyd 2384 (RSA).


CHENOACTIS ARTEMISIFOLIA (Harv. & A.Gray) A.Gray. Buffer: 175 m, 21 Apr 1973, Moran 20596 (SD).

CHENOACTIS GLABRIUSCULA DC. var. GLABRIUSCULA. Mesa: 15 Apr 1925, Jones s.n. (POM).

CONEVA CANADENSIS (L.) Cronquist. Buffer: 70 m, 5 Sep 1978, Moran 26270 (SD).


COREOPSIS MARITIMA (Nutt.) Hook.f. CNPS list 2.2. Synonym: Leptosyne maritima. Mesa & Buffer: 60 m, 4 Apr 1982, Moran 30231 (SD).

*COTULA CORONOPHIOIDES L. 7 Apr 1944, Rehman 2513 (SD).


DIETERA ASTEROIDES Tott. var. ASTEROIDES. Synonyms: Aster canescens var. tephrodes; Aster tephrodes; Machaeranthera tephrodes. Buffer: 200 m, 15 Mar 1986, Delgadillo s.n. (BCMEX).

ENCELIA CALIFORNICA Nutt. All areas: 200 m, 20 Mar 2003, Vinton s.n. (SD).


ERGERON DIVERGENS Tott. & A.Gray. Mesa & Buffer: 20 m, 21 Mar 1982, Moran 30058 (SD).


GNEPHAELIUM PALUSTRE Nutt. All areas: 80 m, 3 Jun 1979, Moran 27596 (SD).


HARYDONIA FERRISAE (S.F.Blake) W.D.Clark. Local endemic. Synonym: Haplopappus ferrisiae. All areas: 40 m, 6 Mar 1982, Bandel 822 (HNT).

HARYDONIA FERRISAE × BERBERIDIS. Buffer: 50 m, 16 Jul 1967, Moran 14070 (SD).

HARYDONIA ORCUITII (A.Gray) Greene. Near-state endemic; CNPS list 1B.1; FC; CaT. Footprint & Buffer: 19 Jun 1985, Thorne 60770 (RSA).

HARYDONIA ORCUITII × FERRISAE. Buffer: 50 m, 16 Jul 1967, Moran 14067 (SD).

HARYDONIA SQUARROSA (Hook. & Arn.) Greene var. GRINDELIOIDES (DC.) W.D.Clark. Synonym: Haplopappus squarroso var. grinde- loides. Buffer: 1 Jan 1925, Jones s.n. (POM).

HARYDONIA VERNOSA (Branedgee) W.D.Clark. Peninsula endemic. Buffer: 150 m, 22 Jul 1968, Moran 15545 (SD).

HELENUM PEBERULICUM DC. Buffer: 7 Apr 1994, Rehman 2530 (BCMEX).

HELIANTHUS NIVEUS (Benth.) Brandedgee. Mesa: 5 m, 3 Jun 1979, Moran 27587 (SD).

HETEROTHECA GRANDIFLORA Nutt. Footprint & Buffer: 70 m, 12 Aug 1977, Moran 24507 (SD).

*HYPOCHAERIS GLABRA L. Mesa: 7 Apr 1994, Rehman 2510 (RSA).


IVA HAYESIANA A.Gray CNPS list 2.2. All areas: 21 Jun 2008, Vanderplank C02S (RSA).


LASTHENIA CORONARIA (Nutt.) Ornduff. Mesa & Buffer: 60 m, 4 Apr 1982, Moran 30219 (SD).


MALACOTERIX SIMILIS W.S.Devis & P.H.Raven. Near-state endemic; CNPS list 1A. Buffer: 225 m, 12 May 1978, Moran 26002 (SD).


PLOSHEA SERICEA (Nutt.) Covile. All areas: 15 m, 12 Aug 1977, Moran 24504 (SD).
Porophyllum gracile Benth. Buffer: 4 May 1939, Gander 7362 (SD).
Pseudognaphalium stramineum (Kunth) Anderb. Synonyms: Gaughalium stramineum; Gaughalium chilense. Mesa: 80 m, 3 Jun 1979, Moran 27598 (SD).

Psilocarpus brevissimus Nutt. Vernal pool. Footprint & Mesa: 50–70 m, 1 Apr 1985, Thorne 58823 (RSA).

Psilocarpus tenellus Nutt. Vernal pool. All areas: 80 m, 1 Apr 1985, Thorne 58870 (RSA).

Rafinesquia californica Nutt. Buffer: 60 m, 4 Apr 1982, Moran 30229 (SD).


Senecio lyoni A.Gray. Buffer: 5 m, 4 Mar 1979, Moran 26561 (SD).


Stephanomeria pauciflora (Torr.) A.Nelson. Buffer: 10 m, 4 Mar 1979, Moran 26592 (SD).

Stylocline gnaphaloides Nutt. Buffer: 60 m, 4 Apr 1982, Moran 30244 (SD).


Verbesina disjita A.Gray. CNPS list 1B.1; FT; CaT. Buffer: 35 m, 10 Jun 1979, Moran 27627 (SD).


Xanthium strumarium L. Mesa & Buffer: 25 m, 3 Jun 1979, Moran 27564 (SD).

Borraginaceae


Boraginaceae


Cryptantha clevelandii Greene var. clevelandi. Buffer: 60 m, 4 Apr 1982, Moran 30215 (SD).

Cryptantha clevelandii (A.Gray) Greene. All areas: 200 m, 20 Mar 2003, Vinton s.n. (SD).


Pectocarya linearis (Ruiz & Pav.) DC. subsp. feroxula (I.M.Johnst.) Thorne. Mesa & Buffer: 150 m, 4 Apr 1982, Moran 30249 (SD).


Plagiobothrys acanthocarpus (Piper) I.M.Johnst. Vernal pool. Mesa: 50–70 m, 1 Apr 1985, Thorne 58825 (RSA).

Plagiobothrys bracteatus (Howell) I.M.Johnst. Vernal pool. Mesa: 50–70 m, 1 Apr 1985, Thorne 58824 (RSA).

Plagiobothrys collinus (Phil.) I.M.Johnst. var. gracilis (I.M.Johnst.) Huggins. Buffer: 60 m, 4 Apr 1982, Moran 30258 (SD).


Brassicaceae

*Brassica napus L. Buffer: 140 m, 3 Apr 1982, Moran 30205 (SD).


*Capsella bursa-pastoris (L.) Medik. Mesa & Buffer: 60 m, 4 Apr 1982, Moran 30226 (SD).

Cardamine californica (Nutt.) Greene var. integrifolia (Nutt.) Rollins. Synonym: Dentaria californica var. integrifolia. Buffer: 30 m, 21 Mar 1982, Moran 30054 (SD).


Guillenia lasiophylla (Hook. & Arn.) Greene. Buffer: 60 m, 4 Apr 1982, Moran 30225 (SD).


Hutchinsia procumbens (L.) Desv. Buffer: 75 m, 10 May 1978, Moran 25842 (SD).

Lepidium lasiocarpum Nutt. var. lasiocarpum. Mesa: 80 m, 3 Jun 1979, Moran 27597 (SD).

Lepidium lasiocarpum Nutt. var. latifolium C.L.Hitchc. Buffer: 5 m, 4 Mar 1979, Moran 26562 (SD).

Lepidium nitidum Nutt. Mesa & Buffer: 80 m, 1 Apr 1985, Thorne 58878 (RSA).

Lepidium virginicum L. var. pubescens (Greene) Thell. Buffer: 75 m, 10 May 1978, Moran 25841 (SD).

*Symbrum orientale L. Footprint & Buffer: 350 m, 15 Feb 1988, Sanders 7664 (SD).

Tropidocarpum gracile Hook. Buffer: 60 m, 4 Apr 1982, Moran 30223 (SD).

Cactaceae


Echinocereus maritimus (M.E.Jones) K.Schum. var. maritimus. Peninsula endemic. Mesa & Buffer: 80 m, 1 Apr 1985, Thorne 58875 (RSA).

Ferocactus virdescens (Torr. & A.Gray) Britton & Rose var. virdescens. Near-state endemic; A; CNPS list 2.1. Mesa: 60 m, 24 May 1980, Moran 28636 (SD).

MYRTILLOCATUS cochian (Orcutt) Britton & Rose. Peninsula endemic. Buffer: 90 m, 1 Jun 1980, Moran 28664 (SD).
*Opuntia ficus-indica* (L.) Mill. Buffer: 120 m, 10 Jun 1998, Rebman 53535 (SD).
Opuntia littoralis (Engelm.) Cockerell. Mesa & Buffer: 150 m, 4 Jun 1998, Rebman 55527 (SD).
Opuntia orocica Philbrick. Buffer: 120 m, 10 Jun 1998, Rebman 53556 (SD).
**CAMPAESACEAE**

Triodanis beflora (Ruiz & Pav.) Greene. Buffer: 60 m, 4 Apr 1982, Moran 30202 (SD).
**CAPARACEAE**

Peritoma arborea (Nutt.) H.H.ILlis var. angustata (Parish) H.H.ILlis. Synonyms: Isomeris arborea subsp. angustata; Cleome isomeris. Mesa: 3 May 1939, Gander 7346 (SD).

**CARYOPHYLLACEAE**

Polygea depressum Nutt. Buffer: 10 m, 4 Mar 1979, Moran 26599 (SD).
Silene antirrhinum L. Buffer: 60 m, 4 Apr 1982, Moran 30242 (SD).
*Silene gallica* L. Mesa & Buffer: 80 m, 10 May 1978, Moran 25814 (SD).
Silene laciniata Cav. subsp. laciniata. Buffer: 35 m, 10 Jun 1979, Moran 27620 (SD).
Spergularia macrotheca (Hornem. ex Cham. & Schlldl.) Heynh. var. macrotheca. Mesa & Buffer: 60 m, 4 Apr 1982, Moran 50253 (SD).
*Spergularia platensis* (Cambess.) Fenzl var. platensis. Mesa: 80 m, 24 May 1980, Moran 28635 (SD).

**CISTACEAE**


**CONVOLVULACEAE**

Calystegia macrostegia (Greene) Brummitt subsp. tenuefolia (Abrams) Brummitt. Buffer: 35 m, 10 Jun 1979, Moran 27623 (SD).

**CRASSULACEAE**

Crasula aquatica (L.) Schönland. Vernal pool. Mesa: 80 m, 1 Apr 1985, Thorne 38883 (RSA).
Dudleya cultrata Rose. Peninsula endemic. Mesa: 100 m, 9 Jun 1985, Faulkner s.n. (SD).
Dudleya engens Rose. Peninsula endemic. All areas: 5 m, 6 May 1979, Moran 27173 (SD).

**CUCURBITACEAE**


**ELATINACEAE**

Bergia texana (Hook.) Seub. ex Walp. Vernal pool. Mesa: 80 m, 12 Aug 1979, Moran 27949 (SD).
Elatine brachysperma A.Gray. Vernal pool. Mesa: 80 m, 1 Apr 1985, Thorne 58882 (RSA).

**ERICACEAE**

Xylococcus bicolor Nutt. Mesa & Buffer: 50 m, 10 Jun 1979, Moran 27636 (SD).

**EUPHORBIACEAE**

Chamaesyce polyacarpa (Benth.) Millsp. Footprint & Buffer: 75 m, 29 May 1976, Moran 23290 (SD).
Euphorbia miserx Benth. CNPS list 2.2. All areas: 19 Mar 1992, Rebman 1333 (RSA).
Euphorbia spatulata Lam. Buffer: 110 m, 25 Mar 1979, Moran 26825 (SD).

**FABACEAE**

*Acacia farnesiana* (L.) Wild. Synonyms: Acacia farnesiana subsp. minuta; Acacia minuta. Buffer: 60 m, 1 Jul 1972, Moran 19167 (SD).
Astragalus didymocarpus Hook. & Arn. var. didymocarpus. Footprint: 50 m, 10 May 1978, Moran 25850 (RSA).
Astragalus gambelianus E.Sheld. Mesa: 80 m, 1 Apr 1985, Thorne 58876 (RSA).
Astragalus trichopodus (Nutt.) A.Gray var. longus (M.E.Jones) Barneby. Mesa & Buffer: 7 Apr 1994, Rehman 2526 (SD).
Dalea bicolor Humb. & Bonpl. ex Wild. var. occidentalis Barneby. Peninsula endemic. Buffer: 90 m, 1 Jun 1980, Moran 20663 (SD).
Lupinus concinns J.Agardh. Synonyms: Lupinus pallidus; Lupinus concinns var. pallidus. Mesa: 5 m, 1 Jun 1980, Moran 26848 (SD).
Lupinus hirsutissimus Benth. Buffer: 185 m, 30 Mar 1985, Sanders 5610 (UCR).
Lupinus sparsiflorus Benth. Buffer: 185 m, 30 Mar 1985, Sanders 5605 (UCR).
Lupinus truncatus Nutt. ex Hook. & Arn. All areas: 350 m, 15 Feb 1988, Sanders 7663 (SD).
*Mecsequum polymorpha L. Buffer: 5 m, 4 Mar 1979, Moran 26574 (SD).
*Mellotus indicus (L.) All. Buffer: 80 m, 10 May 1978, Moran 25815 (RSA).
Parkersonia aculeata L. Buffer: 17 Dec 1953, Harbison s.n. (SD).
Trifolium gracilellum Torr. & A.Gray. Buffer: 80 m, 10 May 1978, Moran 25828 (SD).
Vicia hissei S.Watson. Mesa & Buffer: 60 m, 4 Apr 1982, Moran 30221 (SD).
Vicia ludoviciana Nutt. ex Torr. & A.Gray. Buffer: 120 m, 6 May 1979, Moran 27184 (SD).

Fagaceae

Quercus dumosa Nutt. CNPS list 1B.1. Mesa: 150 m, 16 Jun 1967, Moran 14051 (SD).

Frankeniaceae

Frankenia salina (Molina) L.M.Johnst. Synonym: Frankenia grandifolia, Frankenia grandifolia var. campestris. All areas: 5 m, 1 Jun 1980, Moran 28660 (SD).

Gentianaceae

MALVAEAE

Fremontodendron mexicanum Davidson. Near-state endemic; CNPS list 1B.1; FE; CaR. Buffer: 5 Apr 1931, Wiggins 5184 (POM).


Sphaeralcea fulva Greene. Peninsula endemic. Footprint & Mesa: 5 m, 1 Jun 1980, Moran 28657 (RSA).

MYRINGACEAE


NYCTAGINACEAE

Abraison maritima S.Watson var. maritima. CNPS list 4.2. Mesa: 5 m, 3 Jun 1979, Moran 27589 (SD).

Abraison umbellata Lam. var. umbellata. Mesa: 27 Jul 1955, Chambers 703 (SD).


OLEACEAE


ONAGRACAE


Camissonia lewisi P.H.Raven. CNPS list 3. All areas: 1 m, 27 Mar 1988, Pitzer 720 (SD).


Eplorium canum (Greene) P.H.Raven. Buffer: 30 m, 15 Jun 1976, Moran 23535 (SD).


OROBANCHACEAE


Corydallanthus maritimus Benth. subsp. maritimus. CNPS list 1B.2; FE; CaE. Footprint: 4 Jun 1973, Johnston JV24 (SD).


Orobanche californica Cham. & Schltdl. Buffer: 70 m, 5 Sep 1978, Moran 26253 (SD).

Orobanche parishii (Jeps.) Heckard subsp. brachyloba Heckard. CNPS list 4.2. Buffer: 50 m, 5 May 1979, Moran 27165 (SD).

OXALIDACEAE


PAPAYRACEAE


Stylomecon heterophylla (Benth.) G.Taylor. Synonyms: Meconopsis heterophylla, Papaver heterophyllum. Buffer: 60 m, 4 Apr 1982, Moran 30227 (SD).

PHYRACEAE

Mimulus aurantiacus Curtis var. punicus (Nutt.) D.M.Thomps. Synonym: Mimulus punicus. Buffer: 35 m, 10 Jun 1979, Moran 27628 (SD).

Mimulus brevipes Benth. Buffer: 225 m, 12 May 1978, Moran 26005 (SD).


Mimulus plosus (Benth.) S.Watson. Footprint & Mesa: 25 m, 3 Jun 1979, Moran 27560 (SD).

PLANTAGINACEAE


Linaria canadensis (L.) Chaz. Footprint & Mesa: 100 m, 6 Apr 1991, Boyd 6020 (RSA).


Plantago ovata Forsk. Buffer: 5 m, 4 Mar 1979, Moran 26563 (SD).


PLUMBAGINACEAE

Limonium californicum (Boiss.) A.Heller. Buffer: 50 m, 25 Apr 1984, Thorne 58132 (RSA).
POLEMONIACEAE

ERISTERUM FILIFOLIUM (Nutt.) Wooton & Standl. Mesa & Buffer: 60 m, 4 Apr 1982, Moran 50243 (SD).

GILIA ANGELENSIS V.E.Grant. Buffer: 12 May 1979, Moran 26003 (SD).

LEPTOSIPHON PAVIFOLIUS Benth. Synonym: Linanthus pavifolius. Buffer: 60 m, 4 Apr 1982, Moran 50224 (SD).


LINANTHUS DIANTHIFLORUS (Benth.) Greene. Mesa & Buffer: 50–70 m, 1 Apr 1985, Thorne 58840 (RSA).


NAVARETTA HAMATA Greene subsp. leptantha (Greene) H.Mason. All areas: 5 Jun 1988, Boyd 2396 (RSA).


POLYGONACEAE

CHORIZANTHE FIMBRITA Nutt. var. fimbriata. Footprint & Mesa: 105 m, 24 Mar 1988, Reveal 6768 (CAS).

CHORIZANTHE INEQUIALIS Stokes. Peninsula endemic. Footprint & Mesa: 25 m, 3 Jun 1979, Moran 27566 (SD).

CHORIZANTHE INTERPOSITA Goodman. Peninsula endemic. Mesa & Buffer: 75 m, 19 May 1975, Moran 22010 (CAS).

CHORIZANTHE PROCBEMBS Nutt. Mesa & Buffer: 90 m, 24 May 1980, Moran 28641 (SD).

ERIOGONUM DAVIDSONI Greene. Buffer: 80 m, 3 Jul 1982, Moran 30999 (SD).


ERIOGONUM GRACILE Bentham. Synonym: Eriogonum vinivenum subsp. gracile. Buffer: 100 m, 4 Sep 1976, Latting s.n. (UCR).


HARFORDIA MACROPTERA (Benth.) Greene & Party var. galoides (Greene) Reveal. Peninsula endemic. Mesa & Buffer: 50–70 m, 1 Apr 1985, Thorne 58817 (RSA).


NEMACAULIS DENUDATA Nutt. var. graciosus Goodman & L.D.Benson. CNPS list 2.2. Mesa: 15 Apr 1925, Jones s.n. (POM).

PETROSTEGIA DRYMAROIDES Fisch. & C.A.Mey. Buffer: 5 m, 4 Mar 1979, Moran 26568 (SD).

*RUMEX CRISPUS L. Buffer: 100 m, 6 May 1979, Moran 27178 (SD).

RUMEX SALICIFOLIUS Weinn. Buffer: 30 m, 15 Jun 1976, Moran 23538 (SD).

PORTULACACEAE


RANUNCULACEAE

CLEMATIS PAUCIFLORA Nutt. Mesa & Buffer: 20 m, 4 Mar 1979, Moran 26582 (SD).

DELPHINIUM CARDINALE Hook. Footprint: 11 May 1941, Cronemiller 3019 (RSA).

DELPHINIUM PARRYI A.Gray. Mesa & Buffer: 50–70 m, 1 Apr 1985, Thorne 58844 (RSA).

MYOSURUS MINIMUS L. subsp. APUS (Greene) G.R.Campb. Vernal pool; CNPS list 3.1. Mesa: 80 m, 1 Apr 1985, Thorne 58885 (RSA).

MYOSURUS MINIMUS L. var. FILIFORMIS Greene. Vernal pool. Footprint & Mesa: 50–70 m, 1 Apr 1985, Thorne 58826 (RSA).

RESEDAEAE


RHAMNACEAE


APRANES OCCIDENTALIS (Nutt.) Rydb. Buffer: 60 m, 4 Apr 1982, Moran 30211 (SD).


ROSAMINIFOLIA Engelme. Near-state endemic; CNPS list 2.1; CaE. All areas: 19 Jun 1985, Thorne 60772 (RSA).

RUBIACEAE

GALIUM ANGSTOFIOLIUM A.Gray subsp. ANGSTOFIOLIUM. Buffer: 11 Apr 1936, Epling s.n. (DS).

GALIUM APARINE L. Buffer: 60 m, 4 Apr 1982, Moran 50213 (SD).

GALIUM NUTTALLII A.Gray subsp. NUTTALLII. Buffer: 30 m, 15 Jun 1976, Moran 23551 (SD).

RUTACEAE


SALICACEAE

POLIPUS FREMONTII S.Watson subsp. FREMONTII. Mesa: 30 m, 15 Jun 1976, Moran 23561 (SD).


SAPINDACEAE

AESCHYNOLCUS PARRYI A.Gray. Peninsula endemic. All areas: 30 m, 5 Jun 1984, Dove 457 (SD).

SAXIFRAGACEAE


LITHOPSIRAGMA AFFINE A.Gray. Buffer: 80 m, 25 Mar 1979, Moran 26812 (SD).
**Simmondsiaceae**


**Solanaceae**


**Tamaricaceae**


**Urticaceae**


**Verbenaee**


*Verbena menthifolia* Benth. Mesa & Buffer: 50–70 m, 1 Apr 1985, *Thorne 58841* (RSA).

**Viscaceae**