

## THE FLORA OF GREATER SAN QUINTÍN, BAJA CALIFORNIA, MEXICO (2005–2010)

SULA E. VANDERPLANK

*Rancho Santa Ana Botanic Garden, 1500 North College Avenue, Claremont, California 91711-3157, USA*

### ABSTRACT

The plants of San Quintín (Baja California, Mexico) were documented through intensive fieldwork and collection of herbarium specimens to create a checklist of species. The region is located near the southernmost extent of the California Floristic Province, and the flora is influenced by the adjacent desert to the south. A total of 435 plant taxa were documented, of which 82% are native plants. Almost one in three native plant taxa in Greater San Quintín is a sensitive species, here documented as rare and/or locally endemic, and many taxa have yet to be evaluated fully for rarity and threats. Four major habitats were identified, and a checklist is presented for each. Shell middens and vernal pools represent micro-habitats with unique species that also warrant conservation consideration. All habitats in Greater San Quintín are threatened by human activity, and agricultural water use practices are unsustainable. There is a pressing need for conservation of the natural areas that remain in this unique but heavily impacted region. The El Socorro Dunes and the volcanic bay are of particular conservation value with several narrowly endemic taxa. As a transitional area in a global biodiversity hotspot, Greater San Quintín is home to many species on the edge of their ranges and may be of critical importance to biodiversity conservation in a changing climate.

### RESUMEN

Se documentó la presencia de las plantas que se encuentran en San Quintín (Baja California, México) a través de trabajo de campo intensivo y la colecta de especímenes de herbario, con el objeto de generar un listado de especies de la zona. La región se encuentra cercana al límite sur de la Provincia Florística de California y la flora está influenciada por el desierto que se encuentra en su parte meridional. En total, 435 taxa fueron documentados, de los cuales 82% son plantas nativas. Alrededor de una de cada tres plantas nativas en San Quintín y sus áreas adyacentes es una especie sensible, documentada en este estudio como rara y/o endémica localmente, pero aún quedan por evaluar la rareza y el estado de conservación de varios taxa. Se identificaron cuatro hábitats principales y se presenta un listado florístico para cada uno. Los concheros y las charcas temporales representan microhábitats con especies únicas que también merecen ser consideradas para efectos de conservación. Todos los hábitats de San Quintín y sus áreas adyacentes se encuentran amenazados por actividades humanas y el uso del agua para la agricultura no es sustentable. Existe una necesidad urgente de conservar las áreas naturales que quedan en esta región, que aunque es única ha sido fuertemente impactada. Las dunas de El Socorro y la zona de la bahía volcánica tienen un valor particular de conservación, ya que poseen muchos taxones endémicos a áreas muy restringidas. Al ser una área de transición en un “hotspot” de biodiversidad, la zona de San Quintín y sus alrededores es el hogar de poblaciones de muchas especies que se hallan en el límite de sus rangos de distribución, situación que puede jugar un papel crítico en la conservación de la biodiversidad en un clima cambiante.

### INTRODUCTION

This research grew out of a visit to Baja California, the first night of which was spent in the volcanic bay of San Quintín. In the morning, despite very little sleep owing to the thick coastal fog that soaked my sleeping bag, I woke to find myself surrounded by succulents growing from crevices in the mounds of lava rock that surrounded our campsite. My companions and I climbed the largest cindercone and spent the entire day on just one side of that cone, collecting specimens of more than 120 taxa before climbing back down in the dark. The large number of locally endemic plant taxa made the identifications challenging, but the mix of California plants and succulents was so intriguing that I was determined to document the flora and understand its origins. This project became my master's thesis and this publication.

This study is focused on the area between parallels 30 and 31 on the Pacific coast of Baja California, Mexico, here referred to as “Greater San Quintín” (Fig. 1). Greater San Quintín lies

near the southern end of the California Floristic Province (CFP), a rich floristic region that is also one of the most critically endangered ecosystems on Earth. The CFP has been recognized as a global biodiversity hotspot (Myers et al. 2000). Such hotspots are defined by the presence of more than 1500 endemic plant species in an area that has lost at least 70% of original habitat (Myers et al. 2000). The CFP is mostly in the United States, from southern Oregon through California including the Pacific drainages, but extends south to near El Rosario, Baja California, Mexico (Howell 1957; Raven and Axelrod 1978; Thorne 1993; Peinado et al. 1994). The distribution of the CFP essentially coincides with the presence of winter-spring rainfall and the absence of summer rainfall (Minnich and Franco-Vizcaino 1998; Caso et al. 2007). CFP vegetation once occupied 324,000 hectares of land; today, however, only 80,000 hectares (less than 25%) remain naturally vegetated (Myers et al. 2000). The CFP is home to an estimated 4426 native plant species, of which ca. 2125 are endemic within it (Myers et al. 2000; Brooks et al. 2002).

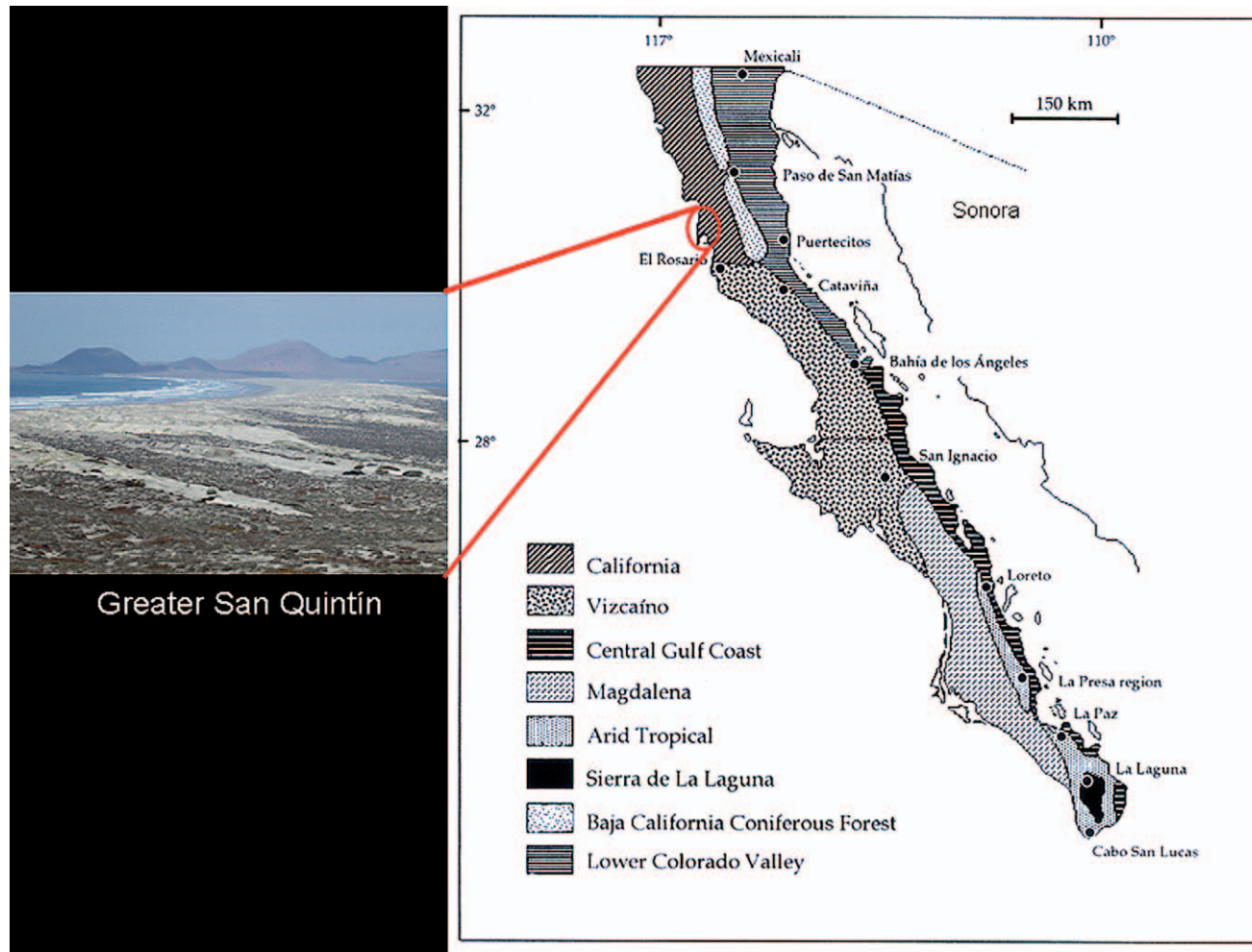


Fig. 1. Baja California peninsula showing the geographic and floristic position of Greater San Quintín near the southern end of the California Floristic Province and just north of the Vizcaíno desert; modified from Cartron et al. (2005). Inset photo of Greater San Quintín taken from the tip of Monte Mazo looking north.

Almost 50% (1031) of the endemics are threatened with extinction or have already become extinct (Brooks et al. 2002).

The southern limit of the CFP has been the subject of debate for decades. Rather than being a sharp transition, there is a gradual transition that begins near the US/Mexico border. The southern limit of the CFP in Baja California is related to water availability (Shreve 1936). Winter rainfall decreases rapidly at around 32° latitude (Caso et al. 2007); however, CFP vegetation continues to occur where coastal fog augments water availability (and in disjunct higher-elevation “sky islands” further south on the peninsula). Fog moisture extends CFP vegetation into areas with relatively low winter rainfall where desert vegetation would otherwise occur. The southern boundary of the CFP is often placed near the 30<sup>th</sup> parallel where large columnar succulents such as *Pachycereus pringlei* and *Fouquieria columnaris* begin to appear; however, even farther northward the vegetation begins to transition from that typical of the CFP to include a greater representation of succulents. The vegetation in northwestern Baja California is thus highly heterogeneous and includes many putatively relictual species and plant associations (Shreve 1936; Peinado et al. 1995a). The coastal

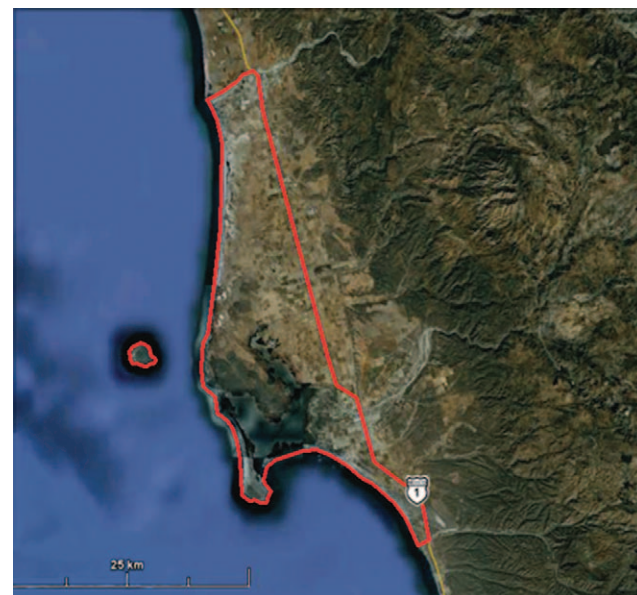


Fig. 2. The area of Greater San Quintín is outlined, delineated by the Rio Santo Domingo in the north, the Arroyo El Socorro in the south, and the Transpeninsular Highway in the east.

strip from 32° latitude southward to 29.5° has been shown to be an area of high endemism (i.e., high richness of endemic species) within the peninsula of Baja California, harboring at least 106 endemic plant taxa, as well as several near-endemic taxa (Riemann and Ezcurra 2007).

In light of this vegetation heterogeneity, there have been multiple attempts to characterize and name the coastal scrub habitat of northwestern Baja California: Thorne (1976) designated it as maritime desert scrub; Heady et al. (1977) and Mooney (1977) called it succulent scrub; Kirkpatrick and Hutchinson (1977) and Axelrod (1978) identified the region as Diegan coastal sage vegetation; and Delgadillo (1998) referred to it as coastal succulent scrub. Most recently this habitat has been referred to as maritime succulent scrub (Minnich and Franco-Vizcaíno 1998; Barbour et al. 2007; Rundel 2007; Harper et al. 2010).

Phytosociological studies have shown diverse shrub associations in northwestern Baja California (as in other Mediterranean climate regions). The climate gradient from north to south correlates with increased diversity (both for endemic species and for vegetation types) as aridity increases (Peinado et al. 1995a). The area between parallels 30 and 31 appears to be an ecoclimatic transitional zone between Mediterranean climate to the north and tropical desert to the south (Peinado et al. 1995a). This transitional zone has the greatest floristic diversity, and vegetation associations recorded here have the highest endemic community values (i.e., greatest densities of narrowly endemic taxa) when compared to regions to the north and south (Peinado et al. 1995a).

The flora of Greater San Quintín is thus of special interest because it occupies the transitional zone from Mediterranean to desert vegetation. The volcanic field and vast salt marshes found here have long attracted botanists to the region; however, the area is today better known as an agricultural valley, and the flora of the region is being heavily impacted. The goals of this study were to catalog and voucher the plants of Greater San Quintín to produce an annotated checklist of the area's plants, to assess the status of the vegetation and current threats to the flora, and to document the rare and endemic plants of the region.

#### BACKGROUND

##### *Physical Setting*

The Sierra de San Pedro Mártir trends north-south, forming the backbone of the northern portion of the Baja California peninsula; with elevations exceeding 3000 m, it is the highest mountain range in Baja California (Delgadillo-Rodríguez 2004). Greater San Quintín is located on the Pacific coastal plain to the west of the Sierra de San Pedro Mártir (Cartron et al. 2005). Three major drainages from the mountains reach the Pacific Ocean within the boundary of the study area. Greater San Quintín (Fig. 2) embraces ca. 360 km<sup>2</sup>, including San Martín Island 5 km offshore. Greater San Quintín encompasses the San Quintín volcanic field with elevations to 260 m, a significant portion of the San Quintín agricultural valley, the town of San Quintín itself, about 200 km of coastline, including several linear km of stable dune systems, and a pristine wetland environment that is often used as a model for restoration (West 2000).

Geologically, Greater San Quintín is located in the central portion of the Pacific Coastal Lowlands Geomorphic Province 16 km southwest of the Santillán and Barrera Line, a major northwest trending tectonic boundary (Luhr et al. 1995). The volcanic field is one of only two sites presently known in the world where highly strained mantle xenoliths are found in alkali basalts, which have a high concentration of magnesium and iron (Cabanes and Mercier 1988, cited in Luhr et al. 1995).

The bay probably developed as a result of wave and tidal processes over the last 6000 years. Eight volcanic complexes are clustered in two geographically separated sets, and two cones are isolated from the others (San Martín Island and the tip of the peninsula known as Punto Mazo) (Fig. 3). An eleventh element is the 30 m sea cliff to the west of the northern group of cinder cones. All but two volcanoes have formal names (Comisión de Estudios del Territorio Nacional [CETENAL] 1976); the remaining two were informally named by Luhr et al. (1995) in honor of two pioneering geologists: A. O. Woodford who first studied the geology of the region in 1928, and A. R. Basu who conducted his research in the area during the 1970s. The three largest cones, Kenton, Ceniza, and Riveroll, are the oldest; the middle-age cones are Woodford, Basu, and Media Luna; and the youngest are Sudoeste, Vizcaíno, and Mazo (Luhr et al. 1995). San Martín Island is thought to also be one of the younger cones (Luhr et al. 1995). Eruptive activity at the San Quintín volcanic field probably continued into the Holocene period, and the youngest olivine-rich lavas erupted as recently as a few thousand years ago (Luhr et al. 1995). At present, the cones are surrounded by—and often covered with—recent aeolian sand deposits. Seven km east of the volcanic field is the prominent Santa María scarp along a NNW trend. This scarp is related to a marine terrace that is 40–80 m elevation above the gently sloping coastal plain (Gorsline and Stewart 1962).

Mean annual temperatures for the San Quintín coastal area are 60–65°F (Junak and Philbrick 1994). As is typical of Mediterranean climates, the winters are mild with infrequent frosts. There is a lengthy dry season between April and November, and the mean annual rainfall is ca. 105–137 mm (Junak and Philbrick 1994) with the majority falling during December, January, and February. Although rainfall is low for most of the year, Greater San Quintín experiences frequent heavy fogs that can occur at almost any time of year and are caused by the California Current off-shore (Herbert et al. 2001). The associated humidity provides significant extra water resources and apparently ideal conditions for lichen growth (Rundel et al. 1972).

Evidence from packrat middens, located 185 km south in Cataviña and beyond, indicates that the climate has changed significantly over the past 2000 years, and that a different plant community existed in the past (Wells 1976, 2000; Sankey et al. 2001; Rhode 2002). Fossil pollen records from northwestern Mexico indicate that climate variability was high during the late Holocene, and the rapid response of vegetation to paleoenvironmental change is evident (Ortegas-Rosas et al. 2008). Unfortunately, conditions in the vicinity of San Quintín do not appear to have been suitable for pack-rat midden preservation or lake sediments so there is a paucity of data on historical climate and vegetation in NW Baja California specifically.



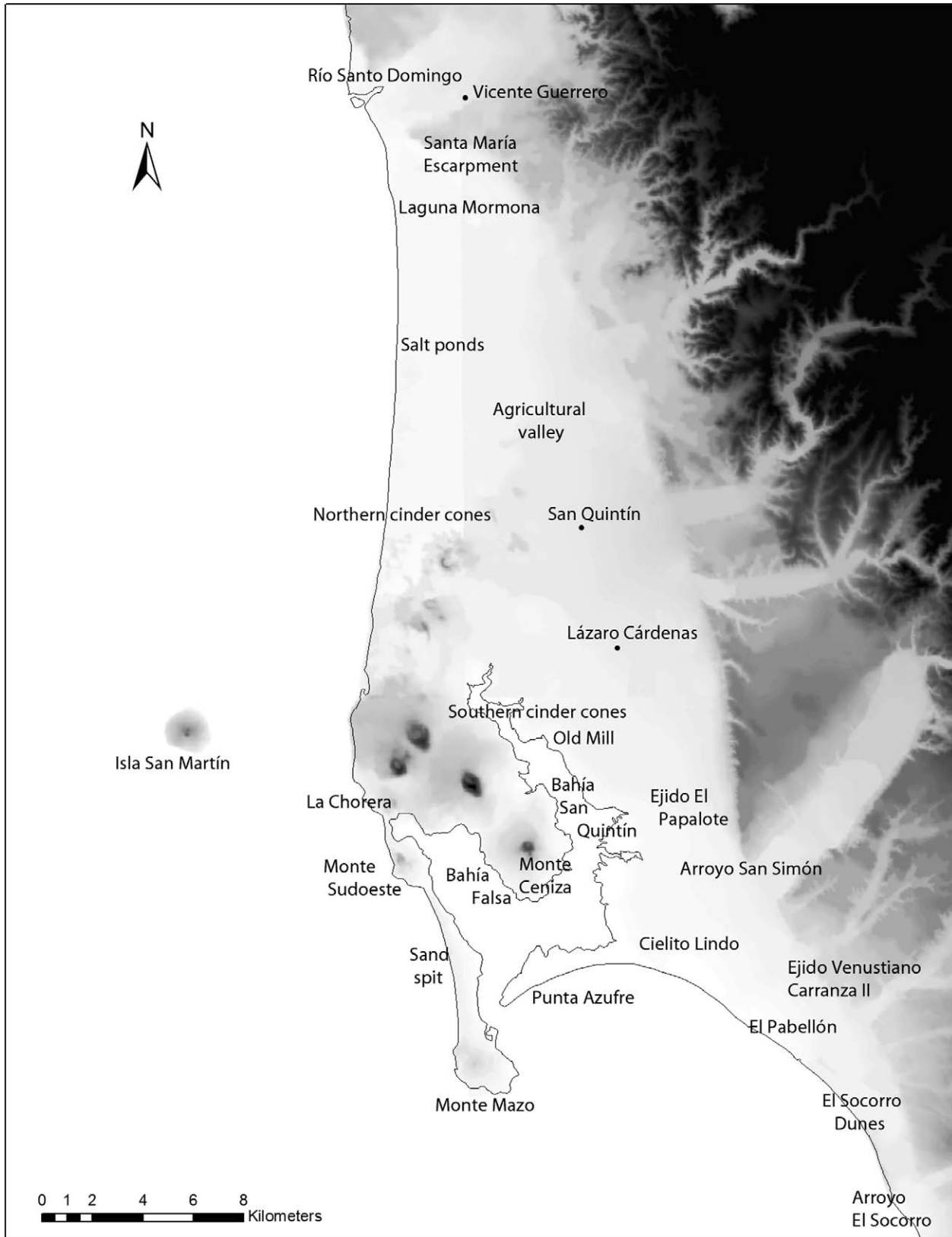


Fig. 3. Local place names and important physiographic points within Greater San Quintín.

### *History of the Area*

The indigenous people of Greater San Quintín were the Kiliwa. They inhabited a large area of the northern part of the peninsula, with a range that crossed the Sierra de San Pedro Mártir and included territory on both the Pacific and Gulf of California coasts. Their lifestyle relied heavily on coastal resources and plants of the maritime succulent scrub such as *Agave shawii* (Asparagaceae), which they used for food and fiber (Gentry 1978; Hodgson 2001). Much evidence remains of their impact on the landscape, including large shell middens that often support high cactus diversity.

Portuguese explorer Juan Rodríguez Cabrillo landed in San Quintín in 1542 and named it “Bahía de la Posesión” (Lazcano Sahagún 2004). When Franciscan missionaries came to San Diego in 1769, they began to build a road between the missions of San Diego, San Telmo, and San Fernando Velicata, and so the transpeninsular road began. In 1775, a mission was founded at Santo Domingo (10 km east of Greater San Quintín), which was accessed via the bay of San Quintín (Lazcano Sahagún 2004). In the middle of the 19<sup>th</sup> century only one wooden house was documented in the bay; salt was sold there, and it also served as an office for the seafood industry (Phelts-Ramos 2004). However, at the end of the 19<sup>th</sup> century, the Lower California Development Company, a British company affiliated with the Mexican Land and Colonization Company, colonized the lands of the bay and attempted to grow crops in the area. British, US, and Mexican citizens moved into the area, planting crops and constructing a small wharf. In 1891, operations began for a dam, irrigation works, and a flour mill on the inland side of the bay of San Quintín (Taylor 1996). The settlement was abandoned in 1917 because the English had failed to comply with the colonization law of 1883 (Phelts-Ramos 2004).

There were only four ranches in the San Quintín Valley before Mexican title 3050 was registered in 1947 (Ramírez Velarde 2004); this government decree granted certain agricultural lands in the valley to families from other regions of Mexico (González López 2004). Over the last few decades, San Quintín has been characterized as a refuge for immigrants from different states and, as new agricultural technology permitted longer growing seasons, many migrants settled in the area permanently (González López 2004). Today the area is home to an expanding agricultural zone producing strawberries, tomatoes, cut flowers, onions and other crops. The region is currently experiencing floristic changes owing partly to land use changes, and a number of agricultural weeds and plants escaping from cultivation are establishing themselves, with some spreading rapidly (Soto 1987).

In 1994, the North American Free Trade Agreement (NAFTA) reduced restrictions on trans-border commerce. This led to international interest in Baja California for large-scale agricultural and industrial projects, notably including those that cannot be easily developed in the US due to environmentally-based legal restrictions (Dedina 2007). At the beginning of the 21<sup>st</sup> century there was a boom of land purchases in Baja California, with a “frenzy” of coastal development (Dedina 2007). Baja California officials have been quoted as saying that because there are “many, many problems at the border, we want to reorient growth to the south and take advantage of the natural resources between Ensenada and San Quintín” (Lindquist 2006).

San Quintín itself is one of a series of rapidly expanding agricultural towns along the Transpeninsular Highway. The town is currently home to ca. 50,000 people, and the colonies to the north and south (Lazaro Cárdenas and Vicente Guerrero, respectively; Fig. 3) are also growing rapidly with the regional agricultural expansion. Consequently, the biological diversity (flora, fauna, and vegetation) and landscape (the adjacent coastal ecosystems, volcanic cones, and riparian areas) are under severe pressure from development and agricultural expansion (Fig. 4).

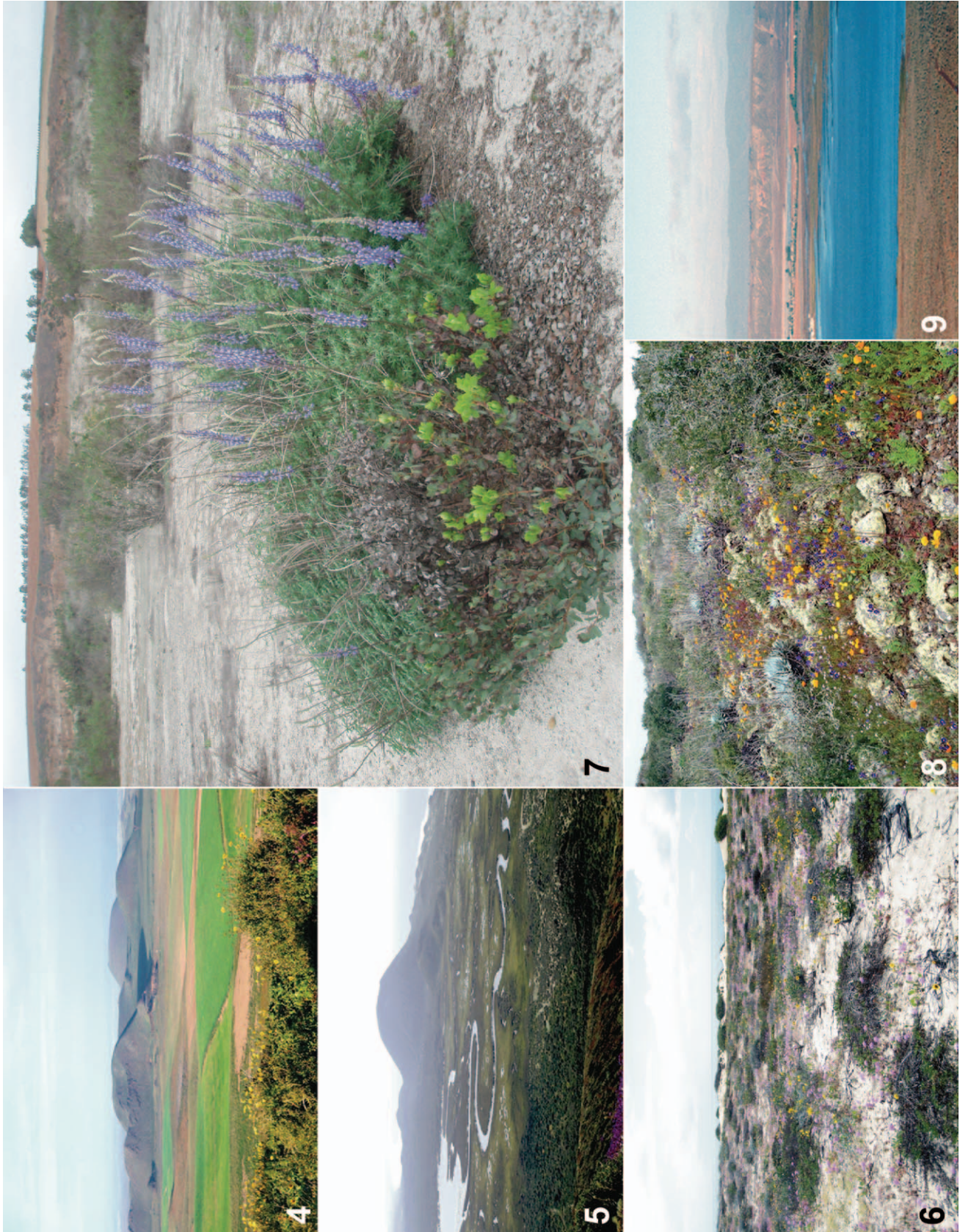
### *Conservation Status*

The peninsula of Baja California is often considered to be well protected in light of the large conservation area “Valle de Los Cirios” in the central desert. It is important to note that this protected area preserves only one of the many vegetation types on the peninsula (Riemann and Ezcurra 2007), and the percentage of land already protected is a poor indicator of conservation needs in the surrounding areas (Rodríguez et al. 2004). The coastal corridor of CFP in Baja California is facing the greatest development and urbanization pressures in the state (Riemann and Ezcurra 2007). Despite the high endemism and level of conservation priority indicated by Riemann and Ezcurra (2007), there is currently no legal protection for any of the coastal lands in the CFP of Baja California other than that provided by ZOFEMAT (Zona Federal Marítimo Terrestre) concessions, which control land use of the tidal zone around the entire coast of Mexico (Riemann and Ezcurra 2005).

In addition to agriculture and urbanization, the area is home to the largest oyster farm in Baja California and to economic activities as diverse as salt ponds, fishing, tourism, and off-road vehicular activity. There are numerous examples of active natural resource harvesting in the area that may exceed ecologically sustainable levels, including harvesting of beach rocks, gravel extraction from rivers, mining of volcanic rock, and salt harvesting in saline flats. Current threats to the flora of Greater San Quintín include agriculture, mining, trash dumping, cattle grazing, recreational off-road vehicle use, invasive species, urban development, and vegetation clearing for future development. A significant new impact may be a lowered water table as a result of water extraction for irrigated agriculture. Despite these impacts, Greater San Quintín supports several fragile ecosystems that are globally scarce. Some of these ecosystems are still comparatively intact and pristine, especially as one moves further from populated areas.

At this time (2010), Greater San Quintín is under consideration for declaration as a natural protected area or “Área Natural Protegida (ANP).” Preliminary results reported in the Conservation Plan for San Quintín produced by the Nature Conservancy of Baja California (unpublished, available from the Rancho Santa Ana Botanic Garden library) have led to the identification of four distinct terrestrial habitats in need of conservation: salt marsh (Fig. 5), dunes and beaches (Fig. 6), rivers and riparian areas (Fig. 7), and maritime succulent scrub (Fig. 8). (Note that the areas identified as rivers and riparian habitat are most often dry washes with sandy substrates.) Vernal wetlands (Fig. 9) and shell middens are also well defined habitats. There are many sub-habitats that can be identified on differing scales in association with dominant vegetation and/or soil type; however, these four







broad habitats are easily distinguished visually, and each includes many plant species. The vegetation has been similarly categorized by the Instituto Nacional de Estadística y Geografía, México (INEGI), although INEGI distinguishes upper salt flats from inundated marshes (Fig. 10).

#### *Previous Biological Studies*

The area has drawn considerable attention from biologists and there have been a number of studies of the biological diversity in the vicinity of Greater San Quintín including marine algae (Aguilar-Rosas and López-Carrillo 2005; Quiróz-Vásquez 2005), lichens (Rundel et al. 1972), birds (Palacios and Mellink 2000; Ruiz-Campos et al. 2005), and mammals (Schultz et al. 1970; Sprague et al. 1978; Best 1983). The area was home to a narrowly endemic kangaroo rat, *Dipodomys gravipes*, which was apparently recently driven to extinction by agricultural development (Best 1983). Greater San Quintín is home to a large colony of Black Brant geese, which are dependent on the eelgrass of the shallow bays as a food source (West 2000) and which are currently the subject of a local biodiversity pride campaign organized by Audubon RARE ([www.rareconservation.org](http://www.rareconservation.org)).

Several renowned botanists of the arid southwest visited Greater San Quintín. Ease of access to the area allowed many natural historians to visit the riparian drainages and the volcanic bay. Listing all botanists who have spent time in Greater San Quintín is beyond the scope of this publication; however, it is interesting to note some of the earliest. Perhaps the earliest visitation was by the Longinos expedition (José Longinos Martínez, 1790–1792) that passed through Santa María (which may have been slightly east of Greater San Quintín). The British expedition on HMS Sulphur enabled botanist Richard Brinsley Hinds to visit San Quintín bay in 1839. It is possible that he collected living material of cacti in the area, but no herbarium specimens were made (Lindsay 1955). Edward L. Greene visited the area in 1885, and Edward Palmer spent time in the volcanic bay in 1889; the locality appears on Palmer's labels as San Quentin bay (McVaugh 1956; Beaty 1964). Alfred Anthony was on the schooner Wahlberg with Townsend S. Brandegee in 1889 when they stopped at San Martín Island and collected what was subsequently described as *Dudleya anthonyi* (Anthony made an earlier visit to the island without collecting specimens). In 1889, he documented many other plants, totaling ca. 300 individual specimens that were later offered for sale (Junak and Philbrick 1994). The island was revisited on the 1905–1906 voyage of Nelson and Goldman. Charles Russell Orcutt visited San Quintín in 1919 and made a small number of collections (DuShane 1971). Marcus E. Jones visited the area several times on collecting trips between 1923–1925 (Lenz 1986), and Ira

Wiggins made collections in Greater San Quintín from 1930 until 1962.

One of the popular sites for setting up field camps along the peninsular route was Hamilton Ranch. Although beyond the bounds of Greater San Quintín as defined here (it is farther east on the banks of the Río Santo Domingo), many visitors who made camp there visited and made collections in adjacent areas including Greater San Quintín. Unfortunately, due to the lack of precision in field notebooks and on specimen labels from that era, it is not always possible to ascertain whether these botanists were within Greater San Quintín. Forrest Shreve must have passed through the area on his trip of 1936, although he does not appear to have made any collections. More recently (1958–1980), Reid Moran of San Diego Natural History Museum made many visits to the region and added a significant number of collections. In the last three decades numerous botanists have added occasional collections to the rich botanical specimen record of Greater San Quintín.

In addition to the work of numerous botanists and their legacy of herbarium specimen data, the current study benefits greatly from several prior published works on the plants of this region. These include a checklist of vascular plants (Thorne 1989), studies of San Martín Island (Thorne and Junak 1989; Junak and Philbrick 1994; Vanderplank and Mata 2010a), notes on some of California's rare plants in the region (Vanderplank 2011), studies of the coastal dunes (Johnson 1977), and descriptions of the vernal pools in the region (Moran 1981). The pristine marsh habitats have been studied extensively by scientists on both sides of the border (Neuenschwander et al. 1979; Delgadillo et al. 1992; James and Zedler 2000; Zedler et al. 2001; Keer and Zedler 2002; Morzaria-Luna et al. 2004; Ruiz-Campos et al. 2005), notably by US scientists as model systems for restoration efforts in California (West 2004).

Prior to the present study, two species had been documented as endemic to Greater San Quintín. *Dudleya anthonyi* Rose (Crassulaceae) is endemic to the volcanic rocks of the San Quintín cinder cones (Thomson 1993) and *Chenopodium flabellifolium* Standley (Amaranthaceae) is known only from San Martín Island (Crawford and Evans 1978; Junak and Philbrick 1994).

As part of a study of vegetation associations in the broader region, Peinado et al. (1995a,b) mention several plant associations of particularly high endemic community value. Notable among those in the maritime succulent scrub of Greater San Quintín are the *Rosa minutifolia-Aesculus parryi* association of wetter environments and the *Bergerocactus emoryi-Agave shawii* associations of drier zones (a tropical desert vegetation association that has penetrated the Mediterranean climate) (Peinado et al. 1995b). That these two associations occur in relative proximity is apparently due to

← Fig. 4–9. Habitats of the Greater San Quintín area.—4. Agriculture has fragmented the natural habitats of Greater San Quintín, and large swaths of level land are in cultivation. Shown here is the view from the northern cones, looking south across a patchwork of agricultural fields (*Encelia californica* in foreground).—5. Salt marsh vegetation of Greater San Quintín (image taken east of Monte Sudoeste near the village of La Chorera). Some maritime succulent scrub with *Phacelia parryi* is seen in the foreground.—6. Vegetation of dunes at El Socorro (near Palo Seco). *Helianthus niveus*, *Isocoma menziesii*, and *Abronia umbellata* are visible in the foreground.—7. Riparian vegetation in Arroyo Santo Domingo. *Lupinus* cf. *longifolius* can be seen in the foreground.—8. Maritime succulent scrub vegetation in Greater San Quintín. Rosettes of *Dudleya anthonyi* can be seen, surrounded by *Eschscholzia californica* and *Phacelia parryi*.—9. Image from the summit of Monte Ceniza showing inundated areas east of Bahía San Quintín. Ejido El Papalote and area previously documented to have many vernal pools is behind the bay in the foreground (photo taken 23 Jan 2010 by Sergio Mata; all other photos by author).

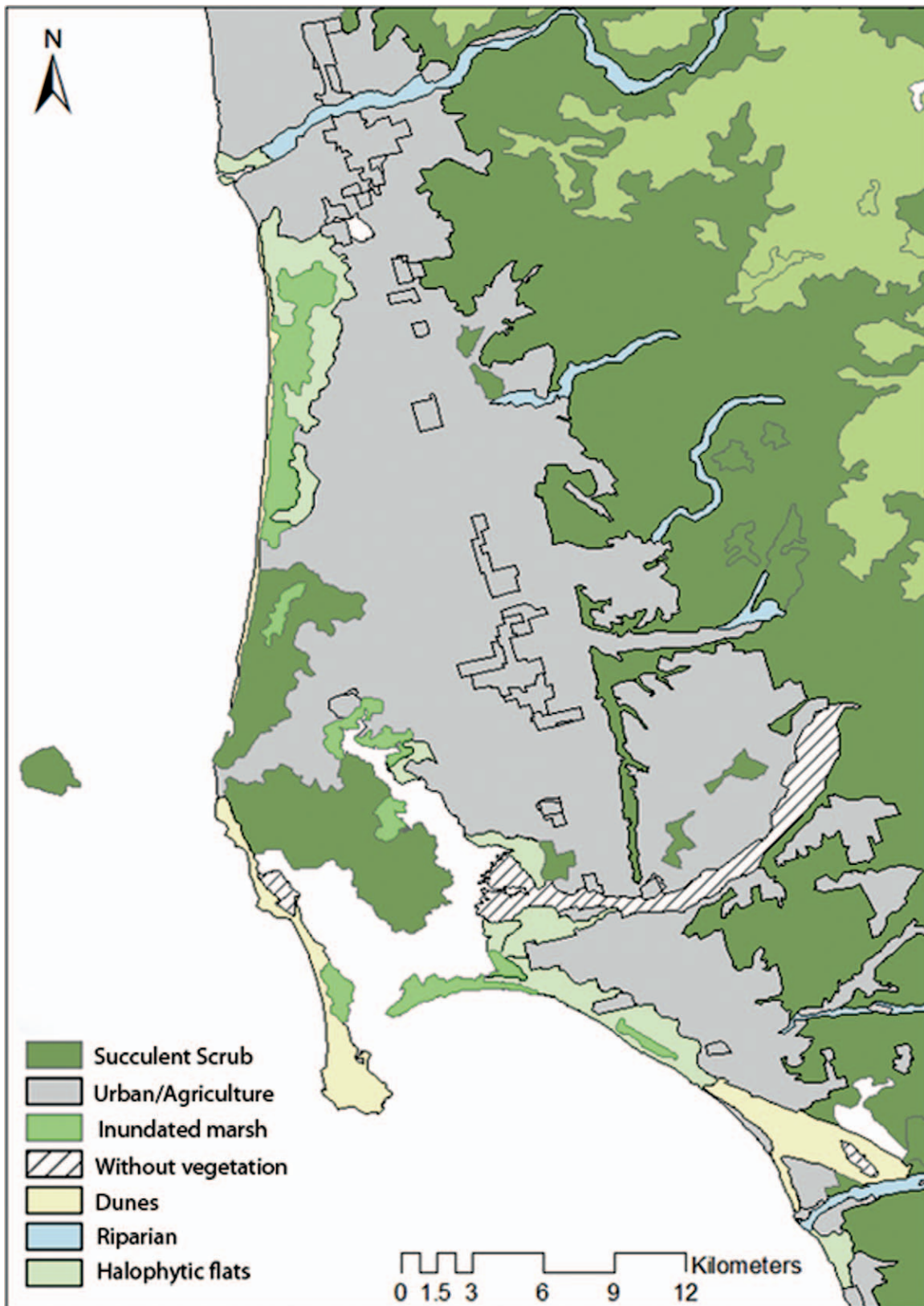


Fig. 10. Vegetation map of Greater San Quintín modified from Geographic Information System layers provided by INEGI.



patterns retained from the late Wisconsin glacial period when woodland occurred as much as 1200 m lower than it does today. During this time period, desert vegetation was restricted to the driest rocky areas and steep southern slopes (Peinado et al. 1995a). Other associations of high endemic community value are the *Ephedra californica-Lycium brevipes* association of coastal dunes with salt spray influence and the *Atriplex julacea-Frankenia palmeri* association in places where sodium carbonate has formed through the alkalization of saline soils (Peinado et al. 1995a).

#### Present Study

As described above, the goal of this study was to provide a description and analysis of the complete flora of the region from 2005 to 2010. Floristic information, in the form of documentation via specimens of the naturally occurring plants and abundance data, is critical to our understanding of plant distributions and biogeography. It also provides information relevant to taxonomic, ecological, and vegetation research, and for study of broader patterns of interactions. These data are crucial to making sound conservation and management decisions.

#### METHODS

##### Documenting the Flora

The primary goal of this study was to document the present-day flora of San Quintín for comparison with historical records and to serve as a baseline to assess potential future changes in the flora. To accomplish this goal, extensive collections were made during every calendar month. Thirty-five visits (varying from part of a day to a full week) were made to the region between 2005 and 2010, for a total of 75 days spent in the field. Every square km of the region that was not enclosed private land was visited. The annotated checklist does not include taxa for which there are historical collections but that were not encountered during the timeframe of this study. This approach allows the present checklist to be compared to prior and future collections to track changes through time.

Each vascular plant taxon encountered in the study area was vouchered by herbarium specimens. The first set of specimens was deposited at Rancho Santa Ana Botanic Garden (RSA), with duplicates to Universidad Autónoma de Baja California (BCMEX) and San Diego Natural History Museum (SD) whenever possible. Likewise, as possible, Santa Barbara Botanic Garden (SBBG) received duplicates of specimens of plants from San Martín Island, and Centro de Investigaciones Biológicas del Noroeste (HCIB) received duplicates of plants from the mainland. More than 1600 collections were made and identified using extensive literature sources as well as the herbaria of RSA and SD. The resources of the www.BajaFlora.org website of San Diego Natural History Museum were invaluable, particularly for the identification of rare and endemic taxa. In the author's opinion the taxonomy used here reflects the most appropriate system for the plants of this region and is largely based on the *Flora of North America* (FNA 1993+) and *The Jepson Manual* (Hickman 1993). For taxa that were not included in these works (e.g., narrow endemics), the *Flora of Baja California* (Wiggins 1980) and taxonomic monographs were also utilized. The taxonomy

Table 1. Numerical summary of the flora of San Quintín by composition, nativity, conservation status, and life form. "Sensitive" refers to taxa that are rare (as determined by B. O'Brien et al. in prep.) or endemic (i.e., endemic to the peninsula of Baja California or nearly endemic to the California Floristic Province of Baja California [may range 10 km north of the US/Mexico border or into the most northern desert ranges south of El Rosario]). Note that rare and endemic are not mutually exclusive categories (i.e., some taxa are both). Percentages are relative to the total flora with values relative to the native flora only in parentheses for sensitive, rare, and endemic taxa.

Taxa	Number of taxa	% of total flora (% of native flora)
Families	73	
Genera	270	
Species	427	
Species and infraspecific taxa	435	
Native	357	82
Non-native	78	18
Sensitive	124	29 (35)
Rare	108	25 (30)
Endemic	67	15 (19)
Annuals (including facultative annuals)	210	48
Aquatic perennial herbs	4	1
Geophytes	9	2
Perennial herbs (including suffruticose perennials)	117	27
Shrubs (including succulents)	90	21
Trees	5	1

includes selected subspecific taxa that are not recognized in recent treatments but are considered useful by the author. For plant family names, this manuscript follows the Angiosperm Phylogeny Group III (Stevens 2001 onwards).

For each taxon, habitat was recorded as one or more of the four major habitats in the Greater San Quintín area identified by The Nature Conservancy of Baja California (i.e., saltmarsh, dunes, maritime scrub, and riparian). These data enabled the creation of four nested checklists, one for each broad habitat type.

#### RESULTS

##### Additions to the Flora

The flora of San Quintín, as documented in the present study, includes 435 taxa (Table 1) vouchered by more than 1600 collections. Thorne (1989) listed 216 taxa for the area. The intensive collection efforts of the five years of this study have approximately doubled the number of taxa known from the region. After accounting for changes in nomenclature, Thorne's checklist included 35 taxa that were not encountered in the present study. Six were found to be misidentifications and were, in fact, taxa that are documented in this study. Therefore, the current study has added 248 taxa to the known flora of the region.

The largest family, Asteraceae, accounts for 16% of the flora (Table 2). Following Asteraceae, there are several families that each account for 5–8% of the flora. Of note are the high numbers of native species of Cactaceae, Boraginaceae, and Polygonaceae. There are a large number of Amaranthaceae;

Table 2. The ten largest native plant families in Greater San Quintín (family ranking including non-natives in parentheses). Data are number of native taxa (number including non-natives in parentheses) and percentage of the native flora (percentage including non-native taxa in parentheses).

Ten largest plant families	# of native taxa (# of total taxa)	% of native flora (% of total flora)
Asteraceae (1)	58 (67)	17 (16)
Fabaceae (3)	29 (33)	8 (8)
Boraginaceae (5)	27 (27)	8 (6)
Poaceae (2)	19 (35)	5 (8)
Amaranthaceae (4)	18 (29)	5 (7)
Cactaceae (7)	18 (19)	5 (4)
Polygonaceae (6)	18 (23)	5 (5)
Solanaceae (9)	12 (13)	3 (3)
Brassicaceae (8)	9 (18)	3 (4)
Plantaginaceae (10)	9 (9)	3 (2)

however, almost 50% are non-native. Poaceae are one of the largest plant families in the world and are so in Greater San Quintín when non-natives are considered. However, poorly developed soil, arid climate, and historical factors make Poaceae fourth among native taxa.

#### Range Extensions

Considerable range extensions were documented for three species in the present study:

*Ceanothus bolensis* (Rhamnaceae) is a narrow endemic previously known from Cerro Bola in the northern coastal ranges of the Sierra Juárez, the northernmost mountain range in Baja California. A sterile specimen from the San Quintín area is here tentatively identified as of this species. If confirmed with fertile specimens, this would represent a range extension of 180 km southward.

*Cheilanthes brandegeei* (Pteridaceae) is a desert fern endemic to the peninsula; its documentation for the San Quintín flora is a northward range extension of 85 km.

*Salvia brandegeei* (Lamiaceae) is a coastal chaparral species previously known from the Channel Islands and Colonet Mesa on the mainland; its discovery in the San Quintín area represents a southward range extension of 100 km (Vanderplank et al. 2009).

#### Narrowly Endemic Species

*Amsinckia inepta* (Boraginaceae) is reported from a few scattered localities outside Greater San Quintín, but all the sheets I have examined from outside the region have been misidentified. Further study is required to determine if this species is indeed endemic to the volcanic field of Greater San Quintín.

*Astragalus anemophilus* (Fabaceae) is nearly endemic to the dunes of Greater San Quintín, with one known vouchered occurrence outside the area, 20 km to the south on the dunes of El Consuelo.

*Chenopodium flabellifolium* (Chenopodiaceae) is a little-known herb endemic to San Martín Island. It occurs only on the southeastern portion of the island, representing a global

range of approximately one km<sup>2</sup> (Vanderplank and Mata 2010b).

*Chorizanthe* (Polygonaceae). With five species, Greater San Quintín may be a center of diversity for the genus. Notably, it lies in the center of the range of three species that are narrowly endemic to the Baja California peninsula (see checklist). Two of these, *C. chaetophora* and *C. inequalis*, each have a range that spans less than 120 km of the peninsula.

*Cryptantha pondii* (Boraginaceae) is endemic to Baja California and known from very few collections. Future studies may reveal this species to be a fairly restricted endemic.

*Dudleya anthonyi* (Crassulaceae) is endemic to the volcanic field of San Quintín where it grows in large numbers directly on lava rock and scree slopes. A few non-reproductive individuals resembling this taxon were noted to be in poor condition on the El Socorro Dunes during the vegetation study, but they may be *D. pulverulenta* (Nutt.) Britton & Rose (pending further study). San Martín Island is home to the largest population of *D. anthonyi*. (Vanderplank and Mata 2010a).

*Leptosiphon laxus* (Polemoniaceae) is not known outside the latitudinal boundaries of Greater San Quintín, but is typically found further inland; specimens were only collected twice during this study, both times from small populations on the larger cinder cones.

*Oenothera wigginsii* (Onagraceae) has its core range on the dunes of Greater San Quintín, with disjunct populations some 90 km to the south on the dunes of Puerto Santa Catarina and beyond.

*Solanum palmeri* (Solanaceae) is known only from Todos Santos Island and Greater San Quintín (including San Martín Island). Todos Santos Island is off the coast of northern Baja California, near Ensenada, some 160 km north of Greater San Quintín.

#### Plants on the Official List of Protected Species in Mexico

Two cactus species in Greater San Quintín are listed as threatened by the Mexican government in the Norma Oficial Mexicana-059 [NOM-059]-SEMARNAT [Secretaría del Medio Ambiente y Recursos Naturales] 2001.

*Cylindropuntia rosarica* is a narrow endemic of the Baja California peninsula, occurring from the Colonet area to El Rosario (ca. 120 km). In Greater San Quintín it occurs only on shell middens, the one in Ejido Venustiano Carranza II harbors ca. 200 individuals.

*Lophocereus schottii* is native to the deserts of Baja California and Sonora. Greater San Quintín is at the edge of its range, where it is scattered along coastal dunes, middens, and sandy patches of succulent scrub.

#### Taxa that Warrant Further Taxonomic Study

Collections of taxa from a species complex formerly in the genus *Antirrhinum* (Plantaginaceae) suggest that further taxonomic study of plants from Greater San Quintín is warranted. In particular, a pubescent form of *Neogaerrhinum strictum* with climbing pedicels on San Martín Island raises questions about specific and generic boundaries. These individuals may have resulted from hybridization between *Neogaerrhinum strictum* and *Sairocarpus pusillus*, a taxon that has changed status from forma *pusillum* of *Antirrhinum*



*nuttallianum* subsp. *subsessile* (Munz 1974) to the rank of species as currently treated (Sutton 1988).

A collection of *Cryptantha* (Boraginaceae) that was made following heavy rainfall in 2005 could not be identified and may represent a new taxon (Vanderplank, O'Brien & Arvizu 050202-42b).

*Mammillaria louisae* (Cactaceae) is not included in Wiggins (1980), but is distinguished by having large flowers that may exceed the size of its small vegetative body. It has historically been confused with *M. hutchinsoniana*, which is a larger plant that occurs farther south. The *Mammillaria* species of Baja California are understudied and there is no single key to all taxa. Identification difficulties obscure our understanding of the range and rarity of taxa such as *M. louisae*. Several individuals appear to be morphologically intermediate or do not fit cleanly within existing species descriptions.

Collections of *Phacelia ixodes* (Boraginaceae) from San Quintín and San Martín Island frequently exhibit lobed sepals. This character is not ubiquitous, but is not seen in specimens from outside the study area and deserves further study.

*Excluded collections.*—Three taxa collected during this study are not included in the checklist because they could not be identified to species. Two are vegetative collections of individual plants (*Atriplex* sp. and cf. *Cordylanthus* sp.). The third is a collection of *Cryptantha* that comes from a mixed collection made in the volcanic field in 2005. The nutlets appear to be winged and the plant does not match any existing descriptions. The specimen has been sent to specialists and warrants further study as noted above.

#### *Comparison with Thorne's (1989) Checklist*

Of 29 taxa reported from the area by Thorne (1989) that were not rediscovered, four were not considered further because of the differing delineation of Greater San Quintín (i.e., they were not documented within the present study area) or because only imprecise localities were given in the earlier study. Of the remaining 25 taxa, only two, *Limonium sinuatum* and *Spermolepis echinatus*, were represented by voucher specimens at RSA. Five additional taxa from the earlier checklist were represented by specimens at the SD herbarium. Because vouchers are lacking, the remaining 19 taxa have been excluded from the flora at this time (Appendix 1).

#### *Comparative Floristics*

The closest available modern flora for comparison is the recent checklist for Punta Colonet (Harper et al. 2010). This flora is essentially identical in size, including 435 taxa, 383 of which are native to the region. Of these, 52 are endemic, or near endemic, to the peninsula (13.5% of the native taxa, a value very similar to that for Greater San Quintín). The region covered by the checklist for Punta Colonet is slightly larger than Greater San Quintín; however, the collecting effort has been more extensive for the San Quintín region. Collecting effort in Colonet has focused more strongly on native species, and the number of non-native taxa is expected to be higher (Harper et al. 2010). Thus, the two areas have floras of a similar relative size and both are high in endemism.

#### *Plants Used by Local Inhabitants*

Local ethnobotanical data are scarce due in part to large numbers of immigrants without local knowledge and the absence of native Kiliwa residents in the study area. Certainly, the Kiliwa made use of a substantial number of local plants, such as the roasting of agave “hearts” (e.g., Gentry 1978; Hodgson 2001). Historical reports of plants uses in the area include *Salvia columbariae* seeds and *Dichelostemma capitatum* bulbs for food, crushed stems of *Stenocereus gummosus* as a fish poison, and *Euphorbia misera* sap as an arrow poison and crushed stems for treating snake bites (Del Barco 1980; Figueroa-Beltrán 2009). The seeds of *Ferocactus* spp. were eaten, and *Simmondsia chinensis* (jojoba) was used extensively as a medicine for various ailments (Del Barco 1980; Figueroa-Beltrán 2009). Local residents currently make use of some plants, most of which is consistent with widespread practices in Mexico, especially northwestern Mexico (e.g., Felger 2007). For example, *Mammillaria* fruits are eaten fresh, *Dudleya* flowering stalks are chewed and sucked (*D. anthonyi* is favored over other species), and preparations of *Lophocereus schottii* stems are esteemed as a remedy for diabetes and as diabetes preventative. Cladodes (pads) and fruits of the native *Opuntia* are sometimes harvested for food, as are the tasty fruits of *Stenocereus gummosus*. Dried *Stenocereus* flowers can be smoked and dried flowers of *Rosa minutifolia* are sometimes taken as a tea to remedy indigestion (pers. obs. 2009). The flower stalks of some plants are harvested for cattle fodder, e.g., *Agave shawii* (Gentry 1978). Where *Typha dominguensis* occurs in the region it is often cut for fodder (pers. obs. 2009).

In the Sonoran Desert region people generally made use of at least 18% of the local flora for medicinal purposes and 15% for food, of these, about 10% (1.5% of the total flora) generally served as major food resources or staples (Felger 1979, 2007). Thus we can expect that about 50 species native to Greater San Quintín might have been utilized for food and a slightly larger number were probably used for medicinal purposes. Information for many of the edible and medicinal plants of Greater San Quintín (those occurring in the United States) can be found in Moerman (1998) and BDMTM (2009).

#### *Habitat Overview*

Checklists for each of the four major habitat types as delineated by The Nature Conservancy are presented in Appendices 2–5 and summarized numerically in Table 3. Because of their distinctiveness as habitats and in terms of species composition, middens and vernal wet areas are listed separately in Appendices 6 and 7. Twenty-eight non-native taxa were considered ruderal weeds that did not occur within intact habitats and are excluded from the habitat checklists (see Appendix 8, list of ruderal weeds).

At least 20% of native species in all habitat types are sensitive (i.e., endemic and/or rare) (Table 3). Twenty-four percent of the dune taxa are local endemics, and this habitat also has the highest percentage of sensitive taxa (39%). Maritime succulent scrub has the most sensitive species, but is also home to the most species overall. All habitats except the dunes have a high percentage of taxa that do not occur in other habitats. This observation is at least partly due to the difficulty in delineating the vegetation of the El Socorro Dunes, which gradually transitions from foredunes with a very distinctive

Table 3. Summary of taxa by habitat, including species strongly associated with middens and vernal wetland areas. Only plants of the California Floristic Province were assessed for rarity; desert species at their northern range limit were not included in B. O'Brien et al. (in prep.; see Appendix 2), and their status is not addressed here. Thus, because some plants have not been evaluated for rarity, the percentage of plants that are rare is most likely higher than presented here. Categories are not mutually exclusive (e.g., a taxon may be rare and endemic); "sensitive" indicates the total number of rare plus endemic taxa.

HABITAT:	TOTAL:	Annuals		Sensitive		Endemic		Rare		Restricted to habitat		Native		Non-native	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%
Scrub	209	116	55	64	31	36	17	53	25	144	69	188	90	21	10
Dunes	100	42	42	39	39	24	24	35	35	28	28	89	89	11	11
Saltmarsh	35	11	31	9	24	1	3	9	26	26	74	29	83	6	17
Riparian	141	45	32	33	23	20	14	27	19	92	65	118	84	23	16
Middens	17	5	29	14	82	8	47	10	58	2	12	16	95	1	5
Vernal	9	7	77	6	67	2	22	6	67	9	100	9	100	0	0

flora into a succulent scrub community on sandy soil that differs less from the surrounding scrub in species composition. The following sections describe notable patterns by habitat type.

*Maritime succulent scrub* (Appendix 2).—The shallow or absent soil of the volcanic field of San Quintín affects the composition of the maritime succulent scrub. These areas harbor the restricted endemics *Dudleya anthonyi* and *Chenopodium flabellifolium*, as well as *Amsinckia inepta* and several other species that are only found in the scrub on volcanic soils within the study area (e.g., *Allium peninsulare*, *Coreopsis maritima*, *Ribes tortuosum*, *Senecio lyonii*, and *Viola pedunculata*). In contrast, the maritime succulent scrub to the north, east and south includes species such as *Agave shawii*, *Myrtillocactus cochal*, and *Rosa minutifolia* which do not occur in the volcanic field. This difference in species composition is likely related to geology and soil deposition. The clay mesa north of the Santo Domingo Escarpment in Colonia Vicente Guerrero is also home to a distinctive composition of maritime succulent scrub; this is the only location for several species in Greater San Quintín (e.g., *Bloomeria crocea*, *Chorizanthe interposita*, and *Mammillaria brandegeei*). Throughout the scrub vegetation of the study area, *Aesculus parryi*, *Ambrosia chenopodiifolia*, *Artemisia californica*, *Eriogonum fasciculatum*, *Euphorbia misera*, and *Mirabilis laevis* are abundant, regardless of the underlying geology.

*Dunes* (Appendix 3).—The majority of the coastal dunes in Greater San Quintín are young and are still undergoing stabilization. These dunes are home to several locally threatened and/or endemic taxa, including *Abronia maritima*, *Astragalus anemophilus*, *Dithyrea maritima*, *Eulobus crassifolia*, and *Lotus distichus*; few species, however, can colonize these shifting sands. Young dunes are dominated by *Abronia maritima*, whereas the older stable dunes are dominated by *Croton californicus*, *Hazardia berberidis*, *Isocoma menziesii* and *Lycium* spp. More than 1 km from the coast, the dunes start to be colonized by maritime succulent scrub species, but with a composition dominated by cacti and succulents, including *Agave shawii* subsp. *shawii*, *Bergerocactus emoryi*, *Cylindropuntia* spp., *Dudleya cultrata*, *Lophocereus schottii*, *Mammillaria dioica*, *Myrtillocactus cochal*, and *Stenocereus gummosus*. The large dune field at the southern end of Greater San

Quintín (El Socorro Dunes) is an old stable dune system that exhibits the highest richness of perennial species among dunes in the study area. Many desert species occur at the northern edge of their range here. Within the study site, several species are found only on the El Socorro Dunes; examples include *Adolphia californica*, *Funastrum arenarium*, *Heteromeles arbutifolia*, *Rhamnus insula*, and *Yucca schidigera*.

*Saltmarsh* (Appendix 4).—Several pristine salt marshes occur in the shallow bays around the volcanic field. Among the habitats, the saltmarsh has the fewest species, although it often has the densest vegetative cover. The inundated marshes are home to a surprisingly large number of taxa, given the extreme saline conditions; they are dominated by *Arthrocnemum subterminale*, *Jaumea carnosa*, *Limonium californicum*, *Sarcocornia pacifica*, and sometimes *Spartina foliosa*. *Spartina* has been observed to be spreading in recent years in the marsh at the northern end of Bahía San Quintín (pers. obs. 2005–2010). Few annual taxa occur in the saltmarsh; tidal fluctuations and salinity may select for perennial habit. None of the saltmarsh taxa are locally endemic, but 29% of the species are sensitive. Most saltmarsh habitat occupies a narrow coastal band; as a result, coastal sampling squares include other vegetation types which dampened the saltmarsh signal in the vegetation analysis (see below). The saline flats are dominated by *Atriplex julacea* with *Frankenia palmeri* and often have a history of disturbance by grazing or agriculture.

*Riparian areas* (Appendix 5).—The three major river drainages are similar in having high native and non-native floristic diversity; however, each of the drainages has a unique species assemblage. The major river drainage of Río Santo Domingo encompasses a large area of native vegetation that is interspersed with areas altered by agriculture and gravel extraction. A large number of taxa are known only from a single plant in this wash in the study area (e.g., *Arctostaphylos glauca*, *Amorpha apiculata*, *Ceanothus* spp., and *Pickeringia montana*). Most of these are more common in the chaparral habitats of higher elevations and may have washed down from the foothills of the Sierra de San Pedro Mártir. These "waif" species include several annual plants that were only seen on single occasions following heavy rainfall events (e.g., *Nemacladus sigmoideus* and *Monardella* spp.). Similar weather extremes may have led to the establishment of the rare perennial plants mentioned above.



Farther south, Río San Simón drains into the bay of San Quintín. Its course has been altered historically and there is extensive cattle grazing and agriculture in its bottomlands. *Prosopis glandulosa* var. *torreyana*, *Salix exigua* var. *hindsiana*, and *Salvia apiana* are most abundant here; *Tiquilia plicata* is not found outside this drainage in the study area.

Arroyo El Socorro, at the south end of Greater San Quintín, is the least disturbed of the drainages, but proximity to agriculture and altered hydrology again result in a large number of non-native species. Native taxa that only occur here include *Asclepias subulata*, *Bahiopsis triangularis*, *Encelia asperifolia*, and *Petalonyx linearis*.

The disturbance that waterways naturally experience makes them susceptible to invasion by non-native species, but all three drainages are also highly impacted by human-caused disturbances. In spite of this disturbance, riparian areas exhibit high species diversity, although abundance is often very low. Fifty-five species documented in riparian areas in the current study were here assessed as rare, meaning that three or fewer individuals were seen over the duration of this study (29 additional species are reported as scarce, i.e., around 10–100 individuals seen). Consistent dominant elements in riparian areas include *Ambrosia monogyra*, *Baccharis salicifolia*, and the non-native *Tamarix chinensis*. Note that Río Santo Domingo and Arroyo El Socorro both have many “waif” species and have more species in common with one another than either does with Arroyo San Simón (see checklist). Disturbances and hydrological changes have apparently resulted in lower floristic diversity along Río San Simón.

*Middens (Appendix 6).*—Shell middens are a unique sub-habitat nested within the other habitats. Shell middens occur within inundated marshes, inland surrounded by coastal scrub, and are an integral part of the formation of the El Socorro Dunes. Notable midden areas include El Socorro Dunes, near the village of Ejido Venustiano Carranza II, the marshes between The Old Mill and Bahía San Quintín, the marsh adjacent to El Pedregal, and the coastal region north of El Socorro on the saline flats near El Pabellón. The El Socorro Dunes are essentially a giant midden resulting from extensive activity by prehistoric people and long-term shellfish consumption and shell deposition. The midden flora of Greater San Quintín is often notably distinct from that of the surrounding areas and tends to have quite distinctive species assemblages rich in cacti. The checklist provided here only includes species that were vouchered on the middens and is not an exhaustive account of species that occur on middens; however, several of the midden taxa were not found in any other habitats. Eighty two percent of the taxa documented on middens are sensitive species; this sub-habitat warrants recognition as part of the ANP and merits further study.

*Vernal wetlands (Appendix 7).*—Vernal pools are seasonal wetlands that become inundated after winter rains due to an impervious soil layer and subsequently gradually dry up. The pools experience a brief waterlogged stage followed by extreme desiccation, often for longer than one year (Keeley and Zedler 1998). Certain species are restricted to vernal pool habitats. Narrowly endemic plant species are often further limited to one kind of vernal pool (e.g., with a particular soil type or climate) that may occur in a highly restricted area. Loss of pool sub-types can therefore be expected to result in the loss of

unique species (Bauder and McMillan 1998). Vernal pools are rapidly disappearing to urban sprawl and agriculture, and California has already lost between 93 and 97% of its vernal pools (Baskin 1994; Kangas 2005).

The clay mesas that promote the formation of vernal pools are an important habitat that has been almost entirely lost from Greater San Quintín and the surrounding region. Vernal pools were well documented in the study area by Moran (1981) as occurring at Ejido El Papalote, but all have been plowed for agriculture. Interestingly, in spring 2010, Ejido El Papalote was inundated as a result of heavy winter rains; some areas, including those historically occupied by vernal pools, were underwater for several weeks (Fig. 9). As a result, several species strongly associated with vernal pool habitats and that had not been seen in the four previous years appeared in roadside ditches (i.e., *Centromadia perennis*, *Eryngium aristulatum* var. *parishii*, and *Plagiobothrys leptocladus*). A small clay mesa north of the Santa Domingo Escarpment (near the hospital in Vicente Guerrero) occasionally has some vernal pool taxa in low areas on its disturbed margins. Although previously undocumented, remnants of vernal pools can be seen in this area and may have been more extensive prior to urban expansion. In some vernal pools just outside Greater San Quintín, a new species of *Eryngium* has been documented (Kim Marsden, pers. comm. 2010). Vernal pool taxa in Greater San Quintín appear after heavy inundation in low, clay-lined ditches in areas that were previously documented to have vernal pools. The vernal wetland taxa listed here (Appendix 7) are entirely restricted to this habitat and could not be placed in the major habitats of the region; however, the list is not exhaustive and other taxa are found in vernal pool habitat. No intact habitat remains for these species and 76% of the taxa are sensitive species.

## DISCUSSION

### *The Flora*

The unusual mix of plants with provenance from the desert area to the south and the CFP to the north makes Greater San Quintín a floristically rich area. A large number of California's rare plants occur in large numbers and several species reach the edge of their range in Greater San Quintín (Vanderplank 2011). An interesting example comes from the species *Eucrypta chrysanthemifolia* (Boraginaceae) which has two co-occurring varieties in Greater San Quintín, var. *chrysanthemifolia* from the CFP on the southern edge of its range, and var. *bipinnatifida* which is a desert taxon on the northern edge of its range. Thirty-four percent of the species that comprise the flora of Greater San Quintín are rare and/or locally endemic. Greater San Quintín is also home to several taxa that do not occur far outside the study area. These taxa should be of the greatest concern for conservation. The San Quintín volcanic field, a unique geological formation in Mexico, is home to the majority of these taxa. The high percentage of endemic taxa makes Greater San Quintín a priority for conservation.

### *Regions of Particular Concern*

*Coastal volcanic field.*—The coastal strip along the volcanic field of San Quintín includes many species that should be a high priority for conservation in Mexico due to their limited

distribution. Since this area appears to be the most diverse within the San Quintín volcanic field and is home to a large population of the endemic *Dudleya anthyoni*, it should be a core zone in the proposed ANP. The cinder cones themselves should also be protected in light of the unique nature of their geology and vegetation. The cone that is home to the only population of *Salvia brandegeei* in the region, Riveroll, the northernmost of the southern group (Vanderplank et al. 2009), is of particular conservation priority given the pending threats from mining.

*El Socorro Dunes.*—The El Socorro Dunes should also be prioritized as a core zone in the proposed ANP. Their conservation value owing to unusual composition and high species diversity cannot be matched in other parts of Baja California. At the time of this writing (July 2010), the entire dune system is slated for development and is being divided into narrow strips that connect the main road to the beach. There is a wealth of archeological data from the area (Moore 1999; Figueroa-Beltrán 2009) that also provides significant justification for conservation.

*Shell middens.*—The shell middens of Greater San Quintín should be mapped and evaluated as conservation targets. Of particular priority should be the midden in Ejido Venustiano Carranza II that has a large population of *Cylindropuntia rosarica*, several individuals of *Lophocereus schottii*, and seven other species of cacti.

*Clay mesa of vicente guerrero.*—The clay mesa, just north of the Santa María Escarpment in Colonia Vicente Guerrero, is used as a village commons by the local ejidatarios. The area is often used as a latrine and as a trash dump. Working with the local ejidos to clean up and conserve this open space should be considered as part of a community outreach and education effort. Restoration of the vernal pools here may be feasible but would require protection and monitoring. Although small in size, the area could serve as a site for re-introduction of species extirpated elsewhere in Greater San Quintín.

#### Broader Conservation Concerns

Most of the vernal pool habitat in San Quintín has been lost to agriculture. The plants found only after the heavy rains of 2010 occurred in small numbers in the vernal pool-like habitats offered by drainage ditches in Ejido El Papalote that are unlikely to persist. Efforts in other parts of the state should focus on protection of vernal pools that remain intact. The vernal pools of Colinet Mesa, 100 km to the north of Greater San Quintín, remain in good condition (Harper et al. 2011) and should be targeted for conservation.

The maritime succulent scrub is a globally rare habitat type with a high proportion of locally endemic taxa in urgent need of conservation (Harper et al. 2011). Floristic composition varies considerably along the coast of NW Baja California, and conservation of the maritime succulent scrub should include land on clay soils beyond the boundaries of this study.

The habitat quality of the scrub, marshes and dunes should be preserved to the greatest extent possible and further anthropogenic disturbance of riparian areas should be avoided. The threat of continued unsustainable agricultural practices should be addressed as part of the long-term conservation planning for this region, including its impacts

on the region's hydrology. Oyster farming may be a more sustainable alternative for this region than agriculture (Aguirre-Muñoz et al. 2001).

The conservation priorities at the habitat level are very different from those at the species level in Greater San Quintín, and locally endemic taxa should be assessed in terms of their individual habitats as part of ongoing conservation efforts in this region. This study provides baseline data from which future changes in the flora can be assessed and monitored. Ongoing assessment of habitat quality and the status of the globally rare and locally endemic taxa are strongly recommended.

#### CONCLUSIONS

San Quintín is home to a diverse assemblage of taxa characteristic of both the CFP to the north and deserts to the south. Almost one in three taxa in Greater San Quintín is a sensitive species, here documented as rare and/or locally endemic, and many resident taxa have yet to be evaluated fully for rarity. All habitats in Greater San Quintín are threatened by human activity. There is a pressing need for conservation of the natural areas that remain in this unique but heavily impacted region. The El Socorro Dunes should be prioritized for inclusion in the ANP, as should the volcanic field and adjacent coastal region. The shell middens should be evaluated as conservation targets. The clay mesa of San Vicente is a possible target for a restoration project in collaboration with the community. The flora of the area forms a rich heterogeneous patchwork that has already suffered substantial habitat loss. As a transitional area in a global biodiversity hotspot, Greater San Quintín may be key to species conservation in times of global climate change.

#### ANNOTATED CHECKLIST

Species accounts for the flora of Greater San Quintín, based on collections from 2005 to 2010. Selected synonymy is provided. A single voucher is cited for each taxon. All specimens are deposited at RSA, with duplicates to other herbaria cited in the text. \* denotes non-native taxa and † denotes sensitive taxa. Sensitive taxa are those noted in *B. O'Brien, J. Delgadillo, S. Junak, T. Oberbauer, J. Rebman, H. Riemann, and S. Vanderplank: Rare, endangered, and endemic vascular plants of the California Floristic Province (CFP) portion of northwestern Baja California, Mexico (in prep.)* as being rare, endemic (or near-endemic), or on the Mexican list of species at risk (NOM-059).

#### GYMNOSPERMS

##### EPHEDRACEAE

EPHEDRA CALIFORNICA S.Watson. Small shrub. Common. Succulent scrub and on dunes of El Socorro. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-23.*

#### FERNS AND FERN ALLIES

##### EQUISETACEAE

EQUISETUM LAEVIGATUM A.Braun. Perennial herb. Rare. Santo Domingo Wash. Heavily grazed. *Vanderplank & Ochoa 081127-6.*

#### PTERIDACEAE (ADIANTACEAE)

†ASPIDOTIS CALIFORNICA (Hook.) Nutt. ex Copel. Perennial herb. Occasional. Crevices of the lava rock in the volcanic field. *Vanderplank & Lesch 050318-62.*



- †CHEILANTHES BRANDEGEEI D.C.Eaton. Perennial herb. Rare. Crevices of lava mounds between larger cones of volcanic field. Endemic to the Baja California peninsula. This occurrence is a significant northern range extension. *Vanderplank, Ochoa & Harper 080218-42*.
- NOTHOLAENA CALIFORNICA D.C.Eaton var. CALIFORNICA. Perennial herb. Rare. Rock crevices on cinder cones. *Vanderplank, O'Brien & Arvizu 050202-54*.
- PELLAEA ANDROMEDIFOLIA (Kaulf.) Fée. Perennial herb. Scarce. Growing in lava rock of succulent scrub in the volcanic field. *Vanderplank & Lesch 050318-63*.
- PELLAEA MUCRONATA (D.C.Eaton) D.C.Eaton var. MUCRONATA. Perennial herb. Scarce. Growing in lava rock of succulent scrub in the volcanic field. *Vanderplank & Lesch 050318-65*.
- PENTAGRAMMA TRIANGULARIS (Kaulf.) Yatsk., Windham & E.Wollenw. subsp. VISCOSA (Nutt. ex D.C.Eaton) Yatsk., Windham & E.Wollenw. Perennial herb. Scarce. Lava mounds between large cinder cones in the volcanic field. *Vanderplank & Lesch 050318-64*.

## POLYPODIACEAE

- POLYPODIUM CALIFORNICUM Kaulf. Perennial herb. Frequent. Growing in cracks of lava rock in volcanic field. *Vanderplank, Fraga & Ochoa 080111-07*.

## ANGIOSPERMS

## DICOTYLEDONS

## ADOXACEAE

- SAMBUCUS CAERULEA Raf. var. MEXICANA (C.Presl ex DC.) L.D.Benson. sensu Bolli (1994) [*Sambucus mexicana* C.Presl ex DC., and *Sambucus nigra* subsp. *caerulea* (Raf.) Bolli]. Large shrub. Rare. Santo Domingo Wash. Near old homesite. *Vanderplank & Ochoa 090524-14*.

## AIZOACEAE

- \*CARPOBROTUS CHILENSIS (Molina) N.E.Br. Succulent perennial herb. Frequent. Young dunes of the bay and in considerable numbers on young dunes of El Socorro. Flower color may vary, but the larger flower size distinguishes this species from *C. edulis*. *Vanderplank & J. Vanderplank 050516-7*.
- \*MALEPHORA CROCEA (Jacq.) Schwantes. Succulent shrub. Occasional. Escaping cultivation and invading disturbed and saline areas. *Vanderplank & Still 090307-14*.
- \*MESEMBRYANTHEMUM CRYSTALLINUM L. Succulent annual. Abundant. Extensive in all habitats, but especially in disturbed areas. This is most abundant weed in the region and the larger of the two *Mesembryanthemum* in the flora area. *Vanderplank & Ochoa 071122-5*.
- \*MESEMBRYANTHEMUM NODIFLORUM L. Succulent annual. Frequent. Increasingly abundant in disturbed areas, particularly on the saline flats north of the bay. *Vanderplank, Ochoa, Hannon, Harper & Bell 080326-2*.
- \*TETRAGONIA TETRAGONIOIDES (Pall.) Kuntze. Succulent annual. Rare. Near trash-dumping area in Santo Domingo Wash. *Vanderplank & Ochoa 081128-4*.

## AMARANTHACEAE (includes Chenopodiaceae)

- ALLENROLFEA OCCIDENTALIS (S.Watson) Kuntze. Small shrub. Uncommon in sandy saline areas along coast. *Vanderplank, Hapner, Gover, Mata & Rodriguez 080928-2*.
- \*AMARANTHUS ALBUS L. Annual. Occasional weed of agricultural areas. *Vanderplank & Hannon 080529-22*.

\*AMARANTHUS cf. HYBRIDUS L. Annual. Occasional weed of agricultural areas. *Vanderplank & Ochoa 071122-4*.

†APHANISMA BLITOIDES Nutt. ex Moq. Annual. Abundant in wet years. Often found under other shrubs. *Vanderplank, Koepke, Arvizu & Eisenstein 070225-32*.

ARTHROCNEMUM SUBTERMINALE (Parish) Standl. [*Salicornia subterminalis* Parish]. Succulent perennial herb. Abundant. Dominant on saline flats and dense on higher ground of inundated marshes. *Vanderplank, Roberts, Bramlet & Southern California Botanists group 070811-2*.

ATRIPLEX CALIFORNICA Moq. Perennial herb. Rare. Near mouth of Santo Domingo Wash. *Vanderplank & Ochoa 081128-18*.

ATRIPLEX CANESCENS (Pursh) Nutt. subsp. CANESCENS. Large shrub. Occasional. In riparian areas and washes. Usually seen in small numbers. The ones in the flora area have narrow leaves, but longer and wider than among var. *linearis*. *Vanderplank, Reccia & Robinson 080816-2*.

†ATRIPLEX COULTERI (Moq.) D.Dietr. Perennial herb. Occasional. Mat-forming in localized patches in the volcanic field. *Vanderplank, Fraga & Ochoa 080111-27*.

†ATRIPLEX ELEGANS (Moq.) D.Dietr. Annual. Rare. Steep slopes on south side of the crater on Isla San Martín; new record for the island. *Vanderplank, Ochoa, Hannon, Harper & Bell 080326-9*.

†ATRIPLEX JULACEA S.Watson. Small shrub. Abundant. Often dominant in saline flats, but at least occasional in all habitats. Low gray shrub with reduced leaves. *Vanderplank, Fraga & Ochoa 080110-5*.

ATRIPLEX LEUCOPHYLLA (Moq.) D.Dietr. Perennial herb. Frequent. Sprawling on open sand and open salt flats. *Vanderplank & Ochoa 061125-5*.

\*ATRIPLEX LINDLEYI Moq. Annual. Uncommon. Locally abundant on disturbed saline flats near salt ponds and north of the town of San Quintín. *Vanderplank & Ochoa 081223-4*.

†ATRIPLEX PACIFICA A.Nelson. Annual. Rare. On shell midden in Ejido Venustiano Carranza II growing with many succulents. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-34*.

\*ATRIPLEX SEMIBACCATA R.Br. Suffruticose perennial. Frequent. Common weed of ditches, saline flats, and disturbed areas including margins of agricultural areas. *Vanderplank & Ochoa 070513-14*.

\*ATRIPLEX SUBERECTA I.Verd. Annual. Occasional. Weedy along roadsides and disturbed places including saline areas. *Vanderplank, Roberts, Bramlet & Southern California Botanists group 070811-5*.

†ATRIPLEX WATSONII A.Nelson. Suffruticose perennial. Common. Sprawling in salt marshes and saline habitats. Low, prostrate perennial with opposite leaves. *Vanderplank, Hapner, Gover, Mata & Rodriguez 080927-2*.

\*BASSIA HYSSOPIFOLIA (Pall.) Kuntze. Annual. Occasional or scarce. Weedy in disturbed wet depressions, roadsides, and semi-saline areas. *Vanderplank & Mata 081025-4*.

\*BETA VULGARIS L. subsp. MARITIMA Perennial herb. Rare. Weed of disturbed saline area in Santo Domingo Wash. *Vanderplank & Ochoa 081128-5*.

CHENOPODIUM CALIFORNICUM (S.Watson) S.Watson. Perennial herb. Rare. Wet, disturbed area of volcanic field. Erect habit, the leaves triangular. *Vanderplank & Ochoa 090526-3*.

†CHENOPODIUM FLABELLIFOLIUM Standl. Biennial herb (perhaps annual or facultatively biennial). Occasional. Endemic to San Martín Island and locally common at the southeast corner of the island in wet years. *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-21*.

\*CHENOPODIUM MURALE L. Annual. Abundant. Disturbed areas, especially in nitrogen-rich situations in guano-rich sites and near agricultural areas. *Vanderplank, Eisenstein, Arvizu & Koepke 070226-6*.

\*DYSPHANIA AMBROSIIOIDES L. Annual. Scarce. Escaping from cultivation in urban areas. *Vanderplank & Ochoa 090525-11*.

SALICORNIA BIGELOVII Torr. Succulent annual. Occasional. Often growing in locally dense patches in tidally inundated marshes. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-3*.

\**SALSOLA AUSTRALIS* R.Br. Annual. Frequent. Agricultural areas, waste places, and invading disturbed areas in succulent scrub. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060916-11.*

\**SALSOLA TRAGUS* L. Annual. Frequent. Major weed of agricultural areas and disturbed places. Plants stouter than *S. australis*, forming tumbleweeds. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060916-10.*

*SARCOCORNIA PACIFICA* (Standl.) A.J.Scott [*Salicornia pacifica* Standl. Sometimes incorrectly called *Salicornia virginica* L.]. Succulent perennial herb. Frequent. Common in tidally inundated marshes. Taller than *Arthrocnemum subterminale*, sprawling, terete-branched halophyte. *Vanderplank, Roberts, Bramlet & Southern California Botanists group 070811-3.*

†*SUAEDA ESTEREA* W.Ferren & S.Whitmore. Perennial herb. Occasional. Tidally inundated marshes. Leaves and bracts subequal and glabrous; flowers bilaterally symmetrical. *Vanderplank, Hapner, Gover, Mata & Rodriguez 080927-1.*

*SUAEDA NIGRA* (Raf.) J.F.Macbr. [*Suaeda moquinii* (Torr.) Greene]. Perennial herb. Occasional. Frequent in marshy areas, often at the margins of the strand. Bracts shorter than the leaves; flowers actinomorphic. *Vanderplank, Ochoa & Harper 080217-9.*

*SUAEDA TAXIFOLIA* (Standl.) Standl. Suffruticose perennial. Occasional. Tidally inundated marshes. Leaves and bracts subequal, entire plant usually densely villous, the flowers actinomorphic. *Vanderplank, Koepke, Arvizu & Eisenstein 070224-7.*

## ANACARDIACEAE

*MALOSMA LAURINA* (Nutt.) Nutt. ex Abrams. Large shrub. Occasional. El Socorro Dunes and edges of riparian areas (rarely in succulent scrub). *Vanderplank, Roberts, Bramlet & Southern California Botanists group 070811-9.*

*RHUS INTEGRIFOLIA* (Nutt.) Brewer & S.Watson. Large shrub. Frequent. Throughout succulent scrub and El Socorro Dunes. *Vanderplank & Lesch 050318-74.*

\**SCHINUS TEREBINTHIFOLIUS* Radd. Tree. Occasional. Planted but persisting after cultivation. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060916-4.*

*TOXICODENDRON DIVERSILOBUM* (Torr. & A.Gray) Greene. Suffruticose perennial. Rare. Riparian areas, Santo Domingo Wash. *Vanderplank & Ochoa 081128-1.*

## APIACEAE

*APIASTRUM ANGUSTIFOLIUM* Nutt. Annual. Frequent, particularly in wet years. *Vanderplank, Ochoa & Harper 080217-34.*

*DAUCUS PUSILLUS* Michx. Annual. Occasional. Succulent scrub of the volcanic field between the cones. *Vanderplank & Lesch 050318-60.*

*DRYMARIA VISCOSA* S.Watson Annual. Occasional. Intact dune systems, primarily south of the volcanic field; rare in succulent scrub. Mostly a desert species, at its ecological limit in the San Quintin region. *Vanderplank & Ledyard 090209-1.*

†*ERYNGIUM ARISTULATUM* Jeps. var. *PARISHII* (J.M.Coult. & Rose) Mathias & Constance. Annual-Perennial. Rare. A few individuals found in a vernal ditch at Ejido El Papalote after heavy rain and several days of inundation. Sprawling annual with blue-gray leaves. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-10.*

\**FOENICULUM VULGARE* Mill. Suffruticose perennial. Scarce. Weed of disturbed roadside places. *Vanderplank & Bell 080627-7.*

## APOCYNACEAE (INCLUDES ASCLEPIADACEAE)

*ASCLEPIAS SUBULATA* Decne. Suffruticose perennial, with semi-succulent stems. Scarce/occasional. Sandy washes. *Vanderplank & Hannon 080529-21.*

†*FUNASTRUM ARENARIUM* (Decne. ex Benth.) Liede [*Sarcostemma arenarium* Decne. ex Benth.]. Perennial herb (vine). Occasional.

Locally common on El Socorro Dunes. Endemic to the Baja California Peninsula. *Vanderplank, Ochoa & Harper 080217-10.*

## ASTERACEAE

*AMAURIA ROTUNDIFOLIA* Benth. Perennial herb. Common in the bay, usually growing in bare volcanic rock. Endemic to the Baja California peninsula. Often growing with the similar-appearing *Perityle emoryi*, but distinguished in part by its larger size, perennial habit, scented glandular foliage, and different achenes. *Vanderplank, Ochoa & Harper 080215-30.*

*AMBLYOPAPPUS PUSILLUS* Hook. & Arn. Annual. Abundant ground cover in succulent scrub, especially in wet years. *Vanderplank, Ochoa, Hannon, Harper & Bell 080323-3.*

†*AMBROSIA CHAMISSONIS* (Less.) Greene [*Franseria chamissonis* (Less.) Greene]. Perennial herb. Scarce on sandy beaches. *Vanderplank, Ochoa, Hannon, Harper & Bell 080326-4.*

*AMBROSIA CHENOPODIIFOLIA* (Benth.) W.W.Payne [*Franseria chenopodiifolia* Benth.]. Small shrub. Abundant. Dominant in the succulent scrub. *Vanderplank, Arvizu & Thibault 050731-5.*

*AMBROSIA CONFERTIFLORA* DC. [*Franseria confertiflora* DC.]. Perennial herb. Scarce in drainages. *Vanderplank, Fraga & Kempton 060723-18.*

*AMBROSIA MONOGYRA* (Torr. & A.Gray) Strother & B.G.Baldwin [*Hymenoclea monogyra* Torr. & A.Gray]. Large shrub. Common. Often dominant in large drainages such as Santo Domingo Wash and San Simón Wash). *Vanderplank & Felger 061206-1.*

*ARTEMISIA CALIFORNICA* Less. Small shrub. Frequent. Irregular component of the succulent scrub in the volcanic field. *Vanderplank & Ochoa 071123-2.*

*ARTEMISIA DRACUNCULUS* L. Suffruticose perennial. Scarce. Scattered in sandy washes. *Vanderplank & Mata 081024-32.*

*ARTEMISIA TRIDENTATA* Nutt. subsp. *TRIDENTATA*. Small shrub. Scarce. Large sandy washes (Santo Domingo and San Simón). *Vanderplank & Ochoa 081127-9.*

*BACCHARIS PILULARIS* DC. var. *CONSANGUINEA* (DC.) C.B.Wolf. Large shrub. Occasional. Santo Domingo Wash and agricultural ditches. *Vanderplank & Ochoa 071123-11.*

*BACCHARIS SALICIFOLIA* (Ruiz & Pav.) Pers. Large shrub. Frequent. Washes, riparian areas, and drainage ditches; sometimes co-dominant. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-12.*

*BACCHARIS SAROTHOIDES* A.Gray. Small shrub. Rare. Few scattered individuals found in Santo Domingo Wash and Arroyo El Socorro. Often nearly leafless, or with reduced leaves. *Vanderplank & Ochoa 081127-13.*

†*BAHIOPSIS LACINIATA* (A.Gray) E.E.Schilling & Panero [*Viguiera laciniata* A.Gray]. Small shrub. Scarce. Scattered individuals in Arroyo El Socorro and Santo Domingo Wash. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-38.*

†*BAHIOPSIS TRIANGULARIS* (M.E.Jones) E.E.Schill. & Panero [*Viguiera triangularis* M.E.Jones]. Small shrub. Scarce. Scattered individuals in Arroyo El Socorro and Santo Domingo Wash. *Vanderplank & Hannon 080529-8.*

*BAILEYA PLENIRADIATA* A.Gray. Annual. Rare. Scattered individuals in Santo Domingo Wash and San Simón Wash. *Vanderplank & Ochoa 081201-3.*

*BEBBIA JUNCEA* (Benth.) Greene var. *ASPERA* Greene. Small shrub. Scarce. Scattered individuals forming clumps in Arroyo El Socorro and an unnamed wash to the north. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-42.*

*BRICKELLIA CALIFORNICA* (Torr. & A.Gray) A.Gray. Small shrub. Rare. One plant was found in Santo Domingo Wash. *Vanderplank & Ochoa 081127-3.*

\**CENTAUREA MELITENSIS* L. Annual. Scarce. Invading from edges of agricultural lands on top of the Santa María Escarpment and in roadside ditches. *Vanderplank, Ochoa, Hannon, Harper & Bell 080323-1.*

- †CENTROMADIA PERENNIS Greene. Annual. Rare. Only seen after significant rainfall on land that sat underwater for several days. A vernal-pool species surviving in the flora area in roadside ditches. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-2.*
- CHAENACTIS GLABRIUSCULA DC. var. GLABRIUSCULA. Annual. Occasional. Distribution patchy; previously most numerous in the coastal area just north of La Chorrera that has been developed. *Vanderplank & Lesch 050318-4.*
- CONYZA CANADENSIS (L.) Cronquist. Annual, probably not native. Uncommon. Weed of riparian areas, not seen in large numbers. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-19.*
- COREOPSIS CALIFORNICA (Nutt.) H.Sharsm. Annual. Occasional. Scattered in coastal scrub during wet years. *Vanderplank & Still 090306-12.*
- †COREOPSIS MARITIMA (Nutt.) Hook. Perennial herb. Occasional. Succulent scrub in areas of coastal influence and on several cinder cones in the volcanic field. *Vanderplank, Ochoa & Harper 080218-31.*
- \*COTULA CORONOPIFOLIA L. Perennial herb. Rare. Weed of ditches and riparian areas with standing water. *Vanderplank & Bell 080426-23.*
- DEINANDRA FASCICULATA (DC.) Greene. Annual. Scarce. Clay mesa just north of Santa María Escarpment. *Vanderplank & Figueroa 090414-11.*
- †ENCELIA ASPERIFOLIA (S.F.Blake) Clark & Kyhos. Small shrub. Rare. Arroyo El Socorro. Waif probably from the nearby desert. Endemic to the Baja California peninsula. *Vanderplank & Hannon 080529-20.*
- ENCELIA CALIFORNICA Nutt. Small shrub. Abundant. Often co-dominant component of the succulent scrub. *Vanderplank & Lesch 050318-45.*
- ENCELIA FARINOSA Torr. & A.Gray var. FARINOSA. Small shrub. Rare. Waifs in riparian areas (Santo Domingo Wash and Arroyo El Socorro). *Vanderplank & Ochoa 090524-24.*
- †ERICAMERIA PALMERI (A.Gray) H.M.Hall var. PALMERI. Small shrub. Occasional/scarce. Scattered lone individuals in riparian areas and on dunes. *Vanderplank & Ochoa 071123-3.*
- ERIOPHYLLUM CONFERTIFLORUM (DC.) A.Gray var. CONFERTIFLORUM. Suffruticose perennial. Scarce to occasional. On larger cinder cones, e.g., Kenton and the largest cinder cone. *Vanderplank, Ochoa, Hannon, Harper & Bell 080328-1.*
- \*GAMOGAETA STAGNALIS (I.M.Johnst.) Anderb. [*Gnaphalium stagnale* I.M.Johnst.]. Annual. Rare. Shell midden in Ejido Venustiano Carranza II. Flower head clusters subtended by purplish bracts. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-35.*
- \*GLEBIONIS CARINATA (Schousb.) Tzvelev [*Chrysanthemum carinatum* Schousb.]. Annual. Rare. Presumed garden escape. Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090524-15.*
- \*GLEBIONIS CORONARIA (L.) Cass. ex Spach [*Chrysanthemum coronarium* L.]. Herbaceous annual. Occasional. Roadsides and disturbed riparian areas. *Vanderplank, Ocampo, Kempton & Chhetri 070401-3.*
- GNAPHALIUM PALUSTRE Nutt. Annual. Rare. Santo Domingo Wash. *Vanderplank & Still 090305-13.*
- †HAZARDIA BERBERIDIS Greene. Perennial herb. Abundant. Often locally dominant in maritime scrub and on El Socorro Dunes. *Vanderplank, Ochoa & Gribbin 061225-2.*
- †HELIANTHUS NIVEUS (Benth.) Brandege subsp. NIVEUS. Perennial herb. Abundant. Locally common along the coast on sandy soils of dunes, riparian, and middens. Low-growing, often with gray foliage. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-10.*
- HETEROTHECA GRANDIFLORA Nutt. Biennial herb. Occasional. Santo Domingo Wash and other sandy riparian areas. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-11.*
- †HULSEA MEXICANA Rydb. Biennial herb. Rare. Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-3.*
- †ISOCOMA MENZIESII (Hook. & Arn.) G.L.Nesom var. DECUMBENS (Greene) G.L.Nesom. Small shrub. Rare. El Socorro Dunes, near the coast, in low slightly saline area. *Vanderplank & Ledyard 090209-2.*
- ISOCOMA MENZIESII (Hook. & Arn.) G.L.Nesom var. MENZIESII. Small shrub. Abundant. Dominant or co-dominant on stable dunes and also present in all habitats. *Vanderplank, Clark, Snapp-Cook & Ochoa 061021-3.*
- IVA HAYESIANA A.Gray. Suffruticose perennial. Frequent. In riparian areas and sandy drainages. *Vanderplank 081026-1.*
- †JAUMEA CARNOSA (Less.) A.Gray. Perennial herb with succulent leaves. Frequent. Often growing densely intertwined with other plants of the tidally inundated marsh. *Vanderplank, Ortiz, Ochoa, L. Lubinsky & P. Lubinsky 070127-1.*
- LASTHENIA GRACILIS (DC.) Greene. Annual. Abundant. Forms a yellow carpet in wet years. Throughout the succulent scrub. This species reinstated as distinct from *L. californica* DC. ex Lindl. *Vanderplank, O'Brien & Arvizu 050202-59.*
- LAYIA PLATYGLOSSA (Fisch. & C.A.Mey.) A.Gray. Annual. Occasional. Frequent in wet years but scarce in dry years. *Vanderplank & Lesch 050318-14.*
- LOGFIA ARIZONICA (A.Gray) Holub [*Filago arizonica* A.Gray]. Annual. Scarce. Succulent scrub on cinder cones and lava mounds of the volcanic field. Distinguished from its congener *L. filaginoides* in having long, dark internodes. *Vanderplank, Ochoa & Harper 080215-25.*
- LOGFIA FILAGINOIDES (Hook. & Arn.) Morefield [*Filago californica* Nutt.]. Annual. Scarce. Cinder cones and in riparian areas. *Vanderplank & Lesch 050318-70.*
- †MALACOTHRIX SIMILIS W.S.Davis & P.H.Raven. Annual. Scarce. Cinder cones and El Socorro Dunes. *Vanderplank, Ochoa & Harper 080219-2.*
- MATRICARIA OCCIDENTALIS Greene. Annual. Rare. In vernal ditch near Ejido El Papalote after period of long inundation. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-3.*
- PERITYLE EMORYI Torr. Annual or biennial. Frequent. Locally common in crevices of volcanic rock. Resembling *Amauria rotundifolia* but the leaves more strongly lobed the foliage unscented, and the achenes different. *Vanderplank & J. Vanderplank 050515-10.*
- PLUCHEA SERICEA (Nutt.) Cov. [*Tessaria sericea*]. Large shrub. Frequent. Locally common in riparian areas and growing especially dense in San Simón Wash. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-9.*
- †PSEUDOGNAPHALIUM BENEOLENS (Davidson) Anderb. [*Gnaphalium beneolens* Davidson]. Suffruticose perennial. Scarce. Santo Domingo Wash. *Vanderplank & Mata 081024-5.*
- PSEUDOGNAPHALIUM BIOLETTII Anderb. [*Gnaphalium bicolor* Bioletti]. Suffruticose perennial. Scarce. Succulent scrub of cinder cones, often on lava. *Vanderplank, Koepke, Arvizu & Eisenstein 070225-19.*
- PSEUDOGNAPHALIUM LEUCOCEPHALUM (A.Gray) Anderb. Suffruticose perennial. Scarce. Scattered in riparian areas and open disturbed sites. *Vanderplank & Mata 081024-20.*
- †PSILOCARPHUS BREVISSIMUS Nutt. Annual. Scarce. Growing in vernal pool areas following inundation. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-8.*
- RAFINESQUIA CALIFORNICA Nutt. Annual. Occasional. Succulent scrub of cinder cones. *Vanderplank, Ochoa & Harper 080215-44.*
- †SENECIO APHANACTIS Greene. Annual. Common. Scattered through the succulent scrub, most common in wet years. *Vanderplank, Ochoa & Harper 080215-20.*
- SENECIO CALIFORNICUS DC. Annual. Abundant in wet years. Throughout succulent scrub and coastal ranges, including dunes. The succulent form of this species, which occurs here was once recognized as var. *ammophilus* Greenm., endemic to the Baja California Peninsula, but no longer considered taxonomically distinct. *Vanderplank & Lesch 050318-9.*
- †SENECIO LYONII A.Gray. Suffruticose perennial. Occasional. Succulent scrub of cinder cones in areas with coastal influence. Known only from the California Channel Islands and very restricted areas in Baja California. *Vanderplank & J. Vanderplank 050515-11.*



- \**SONCHUS OLERACEUS* L. Annual. Occasional to frequent in disturbed areas. *Vanderplank, Fraga & Ochoa 080111-32.*
- \**SONCHUS TENERRIMUS* L. Annual. Occasional. Succulent scrub of the volcanic field. *Vanderplank, Ochoa & Harper 080218-37.*
- STEPHANOMERIA DIEGENSIS* Gottlieb. Annual. Frequent. Scattered throughout the region in the succulent scrub and riparian areas. *Vanderplank & Ochoa 061124-3.*
- STEPHANOMERIA EXIGUA* Nutt. Annual. Occasional. Disturbed areas, dunes, roadsides, and sandy washes. *Vanderplank & Mata 081024-19.*
- STYLOCLINE GNAPHALOIDES* Nutt. Annual. Scarce. Open areas and clearings in succulent scrub. Dark bracts on flower heads. *Vanderplank, Ochoa & Harper 080217-24.*
- TRIXIS CALIFORNICA* Kellogg var. *CALIFORNICA*. Small shrub. Frequent in succulent scrub of the volcanic field. *Vanderplank, Eisenstein, Arvizu & Koepke 070227-2.*
- UROPAPPUS LINDLEYI* (DC.) Nutt. Annual. Occasional. Scattered throughout the succulent scrub. *Vanderplank, Ochoa & Harper 080218-50.*
- \**VERBESINA ENCELIOIDES* (Cav.) Benth. & Hook.f. ex A.Gray subsp. *ENCELIOIDES*. Annual. Rare. Roadside weed near agricultural area. *Vanderplank & Hannon 080529-27.*
- XANTHIUM STRUMARIUM* L. Annual. Scarce. In wet ditches. *Vanderplank, Fraga & Ochoa 080111-31.*

## BATACEAE

- BATIS MARITIMA* L. Highly succulent perennial herb. Common. Saltmarshes subject to tidal inundation. *Vanderplank, Reccia & Robinson 080816-4.*

## BORAGINACEAE (INCLUDES HYDROPHYLLACEAE, LENNOACEAE)

- †*AMSINCKIA INEPTA* J.F.Macbr. Annual. Common. Particularly abundant in wet years. Narrow endemic that does not occur far outside Greater San Quintín. Relatively large orange flowers. See Ray and Chisaki (1957). *Vanderplank, Koepke, Arvizu & Eisenstein 070224-10.*
- AMSINCKIA INTERMEDIA* Fisch. & C.A.Mey. Annual. Infrequent in loose sand. *Vanderplank & Ledyard 090206-3.*
- CRYPTANTHA CLEVELANDII* Greene var. *FLOROSA* I.M.Johnst. Annual. Scarce. Santo Domingo Wash. Plants relatively large, the inflorescences not bracteate. *Vanderplank & Ochoa 090524-18.*
- CRYPTANTHA INTERMEDIA* (A.Gray) Greene. Annual. Common. Abundant in succulent scrub in wet years. Inflorescences branched, flowers relatively large among the genus, the calyx >4 mm long. *Vanderplank, Ochoa & Harper 080215-23.*
- CRYPTANTHA MARITIMA* Greene [*C. m.* var. *pilosa*, *C. m.* var. *cedrosensis*]. Annual. Common. Throughout scrub and middens, abundant in wet years. Flowers minute, the inflorescences bracteate. *Vanderplank & Still 090306-4.*
- †*CRYPTANTHA PATULA* Greene. Annual. Frequent. Sandy soil and volcanic field; Arroyo El Socorro, dunes, Punta Mazo, and Isla San Martín. Similar in appearance to *C. intermedia* (both with calyces >4 mm long), but with simple (unbranched) inflorescences. *Vanderplank & Hannon 080529-5.*
- †*CRYPTANTHA PONDII* Greene. Annual. Frequent. Succulent scrub of volcanic field (vicinity of largest cinder cone) and Arroyo El Socorro. Distinguished by having smaller features than *C. intermedia* and *C. patula*, with calyces <4 mm long. *Vanderplank & Lesch 050318-27.*
- ERIODICTYON ANGUSTIFOLIUM* Nutt. Large shrub. Scarce. Southern edge of Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-1.*
- †*ERIODICTYON SESSILIFOLIUM* Greene. Small shrub. Scarce. Southern edge of Santo Domingo Wash. Growing with *E. angustifolium*. *Vanderplank & Ochoa 090525-9.*
- EUCRYPTA CHRYSANTHEMIFOLIA* (Benth.) Greene var. *BIPINNATIFIDA* (Torr.) Constance. Annual. Occasional to frequent in wet years. Throughout the cinder cones of the volcanic field. Corollas slightly larger than the calyces, but more consistent with var. *bipinnatifida* than var. *chrysanthemifolia*. *Vanderplank, Ochoa & Harper 080217-35.*
- EUCRYPTA CHRYSANTHEMIFOLIA* (Benth.) Greene var. *CHRYSANTHEMIFOLIA*. Annual. Scarce. Succulent scrub of volcanic field. Corollas notably larger than the calyces. *Vanderplank, Ochoa & Harper 080219-06.*
- HELIOTROPIMUM CURASSAVICUM* L. Perennial herb (with semisucculent leaves). Occasional. Sandy soils of riparian areas, especially in San Simón Wash and El Socorro Dunes. *Vanderplank, Fraga & Kempton 060722-11.*
- †*NAMA HISPIDUM* A.Gray var. *SPATHULATUM* (Torr.) C.Hitchc. Annual. Rare. Santo Domingo Wash. *Vanderplank & Ochoa 090525-8.*
- PECTOCARYA PENINSULARIS* I.M.Johnst. Annual. Scarce. Succulent scrub of volcanic field and on El Socorro Dunes. Primarily a Sonoran Desert species. *Vanderplank, Fraga & Ochoa 080110-14.*
- PECTOCARYA RECURVATA* I.M.Johnst. Annual. Rare. Slopes of cinder cones. *Vanderplank, Ochoa & Harper 080215-22.*
- PHACELIA DISTANS* Benth. Annual. Occasional. Scattered throughout the succulent scrub of the volcanic field. *Vanderplank & J. Vanderplank 050515-6.*
- †*PHACELIA HIRTUOSA* A.Gray. Annual. Rare. On slopes of Santa María Escarpment. Sepals dimorphic (sensu Wiggins 1980). *Vanderplank, Ochoa, Hannon, Harper & Bell 080323-7.*
- †*PHACELIA IXODES* Kellogg. Herbaceous; not clear if this taxon is truly perennial, or more like an annual or biennial. Frequent. Locally common on the lava rock of the volcanic field. Abundant glands with phytotoxins can cause dermatitis. Plants in the flora area, including specimens from Isla San Martín, often have lobed sepals. *Vanderplank, Arvizu & Thibault 050730-4.*
- PHACELIA PARRYI* Torr. Annual. Common. Abundant in wet years, throughout the succulent scrub. *Vanderplank, Fraga & Ochoa 080112-01.*
- †*PHACELIA STELLARIS* Brand. Annual. Occasional. Restricted to stable dunes. Distinctive low, prostrate phacelia on sand with lobed leaves and pale purple flowers. *Vanderplank & Still 090307-12.*
- †*PHOLISMA ARENARIUM* Hook. ex Hook. Parasitic perennial herb. Occasional. In sand near Monte Sudoeste (at head of sand spit) and on El Socorro Dunes. *Vanderplank, Harper, Baird & Ochoa 070722-4.*
- †*PHOLISTOMA MEMBRANACEUM* (Benth.) Constance. Annual. Scarce. Succulent scrub of the northern cluster of cinder cones, in craters and depressions. Calyces without appendages and the corollas white. *Vanderplank, Ochoa & Harper 080219-17.*
- PHOLISTOMA RACEMOSUM* (Nutt.) Constance. Annual. Frequent. Throughout the succulent scrub, often trailing over low shrubs and tangling with other herbs. Calyx enclosing the fruit, the calyx appendages conspicuous. *Vanderplank, Fraga & Ochoa 080110-10.*
- PLAGIOBOTHRYIS COLLINUS* (Phil.) I.M.Johnst. var. *CALIFORNICUS* (A.Gray) Higgins. Annual. Scarce. El Socorro Dunes. Corollas 4–7 mm long. *Vanderplank & Still 090307-5.*
- PLAGIOBOTHRYIS COLLINUS* (Phil.) I.M.Johnst. var. *FULVESCENS* (I.M.Johnst.) Higgins. Annual. Scarce. Open flat area near marsh. Corollas 1–3 mm long. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-9.*
- †*PLAGIOBOTHRYIS COLLINUS* var. *URSINUS* (A.Gray) Higgins. Annual. Scarce. Cinder cones in succulent scrub. The variety distinguished by having inflorescences shorter than the leaves. *Vanderplank, O'Brien & Arvizu 050202-37.*
- †*PLAGIOBOTHRYIS LEPTOCLADUS* (Greene) I.M.Johnst. Annual. Rare. Vernal area, in roadside ditch at Ejido El Papalote following several weeks of inundation. This species, more widespread in western North America, is nearing extirpation in Baja California. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-11.*
- TIQUILIA PPLICATA* (Torr.) A.T.Richardson. Perennial herb. Scarce. Sandy soils along major washes, e.g., San Simón Wash. A desert species at the edge of its range in the flora area. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-8.*

## BRASSICACEAE

- \*BRASSICA NIGRA (L.) W.D.J.Koch. Annual. Uncommon. Weed of wet agricultural areas. *Vanderplank, Ocampo, Kempton & Chhetri 070330-23.*
- \*BRASSICA TOURNEFORTII Gouan. Annual. Abundant. Common weed of disturbed areas, often occurring with considerable density in riparian areas. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090701-3.*
- \*CAKILE MARITIMA Scop. var. MARITIMA. Annual. Occasional. Usually on the strand line, on open beaches, and young dunes. *Vanderplank & Figueroa 090411-4.*
- CAULANTHUS LASIOPHYLLA (Hook. & Arn.) Payson [*Guillenia lasiophylla* (Hook. & Arn.) Greene]. Annual. Scarce. Lava mounds and cinder cones of volcanic field. A native mustard with white flowers and strongly reflexed fruits. *Vanderplank, Ochoa & Harper 080218-39.*
- DESCURAINIA PINNATA (Walter) Britton subsp. GLABRA (Wootton & Standl.) Detling. Annual. Frequent. In and around volcanic field and succulent scrub. *Vanderplank, Ochoa & Harper 080215-7.*
- †DITHYREA MARITIMA (Davidson) Davidson. Perennial herb, but dormant in dry years. Scarce. May be locally common in wet years, on dunes of Punta Mazo and El Socorro. *Vanderplank, Espejel & IAVS field trip 100421-2.*
- DRABA CUNEIFOLIA Nutt. ex Torr. & A.Gray. Annual. Rare. Crater rim at summit of the largest cone. *Vanderplank, Fraga & Ochoa 080112-32.*
- \*HIRSCHFELDIA INCANA (L.) Lagr.-Foss. Annual. Occasional. Weed of disturbed roadsides and agricultural edges. *Vanderplank & Bell 080627-5.*
- †HORNUNGIA PROCUMBENS (L.) Hayek [*Hutchinsia procumbens* (L.) Desv.]. Annual. Frequent. Common in wet years. El Socorro Dunes and throughout the succulent scrub. *Vanderplank, Fraga & Ochoa 080111-22.*
- †LEPIDIUM LASIOCARPUM Nutt. var. LATIFOLIUM C.L.Hitchc. Annual. Occasional. Sandy soil around the volcanic field and Santo Domingo Wash. This variety sensu Wiggins (1980). It is not clear that this taxon was considered in more recent treatments for the Flora of North America. *Vanderplank, Lesch, Soza, et al. 050320-35.*
- LEPIDIUM NITIDUM Nutt. Annual. Occasional. Scattered throughout the flora area, in scrub, dunes, and riparian areas. *Vanderplank, Fraga & Ochoa 080113-02.*
- LEPIDIUM OBLONGUM Small [*L. o. var. oblongum*, *L. o. var. insulare*]. Annual. Occasional. Scattered throughout the region on stable dunes and in succulent scrub. *Vanderplank, Fraga & Ochoa 080113-02.*
- \*LEPIDIUM PINNATIFIDUM Ledeb. Annual. Scarce. Weed on clay mesa north of Santa María Escarpment. *Vanderplank & Ochoa 090524-4.*
- LEPIDIUM VIRGINICUM L. subsp. MENZIESII (DC.) Thell [*L. v. var. pubescens*]. Annual. Scarce. Weedy in riparian areas. *Vanderplank & Ochoa 090524-27.*
- \*RAPHANUS SATIVUS L. Annual. Occasional. Weed of roadsides, waste places, and riparian areas. *Vanderplank & Ochoa 081128-10.*
- †SIBARA BRANDEGEANA (Rose) Greene. Annual. Rare. Monte Sudoeste (at head of sand spit). Endemic to the Baja California Peninsula. *Vanderplank, Ochoa & Harper 080216-06.*
- \*SISYMBRIUM IRIO L. Annual. Frequent. Weed of disturbed sites and roadsides. *Vanderplank & Ochoa 070513-19.*
- \*SISYMBRIUM ORIENTALE L. Annual. Scarce. Weed around cultivated fields. *Vanderplank & Bell 080627-8.*

## CACTACEAE

- †BERGEROACTUS EMORYI (Engelm.) Britton & Rose. Succulent. Occasional. Most numerous on the El Socorro Dunes, but also on middens and in the succulent scrub outside the volcanic field. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-26.*
- †CYLINDROPUNTIA ALCAHES (F.A.C.Weber) F.M.Knuth var. nov. Succulent. Scarce. Few individuals scattered on middens, stable dunes, and in sandy washes; San Simón Wash, El Socorro Dunes, midden at Ejido Venustiano Carranza II, and clay mesa near Santa María Escarpment. Somewhat similar to *C. prolifera* but flowering and fruiting much less readily and with shorter, thinner spines. *Vanderplank & Ochoa 090524-1.*
- †CYLINDROPUNTIA CHOLLA (F.A.C.Weber) F.M.Knuth. Succulent. Occasional. Population of ca. 400 individuals on midden at Ejido Venustiano Carranza II, rare in washes. Blue-gray stem segments and pink flowers. *Vanderplank & Bell 080627-18.*
- †CYLINDROPUNTIA MOLESTA (Brandege) F.M.Knuth. Succulent. Occasional. Coastal areas on sandy soil. Rarely co-occurring with other *Cylindropuntia* species. Plants tall (ca. 2 m) with relatively long spines. *Vanderplank, Hapner, Gover, Mata & Rodriguez 080927-5.*
- CYLINDROPUNTIA PROLIFERA (Engelm.) F.M.Knuth. Succulent. Frequent to common. Throughout the area, often on sandy soil of dunes, middens, and riparian areas. Triploid hybrid between *C. alcahes* and *C. cholla* that shows hybrid fitness and is more abundant, with larger range than both parents. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-14.*
- †CYLINDROPUNTIA ROSARICA (G.E.Linds.) Backeb. Succulent. Occasional. Population of ca. 200 individuals on shell midden at Ejido Venustiano Carranza II and scattered plants in riparian areas (Arroyo El Socorro and San Simón Wash). Listed on NOM-059. Low creeping cactus with green stems and yellow flowers. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-13.*
- †ECHINOCEREUS MARITIMUS (M.E.Jones) K.Schum. var. MARITIMUS. Succulent. Frequent. In succulent scrub, sand dunes and frequent on middens, tolerating some salinity. *Vanderplank, Ochoa & Harper 080219-1.*
- †FEROACTUS FORDII (Orcutt) Britton & Rose var. FORDII. Succulent. Common. Scattered throughout the succulent scrub, slopes of cinder cones, middens, dunes, persisting in some agricultural margins, and tolerating some salinity. Endemic to the Baja California peninsula. Flowers pink. *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-15.*
- †FEROACTUS VIRIDESCENS (Torr. & A.Gray) Britton & Rose var. VIRIDESCENS. Succulent. Rare. Coastal mesa just south of Santo Domingo Wash. Flowers green. *Vanderplank & Ochoa 090524-11.*
- †LOPHOCEREUS SCHOTTII (Engelm.) Britton & Rose var. SCHOTTII. Succulent. Occasional. Middens, El Socorro Dunes, and succulent scrub near the coast; often bordering saline habitats. Listed on NOM-059. Primarily a desert species here at the northwestern edge of its range. *Vanderplank & Ochoa 071125-2.*
- †MAMMILLARIA BRANDEGEEI (J.M.Coult.) K.Brandege var. BRANDEGEEI. Succulent. Rare. Clay mesa north of Santa María Escarpment. A distinctive cactus that grows at the soil level and shrinks back into the ground during drought. Flowers yellow. *Vanderplank & Figueroa 090414-13.*
- †MAMMILLARIA DIOICA K.Brandege. Succulent. Frequent. Throughout the succulent scrub, El Socorro Dunes, and on middens. *Vanderplank & Lauri 050424-54.*
- †MAMMILLARIA LOUISAE G.E.Linds. Succulent. Occasional. Locally common on Isla San Martín, rare on El Socorro Dunes. Small plants with relatively large flowers (often larger than the plant body), and brown stigmas, tubercle axils without bristles. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090628-5.*
- †MYRTILLOCACTUS COCHAL (Orcutt) Britton & Rose. Succulent. Scarce. Succulent scrub of Santa María Escarpment, but not present in the volcanic field. Recently extirpated from Isla San Martín. A desert species at the northern margin of its range. *Vanderplank & Ochoa 071124-2.*
- \*OPUNTIA FICUS-INDICA (L.) Mill. Succulent. Scarce. Isla San Martín near the fishing village, presumably persisting from cultivation. *Vanderplank, Bell, Mata & Rodriguez 080628-4.*
- OPUNTIA aff. LITTORALIS (Engelm.) Cockerell. Succulent. Occasional. El Socorro Dunes and succulent scrub outside the volcanic field including clay mesa north of Santa María Escarpment. *Vanderplank & Ochoa 070513-23.*

- †*OPUNTIA* cf. *ORICOLA* Philbrick. Succulent. Scarce. Middens at Ejido Venustiano Carranza II and scrub areas on Isla San Martín. Gross morphology similar to *O. littoralis*, but mature cladodes round with greater spine density. *Vanderplank & Bell 080627-17*.
- OPUNTIA* cf. *PHAEACANTHA* Engelm. Succulent. Rare. Santo Domingo Wash. The spines in pairs with one lying flat across the cladode and along the margins. *Vanderplank & Ochoa 081128-8*.
- STENOCEREUS GUMMOSUS* (Engelm.) A.Gibson & K.E.Horak. Succulent. Occasional. Succulent scrub and on El Socorro Dunes. *Vanderplank & Ochoa 071123-9*.

## CAMPANULACEAE

- NEMACLADUS SIGMOIDEUS* G.T.Robbins. Annual. Rare. Waif in Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-12*

## CARYOPHYLLACEAE

- ACHYRONYCHIA COOPERI* Torr. & A.Gray. Annual. Occasional. Sandy soil of dunes and riparian areas. *Vanderplank, Ochoa & Harper 080216-27*.
- CARDIONEMA RAMOSISSIMA* (Weinm.) A.Nelson & J.F.Macbr. Perennial herb. Occasional. Open areas, sandy soil, and lava scree. *Vanderplank & Lauri 050424-57*.
- LOEFLINGIA SQUARROSA* Nutt. Annual. Rare. On ridge of cinder cone in the northernmost cluster. *Vanderplank, Ochoa, Hannon, Harper & Bell 080329-11*.
- SPERGULARIA MACROTHECA* (Hornem. ex Cham. & Schldl.) Heynh. var. *MACROTHECA*. Perennial herb. Occasional. Saline flats. *Vanderplank, Reccia & Robinson 080816-6*.
- SPERGULARIA SALINA* J.Presl & C.Presl [*S. marina* (L.) Griseb.]. Annual. Scarce or occasional. Possibly not native. Sand and saline flats. *Vanderplank, Ochoa, Hannon, Harper & Bell 080326-1*.

## CLEOMACEAE

- PERITOMA ARBOREA* (Nutt.) H.H.Iltis [*Isomeris arborea* Nutt.]. Small shrub. Scarce. On lava mounds and cinder cones of the volcanic field. *Vanderplank & Lesch 050318-38*.

## CONVOLVULACEAE

- CALYSTEGIA MACROSTEGIA* (Greene) Brummitt subsp. *TENUIFOLIA* (Abrams) Brummitt. Perennial herb with vining stems. Scarce. Riparian areas, climbing over other shrubs. *Vanderplank & Mata 081024-6*.
- \**CONVOLVULUS ARVENSIS* L. Perennial herb with twining stems. Scarce. In roadside ditches, weed of damp disturbed places. *Vanderplank & Ochoa 081201-1*.
- CRESSA TRUXILLENIS* Kunth. Perennial herb. Scarce. Raised sandy margins of salt marsh at head of Bahía San Quintín. Glabrous and glaucous plants observed (green and gray foliage). *Vanderplank & Hannon 080530-8*.
- CUSCUTA OCCIDENTALIS* Millsp. ex Mill. & Nutt. [*C. californica* Hook. & Arn. var. *breviflora* Engelm.]. Parasitic annual. Frequent. Growing on plants of the succulent scrub and dunes, in the volcanic field and beyond. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060916-16*.
- CUSCUTA PACIFICA* Costea & M.A.R.Wright var. *PACIFICA* [*C. salina* Engelm. var. *major* Yuncker]. Parasitic annual. Rare. Growing over low vegetation in salt marsh at Punta Azufre. *Vanderplank, Ochoa & Harper 080216-35*.
- CUSCUTA SUBINCLUSA* Durand & Hilg. Parasitic annual. Scarce. On *Malosma laurina* and plants of succulent scrub. Flowers elongated, not primarily in saline habitats. *Vanderplank, Fraga & Kempton 060723-11*.

## CRASSULACEAE

- CRASSULA CONNATA* (Ruiz & Pav.) A.Berger. Annual. Common. Abundant under shrubs in succulent scrub in wet years. A diminutive, cleistogamous herb. *Vanderplank, Fraga & Ochoa 080112-28*.
- †*DUDLEYA ANTHONYI* Rose ex Britton & Rose. Succulent perennial herb. Frequent. Endemic to the cinder cones and lava of the volcanic field, including Isla San Martín. Mostly adjacent to the ocean, less frequent inland. Large dudleya with white rosettes and red flowers. Related to *D. pulverulenta* (Nutt.) Britton & Rose. *Vanderplank, Roberts, Bramlet & Southern California Botanists group 070811-8*.
- †*DUDLEYA ANTHONYI* × *D. CULTRATA*. Succulent perennial herb. Scarce. Most numerous on Isla San Martín and rare on the adjacent mainland cinder cones. Well documented by Reid Moran; hybrids vary considerably in size, color and form. *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-6*.
- †*DUDLEYA ATTENUATA* (S.Watson) Moran subsp. *ATTENUATA*. Succulent perennial herb. Common. Lava of the volcanic field and open areas of succulent scrub. Small terete-leaved dudleya with gray leaves. *Vanderplank & J. Vanderplank 050515-7*.
- DUDLEYA CULTRATA* Rose. Succulent perennial herb. Common. Throughout succulent scrub and frequent on dunes, entering areas of mild salinity. Green rosettes (occasionally with red markings) and yellow flowers. Hybridizing with *D. anthonyi* on Isla San Martín. *Vanderplank & J. Vanderplank 050515-8*.

## CUCURBITACEAE

- MARAH MACROCARPUS* (Greene) Greene var. *MACROCARPUS*. Geophyte; vining perennial. Frequent. Throughout the succulent scrub, sprawling over shrubs on cinder cones and volcanic rock. *Vanderplank, Fraga & Ochoa 080110-8*.

## ERICACEAE

- ARCTOSTAPHYLOS GLAUCA* Lindl. Large shrub. Rare. Waif in Santo Domingo Wash. *Vanderplank & Mata 081024-26*.

## EUPHORBIACEAE

- ACALYPHA CALIFORNICA* Benth. Small shrub. Occasional in washes and on the El Socorro Dunes. *Vanderplank, Ocampo, Kempton & Chhetri 070331-5*.
- CROTON CALIFORNICUS* Muell. Arg. Suffruticose perennial. Frequent. Locally common (occasionally co-dominant) on El Socorro Dunes, and present in sandy riparian areas. *Vanderplank, Ochoa & Harper 080217-51*.
- EUPHORBIA MISERA* Benth. Small shrub. Common. Sometimes co-dominant in the succulent scrub. *Vanderplank, O'Brien & Arvizu 050202-38*.
- EUPHORBIA POLYCARPA* Benth. [*Chamaesyce polycarpa* (Benth.) Millsp.]. Perennial herb. Frequent. Throughout succulent scrub of the cinder cones and El Socorro Dunes near the road. Cyathia appendages white. *Vanderplank, Lesch, Soza, et al. 050320-05A*.
- †*EUPHORBIA PONDII* Millsp. [*Chamaesyce pondii* (Millsp.) Millsp.]. Annual. Frequent. Throughout the cinder cones and on dunes and sandy places. Plants often reddish; cyathia appendages small or absent. *Vanderplank & Ledyard 090206-2*.
- \**RICINUS COMMUNIS* L. Large shrub. Occasional. Riparian areas, particularly Santo Domingo Wash. *Vanderplank, Fraga & Kempton 060723-06*.
- STILLINGIA LINEARIFOLIA* S.Watson. Suffruticose perennial. Occasional. Locally scattered on El Socorro Dunes and scarce in riparian areas. *Vanderplank, Harper, Baird & Ochoa 070722-5*.

## FABACEAE

- †*AMORPHA APICULATA* Wiggins. Large shrub. Rare. One plant in Santo Domingo Wash. Waif. *Vanderplank & Mata 081024-18*.



- †*ASTRAGALUS ANEMOPHILUS* Greene. Suffruticose perennial. Frequent. Local endemic, restricted to dunes and shell middens. *Vanderplank & Figueroa 090411-2*.
- †*ASTRAGALUS FASTIDIUS* (Kellogg) M.E.Jones. Suffruticose perennial. Occasional. Santo Domingo Wash, among cones of the volcanic field, and bordering agricultural areas. Endemic to the Baja California peninsula. *Vanderplank & Ochoa 081129-1*.
- †*ASTRAGALUS GRUINUS* Barneby. Suffruticose perennial. Scarce. Santo Domingo Wash, in loose sand. Flower color and corolla patterning highly variable in this taxon (each plant with different flowers). *Vanderplank & Mata 081024-14*.
- †*ASTRAGALUS HORNII* A.Gray var. *MINUTIFLORUS* M.E.Jones. Annual. Rare. Santo Domingo Wash in loose sand. *Vanderplank & Ochoa 090524-13*.
- †*ASTRAGALUS INSULARIS* Kellogg var. *QUENTINUS* M.E.Jones. Annual. Rare. Large shell midden south of Punta Azufre in Ejido Venustiano Carranza II. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-21*.
- ASTRAGALUS* aff. *PALMERI* A.Gray [*A. palmeri* var. *johnstonii* (Munz & McBurney) Barneby]. Annual. Rare. Santo Domingo Wash. Pods relatively large. Specimens from the flora area approach *A. douglasii* (Torr. & A.Gray) A.Gray in gross morphology. *Vanderplank & Mata 081024-9*.
- †*ASTRAGALUS PRORIFER* M.E.Jones. Suffruticose perennial. Rare. Santo Domingo Wash in loose sand. *Vanderplank & Still 090305-1*.
- ASTRAGALUS TRICHOPODUS* (Nutt.) A.Gray var. *LONCHUS* (M.E.Jones) Barneby. Perennial herb with inflated pods. Common. Scattered among cones in volcanic field and coastal dunes and middens. Easily confused with herbarium specimens of *A. fastidius*, but distinguished by having inflated pods. *Vanderplank & Figueroa 090413-1*.
- †*LOTUS BRYANTII* (Brandege) Ottley. Perennial herb. Occasional. Locally common on dunes of El Socorro and sand spit to Punta Mazo. Primarily a desert species, endemic to the Baja California peninsula. Foliage grayish, the peduncles long, and the flowers red and white. *Vanderplank, Lesch, Soza, et al. 050320-28*.
- †*LOTUS DISTICHUS* (Greene) Greene. Perennial herb. Occasional. Dunes of El Socorro and sand spit to Punta Mazo. Herbage grayish, the flowers sessile, red and yellow. *Vanderplank & Bell 080425-14*.
- LOTUS HAMATUS* Greene. Annual. Rare. On northern cluster of cinder cones. *Vanderplank, Ochoa, Hannon, Harper & Bell 080329-12*.
- LOTUS HEERMANNII* (Durand & Hilg.) Greene. Perennial herb. Occasional. Locally common in Santo Domingo Wash. Plants prostrate with short peduncles, hairy foliage, and variably sized leaflets. *Vanderplank & Mata 081024-8*.
- †*LOTUS NUTTALLIANUS* Greene. Annual. Occasional. Frequent in riparian areas and on stable coastal dune banks. Prostrate plants with small flowers and leaves, and long peduncles. *Vanderplank & Ochoa 061124-6*.
- LOTUS RIGIDUS* (Benth.) Greene. Suffruticose perennial. Rare. Santo Domingo Wash. Plants erect, with the large flowers and fruits. *Vanderplank & Still 090305-5*.
- LOTUS PURSHIANUS* (Benth.) Clem. & E.G.Clem. Annual. Rare. Waif in Santo Domingo Wash. *Vanderplank & Ochoa 090522-7*.
- LOTUS STRIGOSUS* (Nutt.) Greene. Annual. Occasional. Lava rock of volcanic field in the succulent scrub and El Socorro Dunes. Small plants with flowers usually single or occasionally in pairs. *Vanderplank, Koepke, Arvizu & Eisenstein 070225-15*.
- †*LOTUS WATSONII* (Vasey & Rose) Greene. Small shrub. Frequent. Locally common in succulent scrub and riparian areas. Very similar in habit to *Lotus scoparius*, long peduncles. *Vanderplank, Ochoa & Harper 080217-63*.
- LUPINUS BICOLOR* Lindl. Annual. Scarce. Open fields and roadsides. *Vanderplank & Still 090307-2*.
- LUPINUS CONCINNUS* J.G.Agardh. Annual. Occasional. Low spreading lupin with small, pale flowers, scattered in succulent scrub and Santo Domingo Wash. If varieties are recognized, the flora area population would be var. *pallidus* (Brandege) C.P.Sm. *Vanderplank & Figueroa 090414-20*.
- LUPINUS* cf. *LONGIFOLIUS* (S.Watson) Abrams. Small shrub. Rare. Santo Domingo Wash. *Vanderplank & Mata 081024-28*.
- LUPINUS SPARSIFLORUS* Benth. Annual. Occasional. Scattered in open areas of succulent scrub in volcanic field. Plants hirsute with blue and white flowers and minute hairs at the base of the keel petals. *Vanderplank, Ochoa & Harper 080218-11*.
- LUPINUS SUCCULENTUS* Douglas ex C.Koch. Annual. Frequent. Common in wet years when the seeds are sometimes locally harvested. Succulent scrub, roadsides, and weedy habits. Plants in the flora area usually small, the herbage glabrate and the flowers whorled, bluish purple or occasionally white. *Vanderplank & Still 090306-15*.
- LUPINUS TRUNCATUS* Nutt. ex Hook. & Arn. Annual. Occasional. Scattered throughout open areas in scrub and on El Socorro Dunes. Plants slender, with narrow blunt leaflets, and violet flowers. *Vanderplank, Ochoa & Harper 080216-13*.
- \**MEDICAGO POLYMORPHA* L. Annual. Occasional. Weed of agricultural areas and disturbed sites. *Vanderplank & Ochoa 070513-18*.
- \**MEDICAGO SATIVA* L. Perennial herb. Occasional. Weed of agricultural areas and disturbed places. *Vanderplank & Ochoa 070513-22*.
- \**MELILOTUS ALBUS* Medikus. Annual to perennial herb. Occasional. Riparian areas and agricultural areas. *Vanderplank & Ochoa 070513-10*.
- \**MELILOTUS INDICUS* (L.) All. Annual. Occasional. Riparian areas and agricultural areas. Often occurring with *M. albus*. *Vanderplank & Ochoa 070513-6*.
- PHASEOLUS FILIFORMIS* Benth. Annual (vine). Occasional to scarce. Slopes of cinder cones. *Vanderplank, Ochoa & Harper 080218-17*.
- †*PICKERINGIA MONTANA* Nutt. var. *TOMENTOSA* (Abrams) I.M.Johnst. Small shrub. Rare. Waif in Santo Domingo Wash. *Vanderplank & Ochoa 081127-1*.
- PROSOPIS GLANDULOSA* Torr. var. *TORREYANA* (L.D.Benson) M.C.Johnst. Large shrub. Occasional. Riparian areas. *Vanderplank & Mata 081024-27*.
- TRIFOLIUM MICROCEPHALUM* Pursh. Annual. Rare. Waif in Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-9*.
- TRIFOLIUM WILLDENOVII* Spreng. Annual. Scarce. Lava mounds and cinder cones. Most numerous in the northern group of cinder cones. *Vanderplank, Ochoa, Hannon, Harper & Bell 080329-1*.
- †*VICIA LUDOVICIANA* Nutt. ex Torr. & A.Gray var. *LUDOVICIANA*. Annual. Scarce. Lava and open areas in volcanic field. *Vanderplank, Ochoa, Hannon, Harper & Bell 080328-28*.

## FRANKENIACEAE

- †*FRANKENIA PALMERI* S.Watson. Small shrub. Common. Dominant on saline flats and upper reaches of salt marsh, often co-dominant with *Atriplex julacea*. Flowers small, the petals white and anthers reddish. *Vanderplank & J. Vanderplank 050516-3*.
- FRANKENIA SALINA* (Molina) I.M.Johnst. Perennial herb. Common. Abundant in periodically inundated tidal marshes. Flowers pink. *Vanderplank & Lauri 050425-7*.

## GENTIANACEAE

- ZELTNERA VENUSTA* (A.Gray) G.Mans. [*Centaurium venustum* (A.Gray) B.L.Rob.]. Annual. Occasional. Frequent in wet years. Often growing with *Navarretia hamata* in the succulent scrub. *Vanderplank & J. Vanderplank 050515-9*.

## GERANIACEAE

- \**ERODIUM BRACHYCARPUM* (Godr.) Thell. Annual. Occasional. Weed of roadside ditches and disturbed agricultural places. *Vanderplank & Lesch 050318-8*.

\*ERODIUM CICUTARIUM (L.) L'Hér. ex Aiton. Annual. Frequent. Throughout disturbed areas and edges in succulent scrub and riparian areas. *Vanderplank, Fraga & Ochoa 080113-05.*

\*ERODIUM MOSCHATUM (L.) L'Hér. ex Aiton. Annual. Occasional. Weedy in disturbed areas. *Vanderplank, Fraga & Ochoa 080111-20a.*

ERODIUM TEXANUM A.Gray. Annual. Scarce. On high ground in the northern and southern cluster of cinder cones. Primarily a desert species. *Vanderplank, Ochoa & Harper 080219-16.*

## GROSSULARIACEAE

†RIBES TORTUOSUM Benth. Small shrub. Frequent. Throughout the succulent scrub. Endemic to the Baja California peninsula. *Vanderplank, Gribbin & Ochoa 061226-1.*

## LAMIACEAE

HYPTIS EMORYI Torr. Large shrub. Rare. Santo Domingo Wash. Primarily a desert species, here at the edge of its range. *Vanderplank & Ochoa 061123-5.*

\*MARRUBIUM VULGARE L. Suffruticose perennial. Scarce. Weed in disturbed areas. *Vanderplank, Ocampo, Kempton & Chhetri 070330-1.*

†MONARDELLA LINOIDES A.Gray subsp. STRICTA (Parish) Epling. Annual. Rare. Waif in Santo Domingo Wash after heavy rain, presumably washed down from the Sierra San Pedro Mártir. *Vanderplank, Eisenstein, O'Brien & Howard 100714-3.*

SALVIA APIANA Jeps. Small shrub. Occasional. Major riparian drainages (Santo Domingo and San Simón). *Vanderplank & Mata 081024-25.*

†SALVIA BRANDEGEEI Munz. Large shrub. Scarce. In the flora area known only from a population at a mine on one of the cinder cones. *Vanderplank, Ochoa, Hannon, Harper & Bell 080328-14.*

SALVIA COLUMBARIAE Benth. Annual. Occasional. Slopes of cinder cones in succulent scrub. *Vanderplank, Ochoa & Harper 080218-14.*

SALVIA MUNZII Epling. Small shrub. Rare. Sandy washes. *Vanderplank & Still 090306-18.*

## LOASACEAE

†EUCNIDE CORDATA Kellogg. Perennial herb. Scarce in Río Santo Domingo and Arroyo El Socorro. *Vanderplank, Eisenstein, Arvizu & Koepke 070226-5.*

MENTZELIA MULTIFLORA (Nutt.) A.Gray subsp. LONGILOBA (J.Darl.) Felger. Perennial herb. Rare. San Simón Wash in open areas with loose sand. *Vanderplank, Fraga & Kempton 060723-20.*

PETALONYX LINEARIS Greene. Small shrub. Rare. Arroyo El Socorro. A desert species at the margin of its geographic range. *Vanderplank & Ochoa 071122-11.*

## MALVACEAE

MALACOTHAMNUS FASCICULATUS (Nutt. ex Torr. & A.Gray) Greene. Small shrub. Rare. Arroyo El Socorro and cinder cones. *Vanderplank & Ochoa 081201-7.*

\*MALVA PARVIFLORA L. Annual. Common. Weed of roadsides, agricultural and other disturbed areas. *Vanderplank & Ochoa 070513-17.*

SPHAERALCEA AMBIGUA A.Gray. Suffruticose perennial. Frequent. Throughout the succulent scrub. Various flower colors observed in the flora area. Subspecies appear to be hybridizing in this region. *Vanderplank & Ochoa 081127-5.*

SPHAERALCEA AXILLARIS S.Watson. Suffruticose perennial. Rare. Succulent scrub. *Vanderplank & Figueroa 090414-15.*

†SPHAERALCEA FULVA Greene. Suffruticose perennial. Occasional. Succulent scrub and sandy washes. *Vanderplank & Lauri 050424-10.*

## MYRTACEAE

\*EUCALYPTUS CAMALDULENSIS Dehnh. Tree. Rare. Santo Domingo Wash, near gravel extraction plant. Planted and persisting. *Vanderplank & Mata 081024-17.*

## MYRSINACEAE

\*ANAGALLIS ARVENSIS L. Annual. Rare in riparian areas. *Vanderplank & Ochoa 081128-7.*

## NYCTAGINACEAE

†ABRONIA MARITIMA Nutt. ex S.Watson subsp. MARITIMA. Perennial herb with succulent leaves and magenta flowers all year. Dune stabilizing dominant on young coastal dunes. *Vanderplank & Lesch 050318-76.*

ABRONIA UMBELLATA Lam. subsp. UMBELLATA. Perennial herb. Common in sandy soils, abundant in years with heavy rain. It is not practical to distinguish *A. umbellata* from *A. gracilis* Benth., at least in the flora area, using current identification keys. *Vanderplank & Still 090306-21.*

MIRABILIS LAEVIS (Benth.) Curran var. CRASSIFOLIA (Choisy) Spellenb. [*Mirabilis californica* A.Gray]. Suffruticose perennial. Common. Present throughout the succulent scrub. A small-flowered white morph was seen on Isla San Martín. *Vanderplank & Ochoa 070513-21.*

## ONAGRACEAE

CAMISSONIOPSIS CHEIRANTHIFOLIA (Hornem. ex Spreng.) W.L.Wagner & Hoch subsp. SUFFRUTICOSA (S.Watson) W.L.Wagner & Hoch [*Camissonia cheiranthifolia* (Hornem. ex Spreng.) Raim. subsp. *cheiranthifolia*]. Annual. Common. On young dunes (frequently on the lee side of the first dune and near the ocean) and occasional in washes and other sandy soil sites. *Vanderplank, Ochoa & Harper 080217-45.*

CAMISSONIOPSIS HIRTELLA (Greene) W.L.Wagner & Hoch [*Camissonia hirtella* (Greene) P.H.Raven]. Annual. Scarce. Co-occurring with other *Camissoniopsis* species (e.g., *C. lewisii*) in sandy riparian areas. Plants generally erect with short glandular hairs and slender fruits (>2 mm). *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-15.*

†CAMISSONIOPSIS LEWISII (P.H.Raven) W.L.Wagner & Hoch. Annual. Common. Sandy soil of riparian areas and on dunes. New record for Isla San Martín. Fruits distinctive, gnarled, and >2 mm in diameter. This is the most common annual *Camissoniopsis* in the flora area. *Vanderplank & Lesch 050318-20.*

†CAMISSONIOPSIS PROAVITA (P.H.Raven) W.L.Wagner & Hoch [*Camissonia proavita* P.H.Raven]. Annual. Scarce. Sandy soil of dunes and shell middens. All fruits borne at base of plant among long leaves. Plants sparsely branched or unbranched, the flowers notably small. *Vanderplank, Ochoa & Harper 080217-23.*

†EPILOBIUM PYGMAEUM (Speg.) Hoch & P.H.Raven. Annual. Rare. A few individual were found in vernal areas after heavy rains. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-7.*

EULOBUS CALIFORNICUS Nutt. ex Torr. & A.Gray [*Camissonia californica* (Torr. & A.Gray) P.H.Raven]. Annual. Scarce. Uncommon annual of dunes and sandy areas along the coast. *Ochoa & Harper 080218-20.*

†EULOBUS CRASSIFOLIUS (Greene) W.L.Wagner & Hoch [*Camissonia crassifolia* (Greene) P.H.Raven]. Suffruticose perennial. Common. On intact dune systems, commonly on younger dunes. Endemic to the Baja California peninsula. Leaves entire and the flowers large. *Vanderplank, Ochoa & Kiel 071215-5.*

†OENOTHERA WIGGINSII W.M.Klein. Annual. Frequent. Locally common in wet years in open and sometimes disturbed areas of succulent scrub and on El Socorro Dunes. Local endemic, with only one collection known from outside the Greater San Quintín area. Plant becomes woody in fruit. *Vanderplank, Ochoa & Harper 080216-8.*

## OROBANCHACEAE (INCLUDES SCROPHULARIACEAE, IN PART)

CASTILLEJA EXSERTA (A.Heller) T.I.Chuang & Heckard subsp. EXSERTA [*Orthocarpus exsertus* A.Heller]. Hemiparasitic annual. Scarce.

- Scrub of volcanic field and riparian areas. Rarely seen in significant numbers. *Vanderplank, Ochoa, Hannon, Harper & Bell 080328-5.*
- CASTILLEJA SUBINCLUSA Greene subsp. SUBINCLUSA. Hemiparasitic perennial herb. Rare. Slopes of cones in volcanic field, in succulent scrub. *Vanderplank, Ochoa & Harper 080219-20.*
- †CORDYLANTHUS MARITIMUS Nutt. ex Benth. subsp. MARITIMUS. Hemiparasitic annual. Abundant in wet years and not seen during dry years. In several of the large, occasionally inundated marshes; large populations on Punta Azufre. Parasitic on *Distichlis littoralis*. Leaves entire, often with salt crystals. *Vanderplank & Hannon 080530-14.*
- †CORDYLANTHUS ORCUTTIANUS A.Gray. Hemiparasitic annual. Scarce. Locally clumped in wash near Santa María and on El Socorro Dunes. *Vanderplank & Bell 080425-2.*
- †ORBANCHE PARISHII (Jeps.) Heckard subsp. BRACHYLOBA Heckard. Parasitic annual. Scarce. Santo Domingo Wash and El Socorro Dunes. Few Baja California populations are known. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-4.*
- PLANTAGO ERECTA E.Morris. Annual. Scarce. Volcanic soils of the cinder cones. *Vanderplank, Ochoa & Harper 080218-44.*
- PLANTAGO OVATA Forssk. var. INSULARIS (Eastw.) S.Meyers & A.Liston. Annual. Frequent. Succulent scrub and on El Socorro Dunes near the coast. *Vanderplank, Figueroa, Lahmeyer & Zimmerman 100328-1.*
- SAIROCARPUS COULTERIANUS (Benth.) D.A.Sutton sensu Sutton (1998) [*Antirrhinum coulterianum* Benth.]. Annual. Rare. Waif in Santo Domingo Wash. *Vanderplank & Ochoa 090524-22.*
- SAIROCARPUS PUSILLUS (Brandege) D.A.Sutton sensu Sutton (1998) [*Antirrhinum nuttallianum* Benth. forma *pusillum* (Brandege) Munz]. Annual. Common, especially in wet years. Foliage has particularly long hairs. *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-7.*
- SAIROCARPUS WATSONII (Vasey & Rose) D.A.Sutton sensu Sutton (1998) [*Antirrhinum watsonii* Vasey & Rose; *A. kingii* S.Watson subsp. *watsonii* (Vasey & Rose) Munz]. Annual. Scarce in thin soil of the volcanic field. Plants glabrous. *Vanderplank, Ochoa & Harper 080218-54.*

## PAPAVERACEAE

- ARGEMONE MUNITA Durand & Hilg. Annual or perennial herb. Scarce. Open sandy washes. *Vanderplank & Still 090306-19.*
- ESCHSCHOLZIA CALIFORNICA Cham. var. CALIFORNICA. Annual. Common. Abundant in wet years throughout the succulent scrub and occasional in riparian areas. *Vanderplank, Ochoa & Harper 080217-12.*
- PLATYSTEMON CALIFORNICUS Benth. Annual. Occasional. Frequent in wet years. Succulent scrub of the cinder cones and fallow agricultural fields. *Vanderplank, Ochoa & Harper 080217-11.*
- ROMNEYA TRICHALYX Eastw. Small shrub. Rare. Santo Domingo Wash. *Vanderplank & Figueroa 090414-17.*
- STYLOMECON HETEROPHYLLA (Benth.) G.C.Taylor. Annual. Occasional. Throughout the succulent scrub on the cinder cones. *Vanderplank, Ochoa & Harper 080219-7.*

## PHRYMACEAE (INCLUDES SCROPHULARIACEAE, IN PART)

- MIMULUS AURANTIACUS Curtis var. PUNICEUS (Nutt.) D.M.Thomps. Small shrub. Rare. Lava mounds between largest cinder cones. *Vanderplank & Ochoa 090526-4*
- MIMULUS PILOSUS (Benth.) S.Watson. Annual. Rare. Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090522-6.*

## PLANTAGINACEAE (INCLUDES SCROPHULARIACEAE, IN PART)

- COLLINSIA HETEROPHYLLA Buist ex Graham var. HETEROPHYLLA. Annual. Scarce. Uncommon annual appearing in wet years, occupying moist microsites in the volcanic field. *Vanderplank, Ochoa, Hannon, Harper & Bell 080329-15.*
- GAMBELLA JUNCEA (Benth.) D.A.Sutton [*Galvezia juncea* (Benth.) A.Gray]. Small shrub. Common. Dominating small areas within the succulent scrub and El Socorro Dunes. Baja California and Sonora. *Vanderplank, Ortiz, Ochoa, L. Lubinsky & P. Lubinsky 070128-9.*
- †NEOGAERRHINUM STRICTUM (Hook. & Arn.) Rothm. [*Antirrhinum* aff. *kelloggii* Greene]. Annual. Rare twining annual on Isla San Martín. Flowering when foliage is dry. Plants hirsute and with twining pedicels. The specimens do not fit clearly the species description, and further study might reveal hybridization. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090628-10.*
- NUTTALLANTHUS CANADENSIS (L.) D.A.Sutton [*Linaria canadensis* (L.) Dum. Cours.]. Annual. Occasional. Open sites in succulent scrub and on El Socorro Dunes. *Vanderplank, O'Brien & Arvizu 050202-2.*
- †PENSTEMON SPECTABILIS Thurb. ex A.Gray subsp. SUBINTEGER D.D.Keck. Suffruticose perennial. Scarce. Sandy wash near Santa María. Endemic to the Baja California peninsula. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-41.*

## PLATANACEAE

- PLATANUS RACEMOSA Nutt. Tree. Rare. Arroyo El Socorro. *Vanderplank & Hannon 080529-17.*

## PLUMBAGINACEAE

- †LIMONIUM CALIFORNICUM (Boiss.) A.Heller. Perennial herb. Frequent. In marshes that receive at least occasional tidal inundation. *Vanderplank, Fraga & Kempton 060722-06.*

## POLEMONIACEAE

- ERIASTRUM FILIFOLIUM (Nutt.) Wooton & Standl. Annual. Scarce. El Socorro Dunes and wash just to the north. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-36.*
- GILIA ANGELENSIS V.E.Grant. Annual. Scarce. Lava mounds between large cinder cones of the volcanic field. *Vanderplank, Ochoa & Harper 080215-38.*
- †IPOMOPSIS EFFUSA (A.Gray) Moran. Annual. Rare. Waif in Santo Domingo Wash after heavy rain, presumably washed down from the Sierra San Pedro Mártir. *Vanderplank, Eisenstein, O'Brien & Howard 100714-7.*
- †IPOMOPSIS TENUIFOLIA (A.Gray) V.E.Grant. Annual. Rare. Waif in Santo Domingo Wash after heavy rain, presumably washed down from the Sierra San Pedro Mártir. *Vanderplank, Eisenstein, O'Brien & Howard 100714-6.*
- †LEPTOSIPHON LAXUS (Vasey & Rose) J.M.Porter & L.A.Johnson [*Gilia laxa* Vasey & Rose]. Annual. Rare. Known only from the peaks of two cinder cones (northern and southern group). This species is little known outside the Greater San Quintín region. Plants very small and with white flowers. *Vanderplank, Ochoa & Harper 080218-57.*
- LINANTHUS DIANTHIFLORUS (Benth.) Greene. Annual. Frequent. Common in wet years on the cinder cones and in the open succulent scrub of the volcanic field. Flowers often pure white, the petals fringed and much larger than those of *Leptosiphon laxus*. *Vanderplank, Ochoa, Hannon, Harper & Bell 080329-8.*
- NAVARRETTIA ATRACTYLOIDES (Benth.) Hook. & Arn. Annual. Rare. Waif in Santo Domingo Wash. *Vanderplank, Ochoa, Lopez, Hargreaves, Button & Morrill 090524-20*
- NAVARRETTIA HAMATA Greene subsp. LEPTANTHA (Greene) H.Mason. Annual. Frequent. Common in wet years, growing with *Zeltnera venustum*. Cinder cones in succulent scrub. *Vanderplank & Bell 080426-2.*

## POLYGONACEAE

- †CHORIZANTHE CHAETOPHORA Goodman. Annual. Rare. Sandy area west of salt ponds in northern part of the flora area. Leaves and



- bracts hirsute. Endemic to Colonet and the San Quintín region. Treated as a synonym of *C. procumbens* by Reveal (1989) and as distinct by Wiggins (1980). *Vanderplank & Figueroa 090414-10*.
- †CHORIZANTHE INEQUALIS Stokes. Annual. Rare. El Socorro Dunes and middens. Local endemic, coastal areas from Colonet to El Rosario. A distinctive spineflower with pink petals. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-31*.
- †CHORIZANTHE INTERPOSITA Goodman. Annual. Rare. On slopes of Santa María Escarpment. Endemic to the Baja California peninsula, from Colonet south into the Vizcaino Desert. Resembles *Lastarriaea* and thought to be a close relative. *Vanderplank, Ochoa, Hannon, Harper & Bell 080323-2*.
- †CHORIZANTHE JONESIANA Goodman. Annual. Scarce. Only seen in years of ample rainfall. Open flats in coastal succulents scrub. Growing with other low annuals. Treated as a synonym of *C. procumbens* by Reveal (1989) and as a distinct species by Wiggins (1980). There is a difference in the awn size that distinguishes this taxon from *C. procumbens*. *Vanderplank & Lesch 050318-32*.
- CHORIZANTHE PROCUMBENS Nutt. Annual. Scarce. Throughout the scrub in open clearings, most common on silty soils. *Vanderplank & Bell 080426-13*.
- \*EMEX SPINOSA (L.) Campd. Annual. Rare. One plant seen on dunes of El Pabellón campsite (Santa María). *Vanderplank & Figueroa 090414-1*.
- ERIOGONUM FASCICULATUM Benth. var. FASCICULATUM. Small shrub. Abundant. Co-dominant species in the succulent scrub. *Vanderplank & Lesch 050318-66*.
- ERIOGONUM FASCICULATUM var. POLIFOLIUM (Benth.) Torr. & A.Gray. Small shrub. Rare. Santo Domingo Wash. Waif presumably washed down from higher elevations. *Vanderplank & Mata 081024-24*.
- †ERIOGONUM HASTATUM Wiggins. Annual. Rare. Waif in Santo Domingo Wash after heavy rain, presumably washed down from the Sierra San Pedro Mártir. *Vanderplank, Eisenstein, O'Brien & Howard 100714-4*.
- †ERIOGONUM SCALARE S.Watson. Perennial herb. Scarce. El Socorro Dunes in open areas. Endemic to the Baja California peninsula. *Vanderplank & Ochoa 081130-2*.
- ERIOGONUM THURBERI Torr. Annual. Occasional. Most common in Santo Domingo Wash and also rarely in succulent scrub on cinder cones. *Vanderplank & Mata 081024-7*.
- †HARFORDIA MACROPTERA (Benth.) Greene & Parry var. GALIOIDES (Greene) Reveal. Suffruticose perennial. Common. Throughout the succulent scrub. Flowers inconspicuous, and the plants only become obvious when fruiting. Endemic to the Baja California Peninsula. *Vanderplank, Fraga & Ochoa 080111-01*.
- LASTARRIAEA CORIACEA (Goodman) Hoover. Annual. Occasional. Not seen in dry years. Open areas of saline flats, e.g., cleared areas, dunes, and clay mesa. *Vanderplank, Ochoa & Harper 080216-17*.
- †NEMACAULIS DENUDATA Nutt. var. DENUDATA. Annual. Frequent. Locally common on dunes and in sandy washes near the ocean. The coastal variety is distinguished by its prostrate or low-spreading habit, sparsely woolly pubescence, and more flowers per glomerule. *Vanderplank, Ochoa, Hannon, Harper & Bell 080325-30*.
- NEMACAULIS DENUDATA Nutt. var. GRACILIS Goodman & L.D.Benson. Annual. Scarce. El Socorro Dunes. The inland variety, distinguished by erect-growing habit, densely woolly pubescence, and fewer flowers per glomerule. *Vanderplank, Ochoa & Harper 080216-14*.
- PERSICARIA PUNCTATA (Elliott) Small [*Polygonum punctatum* Elliott]. Suffruticose perennial. Rare. Sprawling on pebbles in Santo Domingo Wash. Distinguished by distinctive punctate glands on ocrea. *Vanderplank & Ochoa 081128-6*.
- \*POLYGONUM ARGYROCOLEON Steud. ex Kunze. Annual. Occasional. Roadside weed. *Vanderplank & Ochoa 071122-9*.
- \*POLYGONUM AVICULARE L. Annual. Scarce. Weed of wet roadside areas. *Vanderplank & Hannon 080528-2*.
- PTEROSTEGIA DRYMARIOIDES Fisch. & C.A.Mey. Annual. Frequent. Common in wet years. Growing under shrubs throughout the succulent scrub. *Vanderplank, Fraga & Ochoa 080113-11*.
- \*RUMEX CRISPUS L. Perennial herb. Scarce. Weed of disturbed areas. *Vanderplank, Fraga & Ochoa 080111-30*.
- RUMEX HYMENOSEPALUS Torr. Perennial herb. Scarce. Riparian habitat, Arroyo El Socorro. *Vanderplank & Still 090306-23*.
- †RUMEX cf. PERSICARIOIDES L. Annual. Scarce. Confined to wet ditches. The specimens are difficult to distinguish from *R. fueginus* Phil. *Vanderplank & Ochoa 081223-1*.
- \*RUMEX PULCHER L. Annual. Scarce. Wet roadside ditches. *Vanderplank & Bell 080425-20*.

## PORTULACACEAE

- CALANDRINIA CILIATA (Ruiz & Pav.) DC. Annual. Common in wet years. Slopes of cinder cones or understory plant in succulent scrub. *Vanderplank, Fraga & Ochoa 080112-29*.
- CALYPTRIDIVM MONANDRUM Nutt. Annual. Scarce. Uncommon annual in sandy riparian areas and disturbed areas within El Socorro Dunes. *Vanderplank & Figueroa 090414-18*.
- †CISTANTHE MARITIMA (Nutt.) Carolin ex Herschkovitz [*Calandrinia maritima* Nutt.]. Annual. Frequent. Slopes of cinder cones in loose lava and in open succulent scrub. *Vanderplank & Lauri 050425-15*.
- CLAYTONIA PERFOLIATA Donn ex Willd. subsp. MEXICANA (Rydb.) John M. Miller & K.L.Chambers. [*Montia perfoliata* (Donn ex Willd.) T.J.Howell]. Annual. Frequent. Moist micro-habitats of the succulent scrub, between lava rocks and in craters. *Vanderplank, Ochoa & Harper 080218-29*.

## RANUNCULACEAE

- CLEMATIS PAUCIFLORA Nutt. Liana. Occasional. Sandy soils of riparian areas and dunes. Scrambling over other shrubs. *Vanderplank, Fraga & Ochoa 080112-30*.
- †DELPHINIUM PARRYI A.Gray subsp. MARITIMUM (A.Davidson) M.J.Warnock. Geophyte. Scarce. Lava flats of volcanic field. Only seen in wet years and in small numbers. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-26*.

## RESEDACEAE

- OLIGOMERIS LINIFOLIA (M.Vahl) J.F.Macbr. Annual. Occasional. Scattered through succulent scrub. *Vanderplank & Lauri 050424-5*.

## RHAMNACEAE

- ADOLPHIA CALIFORNICA S.Watson. Small shrub. Rare. One individual found on El Socorro Dunes. *Vanderplank, Ochoa & Harper 080216-20*.
- †CEANOTHUS aff. BOLENSIS S.Boyd & J.E.Keeley. Large shrub. Rare. One plant found in Santo Domingo Wash, suggesting this species may occur at higher elevations upstream. This occurrence would represent a significant range extension; the nearest known population is in the Sierra Juárez. The leaves indicate *C. bolensis*, but flowers and fruits not known. *Vanderplank & Ochoa 081127-8*.
- CEANOTHUS LEUCODERMIS Greene. Large shrub. Rare. Scattered individuals in Santo Domingo Wash. *Vanderplank & Ochoa 081127-17*.
- †RHAMNUS INSULA Kellogg [*Rhamnus crocea* subsp. *insula* (Kellogg) C.B.Wolf]. Small shrub. Scarce. El Socorro Dunes. *Vanderplank & Bell 080425-1*.

## ROSACEAE

- ADENOSTOMA FASCICULATUM Hook. & Arn. Large shrub. Rare. One individual found in Santo Domingo Wash. Waif from higher elevation. *Vanderplank & Ochoa 081127-4*.

†APHANES OCCIDENTALIS (Nutt.) Rydb. Annual. Rare. Found on ledge of dry waterfall of large cinder cone. *Vanderplank, Ochoa, Hannon & Bell 080328-17.*

HETEROMELES ARBUTIFOLIA (Lindl.) M.Roem. Large shrub. Rare. One individual found on El Socorro Dunes. *Vanderplank & Ochoa 071123-1.*

†ROSA MINUTIFOLIA Engelm. Small shrub. Occasional. Localized in succulent scrub outside the volcanic field; Santa María Escarpment and clay mesa to the north. *Vanderplank, Fraga & Ochoa 080113-13.*

## RUBIACEAE

GALIUM APARINE L. Annual. Frequent. Scattered throughout the volcanic field in moist microsites of lava rock. *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-3.*

## SALICACEAE

SALIX EXIGUA Nutt. var. HINDSIANA (Benth.) Dorn. Large shrub. Frequent. Locally abundant in San Simón Wash and occasional in other riparian drainages. *Vanderplank & Bell 080627-9.*

SALIX LASIOLEPIS Benth. Large shrub. Occasional. Sandy washes of drainages. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-22.*

## SAPINDACEAE

†AESCULUS PARRYI A.Gray. Tree (although a dwarf tree to 1.5 m). Common. Sometimes dominant in succulent scrub. This is the only native "tree" of the succulent scrub, in the San Quintín region. Endemic to the Baja California peninsula. *Vanderplank & Lauri 050424-1.*

## SAXIFRAGACEAE

JEPSONIA PARRYI (Torr.) Small. Geophyte. Rare. Clay mesa north of Santa María Escarpment. *Vanderplank & Ochoa 091114-1.*

## SCROPHULARIACEAE (INCLUDES BUDDLEJACEAE)

\*BUDDLEJA SESSIFLORA Kunth. Large shrub. Rare. One individual found in Santo Domingo Wash. *Vanderplank & Ochoa 081128-3.*

## SIMMONDSIACEAE

SIMMONDSIA CHINENSIS (Link) C.K.Schneider. Large shrub. Common. Throughout the succulent scrub and on El Socorro Dunes. *Vanderplank, Ochoa & Harper 080217-61.*

## SOLANACEAE

DATURA WRIGHTII Regel. Perennial herb. Scarce. Weed of disturbed roadsides. *Vanderplank, Harper, Baird & Ochoa 070733-1.*

LYCIUM ANDERSONII A.Gray var. ANDERSONII. Small shrub. Scarce. Succulent scrub of volcanic field. Distinguished in part by narrow leaves and flowers. *Vanderplank & Ledyard 090206-5.*

LYCIUM BREVIPES Benth. var. BREVIPES. Small shrub. Common. Throughout coastal habitats excluding inundated marshes. Plants variable, the leaves broad, and the corollas pale purple with 4 or 5 lobes. *Vanderplank, Koepke, Arvizu & Eisenstein 070225-31.*

LYCIUM CALIFORNICUM A.Gray var. CALIFORNICUM. Small shrub. Frequent. Scattered throughout region in succulent scrub and dunes. Often occurring with *L. brevipes*. Stems knobby, leaves terete and succulent, the flowers small and white. *Vanderplank, Koepke, Arvizu & Eisenstein 070224-8.*

LYCIUM FREMONTII A.Gray var. CONGESTUM C.L.Hitchc. Small shrub. Rare. San Simón Wash. Primarily a desert species. Herbage glandular pubescent. *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-16.*

NICOTIANA CLEVELANDII A.Gray. Annual. Frequent. Common in wet years, throughout succulent scrub. *Vanderplank & Lesch 050318-2.*

\*NICOTIANA GLAUCA Graham. Large shrub. Occasional. Scattered in washes and succulent scrub. Sometimes planted as an ornamental. *Vanderplank & Ochoa 061123-8.*

PETUNIA PARVIFLORA Juss. [*Calibrachoa parviflora* (Juss.) D'Arcy]. Annual. Rare. Appearing in ditch of vernal pool area of Ejido El Papalote after weeks of inundation. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-16.*

PHYSALIS CRASSIFOLIA Benth. Perennial herb. Occasional. Not seen in dry years. Cinder cones and disturbed areas. *Vanderplank & J. Vanderplank 050516-5.*

SOLANUM AMERICANUM Mill. Annual or perennial herb. Occasional. Wet microsites throughout the region. *Vanderplank & Mata 081024-1.*

SOLANUM HINDSIANUM Benth. Perennial herb. Occasional. El Socorro Dunes. Primarily a desert species occurring south of the flora area. *Vanderplank & Ochoa 070513-24.*

†SOLANUM PALMERI Vasey & Rose. Perennial herb. Occasional. Scattered throughout the succulent scrub of the volcanic field. Known only from greater San Quintín region and Isla Todos Santos. Leaves are strongly lobed. *Vanderplank & J. Vanderplank 050516-10.*

\*SOLANUM SARRACHOIDES Sendtn. Annual. Rare. Waif in Santo Domingo Wash. *Vanderplank & Still 090305-17.*

## TAMARICACEAE

\*TAMARIX CHINENSIS Louf. [*T. ramosissima* Ledeb.]. Tree. Common. Abundant in riparian areas and saline flats near the salt ponds in the north. *Vanderplank & Ochoa 061124-2.*

## URTICACEAE

HESPEROCNIDE TENELLA Torr. Annual. Frequent. Abundant in wet years, growing out of crevices in the lava rock of the volcanic field. *Vanderplank, O'Brien & Arvizu 050202-58.*

†PARIETARIA HESPERA B.D.Hinton var. CALIFORNICA B.D.Hinton. Annual. Scarce. In the flora area found only on Isla San Martín, throughout the succulent scrub. The variety is distinguished by small leaves. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090628-6.*

PARIETARIA HESPERA B.D.Hinton var. HESPERA. Annual. Occasional. Growing under shrubs and from rock crevices throughout the cinder cones. Large-leafed variety. Leaves often mottled or variegated, and larger than those of var. *californica*. *Vanderplank, Ochoa & Harper 080217-59.*

## VERBENACEAE

VERBENA MENTHIFOLIA Benth. Perennial herb. Rare. Vernal pool area of clay mesa north of Santa María Escarpment. *Vanderplank & Ochoa 090524-3.*

\*VITEX TRIFOLIA L. Large shrub. Rare. Persisting at abandoned homesite. *Vanderplank & Ochoa 081223-5.*

## VIOLACEAE

†VIOLA PEDUNCULATA Torr. & A.Gray. Geophyte. Scarce. Near summits of cinder cones in the southern group of cones. *Vanderplank, Ochoa & Harper 080219-10.*

## ANGIOSPERMS

## MONOCOTYLEDONS

## AGAVACEAE

†AGAVE SHAWII Engelm. subsp. SHAWII. Succulent shrub. Occasional, stable dunes of El Socorro and along the El Socorro Wash, and

slopes of Santa María Escarpment. *Vanderplank, Ocampo, Kempton & Chhetri 070331-20.*

YUCCA SCHIDIGERA Ortgies. Succulent shrub. Scarce. El Socorro Dunes. Possibly introduced. *Vanderplank & Ochoa 090525-1.*

#### ALLIACEAE

\*ALLIUM CEPA L. Geophyte. Persisting from cultivation in abandoned fields. *Vanderplank & Ochoa 071122-1.*

†ALLIUM PENINSULARE Lemmon ex Greene var. PENINSULARE. Geophyte. Scarce in volcanic rock of the bay and on Monte Kenton. *Vanderplank, Ochoa & Harper 080218-56*

#### CYPERACEAE

BOLBOSCHOENUS MARITIMUS (L.) Palla [*Scirpus maritimus* L.; *Schoenoplectus maritimus* (L.) Lye]. Perennial herb. Rare. Seasonally inundated riparian areas. *Vanderplank & Ochoa 081201-8.*

\*CYPERUS cf. ESCULENTUS L. Perennial herb. Rare. Santo Domingo Wash. Plants grazed. Rhizomes bear small tubers. *Vanderplank & Still 090305-15.*

†ELEOCHARIS MACROSTACHYA Britton. Perennial herb. Rare. Roadside ditches remnant from vernal pools. Ejido Nuevo Odisea. Bi-parted stigmas and 2-faced achenes. *Vanderplank & Bell 080425-21.*

#### JUNCACEAE

JUNCUS ACUTUS L. subsp. LEOPOLDII (Parl.) Snogerup. Perennial herb. Frequent. Locally common in saline areas; coastal riparian areas and low microsites in dunes. *Vanderplank & Ochoa 061125-7.*

JUNCUS ARCTICUS Willd. var. MEXICANUS (Willd. ex Schult. & Schult.f.) Balslev [*J. mexicanus* Willd. ex Schult. & Schult.f.]. Perennial herb. Rare. Santo Domingo Wash. *Vanderplank & Ochoa 081128-16.*

#### JUNCAGINACEAE

†TRIGLOCHIN MARITIMA L. [*T. concinna* Burt Davy]. Aquatic perennial herb. Scarce to occasional. Tidally inundated marshes. *Vanderplank, Ochoa & Harper 080216-34.*

#### LILIACEAE

CALOCHORTUS SPLENDENS Douglas ex Benth. Geophyte. Rare. In lava of volcanic field between cones. Only seen in wet years. *Vanderplank, Ochoa, Hannon, Harper & Bell 080328-25.*

#### POACEAE

ARISTIDA ADSCENSIONIS L. Annual. Scarce. Sandy soil of shell midden. *Vanderplank, Ochoa, Hannon, Harper & Bell 080327-29.*

ARISTIDA CALIFORNICA Thurber var. CALIFORNICA. Perennial herb. Occasional on stable dunes and shell middens. *Vanderplank, Harper, Baird & Ochoa 070722-14.*

ARISTIDA PURPUREA Nutt. var. LONGISETA (Steud.) Vasey. Perennial herb. Scarce. El Socorro Dunes. *Vanderplank & Ochoa 071123-8.*

\*AVENA BARBATA Pott ex Link. Annual. Occasional. Agricultural areas in drainage ditches. *Vanderplank, Ocampo, Kempton & Chhetri 070401-07.*

\*AVENA FATUA L. Annual. Scarce. Coastal scrub near disturbed areas. *Vanderplank, Ochoa, Hannon, Harper & Bell 080325-27.*

BOTHRIOCHLOA BARBINODIS (Lag.) Herter. Perennial herb. Rare. El Socorro Dunes near the coast with *Hazardia* and *Isocoma*. *Vanderplank, Harper, Baird & Ochoa 070722-6.*

†BROMUS ARIZONICUS (Shear) Stebbins. Annual. Occasional. Scattered in open scrub of the volcanic field and roadsides. *Vanderplank, Ochoa, Hannon, Harper & Bell 080326-14.*

BROMUS BERTEROANUS Colla [*B. trinii* Desv.]. Annual. Occasional. Scattered on lava rock. Common on Isla San Martín. The distinctly twisted awn distinguishes it from *B. arizonicus* and other annual bromes. *Vanderplank, Ochoa, Hannon, Harper & Bell 080325-24.*

BROMUS CARINATUS Hook. & Arn. Perennial herb. Scarce. Growing in lava rock near the village on Isla San Martín. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090628-11.*

\*BROMUS HORDEACEUS L. subsp. HORDEACEUS [*B. mollis* L.]. Annual. Infrequent. Disturbed places and waste areas, and throughout Isla San Martín. *Vanderplank, Ochoa, Hannon, Harper & Bell 080326-6.*

\*BROMUS MADRITENSIS L. subsp. RUBENS (L.) Husn. [*B. rubens* L.]. Annual. Frequent. Invasive in riparian areas and spreading along disturbed areas and agricultural edges. *Vanderplank & Lesch 050318-73.*

\*CENCHRUS CILIARIS L. [*Pennisetum ciliare* (L.) Link]. Perennial herb. Occasional. Weed of roadsides and disturbed agricultural areas. *Vanderplank, Kiel & Ochoa 071215-6.*

\*CENCHRUS CLANDESTINUS (Hochst. ex Chiov.) Morrone [*Pennisetum clandestinum* Hochst. ex Chiov.]. Perennial herb. Rare. Mat-forming weed in wet area at old homesite. *Vanderplank & Ochoa 090524-26.*

\*CYNODON DACTYLON (L.) Pers. var. DACTYLON. Perennial herb. Occasional. Weed of riparian areas and agricultural lands. *Vanderplank, Ocampo, Kempton & Chhetri 070313-16.*

†DISTICHLIS BAJAENSIS H.L.Bell. Perennial herb. Common. This recently described species (*Madroño 57(1)*: 54–63 [2010]) is endemic to the Baja California peninsula. A large population was documented near Laguna Mormona, growing with both the other *Distichlis* species, in fall 2010. The full extent of this species in the local area has not yet been documented. *Bell 479.*

DISTICHLIS LITTORALIS (Engelm.) H.L.Bell & Columbus [*Monanthochloe littoralis* Engelm.]. Perennial herb. Common. Often dominating saline flats; also riparian areas with salinity soil. *Vanderplank, Gribbin & Ochoa 061224-1.*

DISTICHLIS SPICATA (L.) Greene. Perennial herb. Abundant. Primarily on saline soils but also often in sandy soils of dunes and riparian areas. *Vanderplank, Gribbin & Ochoa 061224-2.*

\*FESTUCA cf. BROMOIDES L. [*Vulpia* cf. *bromoides* (L.) Gray]. Annual. Scarce. Succulent scrub near disturbed area. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090628-5a.*

\*FESTUCA MYUROS L. [*Vulpia myuros* (L.) C.C.Gmel.]. Annual. Occasional. Disturbed areas in succulent scrub and dunes. *Vanderplank, Koepke, Arvizu & Eisenstein 070225-9.*

FESTUCA OCTOFLORA Walter [*Vulpia octoflora* (Walter) Rydb.]. Annual. Scarce. Lava rock near the coast. Variety *octoflora* and var. *hirtella* (Piper) Hitchc. are both present, but the varieties do not seem worthy of recognition (e.g., Felger 2000). *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-43.*

†HORDEUM INTERCEDENS Nevsk. Annual. Scarce. Shell middens, in the area around Ejido Venustiano Carranza II. Similar to *H. pusillum* Nutt., but has stripes of hairs on the leaf sheaths and lemmas of the lateral spikelet are awnless. *Vanderplank & Ochoa 070513-3.*

\*HORDEUM MURINUM L. subsp. GLAUCUM (Steud.) Tzvelev. Annual. Scarce. Disturbed area near Ejido Venustiano Carranza II and on Isla San Martín. *Vanderplank & Ochoa 070513-11.*

\*HORDEUM VULGARE L. Annual. Scarce. Escaping cultivation on margins of agriculture. *Vanderplank, Ocampo, Kempton & Chhetri 070401-05.*

\*LAMARCKIA AUREA (L.) Moench. Annual. Frequent. Scattered throughout the succulent scrub, particularly in disturbed areas. *Vanderplank, Ochoa, Hannon, Harper & Bell 080324-1.*

LEYMUS TRITICOIDES (Buckley) Pilg. [*Elymus triticoides* Buckley]. Perennial herb. Rare. Coastal dunes near riparian area just south of Río Santo Domingo. *Vanderplank, Ratay, Barnhill, Zimmerman & Ochoa 100527-12.*

MELICA FRUTESCENS Scribn. Perennial herb. Scarce. Lava of volcanic field. *Vanderplank, Ochoa & Harper 080218-48.*



- MELICA IMPERFECTA Trin. Perennial herb. Occasional. On lava and cinder cones of the volcanic field, including Isla San Martín. *Vanderplank, Ochoa & Harper 080218-3.*
- MUHLENBERGIA MICROSPERMA (DC.) Trin. Annual. Frequent. Throughout succulent scrub of volcanic field and in sandy washes. *Vanderplank, Fraga & Ochoa 080112-23.*
- \*PHALARIS MINOR Retz. Annual. Occasional. Weedy in disturbed areas and roadsides. *Vanderplank & Ochoa 070513-9*
- \*POLYPOGON MONSPELIENSIS (L.) Desf. Annual. Occasional. Wet places, agricultural seeps, and roadside ditches. *Vanderplank & Ochoa 081129-2.*
- \*SCHISMUS BARBATUS (L.) Thell. var. BARBATUS. Annual. Common. Open, disturbed areas and El Socorro Dunes. *Vanderplank, Harper, Baird & Ochoa 070722-7.*
- \*SORGHUM HALEPENSE (L.) Pers. Perennial herb. Rare. Abandoned agricultural lands. *Vanderplank & Ochoa 071122-10.*
- †SPARTINA FOLIOSA Trin. Perennial herb. Frequent. Locally abundant in some inundated marshes (at head of Bahía San Quintín and on Punta Azufre). *Vanderplank, J. Vanderplank, P. Vanderplank & Ochoa 060917-6.*
- STIPA LEPIDA A.Hitchc. [*Nassella lepida* (A. Hitchc.) Barkworth]. Perennial herb. Scarce. Growing with *Salvia brandegeei* on cinder cone of volcanic field. *Vanderplank, Ochoa, Hannon, Harper & Bell 080328-10.*
- STIPA SPECIOSA Trin. & Rupr. [*Achnatherum speciosum* (Trin. & Rupr.) Barkworth]. Perennial herb. Rare. El Socorro Dunes. *Vanderplank & Bell 080425-3.*

## THEMIDACEAE

- BLOOMERIA CROCEA (Torr.) Cov. var. CROCEA. Geophyte. Scarce. Known only from a clay mesa just south of Río Santo Domingo. *Vanderplank & Figueroa 090414-12.*
- DICHELOSTEMMA CAPITATUM (Benth.) Alph. Wood var. CAPITATUM [*Dichelostemma pulchellum* (Salisb.) A.Heller var. *pulchellum*]. Geophyte. Common throughout succulent scrub of the region. *Vanderplank, Fraga & Ochoa 080113-10.*

## TYPHACEAE

- TYPHA DOMINGENSIS Pers. Perennial herb. Scarce. Riparian areas with standing water. Populations in the flora area do not seem permanent. *Vanderplank, Harper, Baird & Ochoa 070723-2.*

## XANTHORRHOACEAE (INCLUDES ASPHODELACEAE)

- \*ALOE MACULATA All. [*A. saponaria* (Aiton) Haw.]. Succulent perennial herb. Rare. Only one plant seen, weed between volcanic cones. Transient. *Vanderplank & J. Vanderplank 050516-6.*

## ZOSTERACEAE

- PHYLLOSPADIX SCOULERI Hook. Submerged aquatic perennial herb. Frequent. Intertidal shore plant of rocky coast. *Vanderplank & Felger 061206-6.*
- PHYLLOSPADIX TORREYI S.Watson. Submerged aquatic perennial herb. Frequent. Intertidal shore plant of rocky coast. *Vanderplank, Mata, Ratay, Rodriguez & Dixon 090630-1.*
- ZOSTERA MARINA L. var. MARINA. Submerged aquatic perennial herb. Abundant. Marine species, abundant in the shallow bays. *Vanderplank & Felger 061206-7.*

## ACKNOWLEDGMENTS

This work would not have been possible without the help of many people. I am particularly indebted to Jon Rebman for taxonomic assistance and to Jorge Ochoa for field assistance, time and patience. I owe endless thanks to my advisor and

mentor, Lucinda McDade, who has significantly improved this manuscript, and who continues to inspire me. I thank my committee members who all assisted with this manuscript: Richard Felger gave considerable editorial feedback and constant encouragement, José Delgadillo enabled the fieldwork and provided the permits, J. Travis Columbus, Elizabeth Friar, and honorary committee member J. Mark Porter provided direction throughout the study. Special thanks are extended to Naomi Fraga, Sergio Mata, and Alan Harper who have helped in many ways over the years. I also thank Steve Boyd and Bart O'Brien for support early in my career, and Gilberto Ocampo for his assistance with the Spanish abstract.

I am privileged to have been accompanied and assisted in the field by all of the following individuals: Valentin Arvizu, Carol Baird, Chris Barnhill, Duncan Bell, Dave Bramlet, Lindsey Button, Hari Chhetri, Kevin Clark, Peter Dixon, Barbara Eisenstein, Ileana Espejel, Richard Felger, Carlos Figueroa, Naomi Fraga, Erika Gardner, Lisa Gover, Dylan Hannon, Nina Hapner, Ana Hargreaves, Alan Harper, Cody Coyotee Howard, JoAnna Jarvis, Susan Jett, Beth Kempton, Carrie Kiel, Josh Koepke, Tony LaFetra, Sean Lahmeyer, Robert Lauri, BJ Ledyard, William Lesch, Adriana López, Leland Lubinsky, Pesach Lubinsky, Sergio Mata, Natalie Morrill, Bart O'Brien, Gilberto Ocampo, Jorge Ochoa, Martín Ortiz, Sarah Ratay, Lucila Reccia, Naomi Reyna, Fred Roberts, Suzanne Robinson, Gonzalo Rodriguez, Jonathan Snapp-Cook, Valerie Soza and friends, Shannon Still, Tim Thibault, John Vanderplank, Penny Vanderplank, Karen Zimmerman, and the late Matthew Gribbin.

Identifications of difficult taxa were facilitated in part by generous assistance from Jeff Morawetz (*Orobanche*), Kristen Hasenstab-Lehman (*Cryptantha*), Michael Simpson (*Camissoniopsis*), Beth Kempton and James Reveal (*Chorizanthe*), J. Travis Columbus (various Poaceae), and LeRoy Gross (*Rumex*). I thank collections personnel: Michael Wall, Shawn Overstreet, Sarah Siedschlag, and Erika Gardner from RSA; Mary Alice Kessler, Judy Gibson, Jeannie Gregory, Layla Aerne-Hains, Karen Rich, and Annette Winner from SD; and José Delgadillo from BCMEX. Irene Holiman, Gary Wallace, Alan Romspert, Jim Henrickson, and Dave Bramlet kindly provided access to valuable literature sources.

Funding was generously provided by The Jiji Foundation, Rancho Santa Ana Botanic Garden and Claremont Graduate University, Claremont University Club, The Cactus and Succulent Society of America, The California Botanical Society (Annetta Carter Fund for fieldwork in Baja California), BJ Ledyard, Tony LaFetra, and the California Native Plant Society. Fieldwork was also supported in part by the Miller Family Foundation, El Club de Cazadores de La Misión, San Vicente, and the Walter Lantz Foundation.

## LITERATURE CITED

- AGUILAR-ROSAS, R. AND M. LÓPEZ-CARRILLO. 2005. Microalgas marinas de la Bahía de San Quintín, Baja California, México. *Polibotánica* 19: 19–38.
- AGUIRRE-MUÑOZ, A., R. W. BUDDEMEIER, V. CAMACHO-IBAR, J. D. CARRIQUIRY, S. E. IBARRA-OBANDO, B. W. MASSEY, S. V. SMITH, AND F. WULFF. 2001. Sustainability of coastal resource use in San Quintín, Mexico. *Ambio* 30: 142–149.
- AXELROD, D. I. 1978. The origin of coastal sage vegetation, Alta and Baja California. *Amer. J. Bot.* 65: 1117–1131.

- BARBOUR, M. G., T. KEELER-WOLF, AND A. A. SCHOENHERR. 2007. Terrestrial vegetation of California. University of California Press, Berkeley, USA. 712 p.
- BASKIN, Y. 1994. California's ephemeral vernal pools may be a good model for speciation. *BioScience* **44**: 384–388.
- BAUDER, E. T. AND S. McMILLAN. 1998. Current distribution and historical extent of vernal pools in southern California and northern Baja California, Mexico, pp. 56–70. In C. W. Witham, E. T. Bauder, D. Belk, and W. R. Ferren, Jr. [eds.], Ecology, conservation, and management of vernal pool ecosystems—Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, California.
- BEATY, J. J. 1964. Plants in his pack: a life of Edward Palmer, adventurous botanist and collector. Pantheon Books, New York, USA. 193 p.
- BEST, T. L. 1983. Morphologic variation in the San Quintín kangaroo rat (*Dipodomys gravipes* Huey 1925). *Amer. Midl. Naturalist* **109**: 409–413.
- BIBLIOTECA DIGITAL DE LA MEDICINA TRADICIONAL MEXICANA [BDMTM]. 2009. México. <http://www.medicinatradicionalmexicana.unam.mx/index.php> (Jul 2010).
- BROOKS, T. M., R. A. MITTERMEIER, C. G. MITTERMEIER, G. A. B. DA FONSECA, A. B. RYLANDS, W. R. KONSTANT, P. FLICK, J. PILGRIM, S. OLDFIELD, G. MAGIN, AND C. HILTON-TAYLOR. 2002. Habitat loss and extinction in the hotspots of biodiversity. *Conservation Biol.* **16**: 909–923.
- CARTRON, J. E., G. CEBALLOS, AND R. S. FELGER (editors). 2005. Biodiversity, ecosystems and conservation in Northern Mexico. Oxford University Press, New York, USA. 496 p.
- CASO, M., C. GONZÁLEZ-ABRAHAM, AND E. EZCURRA. 2007. Divergent ecological effects of oceanographic anomalies on terrestrial ecosystems of the Mexican Pacific coast. *Proc. Natl. Acad. Sci. U.S.A.* **104**: 10530–10535.
- COMISIÓN DE ESTUDIOS DEL TERRITORIO NACIONAL [CETENAL]. 1976. Carta geológica, 1:50,000 scale.
- CRAWFORD, D. J. AND K. A. EVANS. 1978. The affinities of *Chenopodium flabellifolium* (Chenopodiaceae): evidence from seed coat surface and flavonoid chemistry. *Brittonia* **30**: 313–318.
- DEDINA, S. 2007. Baja California land rush. US residents flock to build on Mexico's unprotected coast. *California Coast and Ocean* **23**: 1–5.
- DEL BARCO, M. 1980. The natural history of Baja California [translated by F. Tiscareno]. In E. Carpenter and G. Dawson [eds.], Baja California travels series. Los Angeles, USA. 298 p.
- DELGADILLO, J. 1998. Florística y ecología de norte de Baja California. Universidad Autónoma de Baja California, Mexicali, Mexico. 141 p.
- , M. PEINADO, M. DE LA CRUZ, J. M. MARTINEZ-PARRAS, F. ALCARAZ, AND A. DE LA TORRE. 1992. Analisis fitosociológico de los saladares y manglares de Baja California, México. *Acta Bot. Mex.* **19**: 1–35.
- DELGADILLO-RODRÍGUEZ, J. 2004. El bosque de coníferas de la Sierra de San Pedro Mártir, Baja California. Secretaría del Medio Ambiente y Recursos Naturales, Instituto Nacional de Ecología, D.F., Mexico. 159 p.
- DUSHANE, H. 1971. The Baja California travels of Charles Russell Orcutt. Dawson's Book Shop, Los Angeles, California, USA. 75 p.
- FELGER, R. S. 1979. Ancient crops for the 21st century, pp. 5–20. In G. Ritchie [ed.], New agricultural crops. AAAS Selected Symposium no. 38. Westview Press, Boulder, Colorado, USA.
- . 2000. Flora of the Gran Desierto and Río Colorado of north-western Mexico. University of Arizona Press, Tucson, USA. 673 p.
- . 2007. Living resources at the center of the Sonoran desert: native American plant and animal utilization, pp. 147–192. In R. S. Felger and B. Broyles [eds.], Dry borders: great natural reserves of the Sonoran desert. University of Utah Press, Salt Lake City, USA.
- FIGUEROA-BELTRÁN, C. 2009. La arqueología del holoceno en el corredor costero Colnett-El Rosario (Baja California, México): un análisis orientado a la gestión. Tesis de Doctorado, en Ciencias en Medio Ambiente y Desarrollo. Universidad Autónoma de Baja California, Ensenada, B.C., Mexico. 133 p.
- FLORA OF NORTH AMERICA EDITORIAL COMMITTEE. 1993+Flora of North America north of Mexico [FNA], 12+ vols. Oxford University Press, New York, USA, [www.fna.org](http://www.fna.org).
- GENTRY, H. S. 1978. Agaves of continental North America. University of Arizona Press, Tucson, USA. 668 p.
- GONZÁLEZ LÓPEZ, J. L. 2004. San Quintín, entre la tierra y el mar: una historia compartida. La tenencia de la tierra en San Quintín: el título 3050, pp. 20–22. In Voces de la Península—Revista de Geografía e Historia de Baja California, no. 2.
- GORSLINE, D. S. AND R. A. STEWART. 1962. Benthic marine exploration of Bahía de San Quintín, Baja California, 1960–61: marine and Quaternary geology. *Pacific Naturalist* **3**: 282–319.
- HARPER, A., S. VANDERPLANK, M. DODERO, S. MATA, AND J. OCHOA. 2011. Plants of the Colonet region, Baja California, Mexico, and a vegetation map of Colonet Mesa. *Aliso* **29**: 25–42.
- HEADY, H. F., T. C. FOIN, M. M. HEKTNER, D. W. TAYLOR, M. G. BARBOUR, AND W. J. BARRY. 1977. Coastal prairie and northern coastal scrub, pp. 733–757. In M. G. Barbour and J. Major [eds.], Terrestrial vegetation of California. John Wiley and Sons, New York, USA. 1002 p.
- HERBERT, T. D., J. D. SCHUFFERT, D. ANDREASEN, L. HEUSSER, M. LYLE, A. MIX, A. C. RAVELO, L. D. STOTT, AND J. C. HERGUERA. 2001. Collapse of the California current during glacial maxima linked to climate change on land. *Science* **293**: 71–76.
- J. C. HICKMAN (editor). 1993. The Jepson manual. University of California Press, Berkeley, USA. [http://ucjeps.berkeley.edu/ucgi-bin/get\\_JM\\_treatment.pl?8349,8350](http://ucjeps.berkeley.edu/ucgi-bin/get_JM_treatment.pl?8349,8350) (Jul 2010).
- HODGSON, W. 2001. Food plants of the Sonoran desert. University of Arizona Press, Tucson, USA. 313 p.
- HOWELL, J. T. 1957. The California flora and its province. *Leaflets of Western Botany* **8**: 133–138.
- JAMES, M. L. AND J. B. ZEDLER. 2000. Dynamics of wetland and upland subshrubs at the salt marsh-coastal sage scrub ecotone. *Amer. Midl. Naturalist* **143**: 298–311.
- JOHNSON, A. F. 1977. A survey of the strand and dune vegetation along the Pacific and southern gulf coast of Baja California, Mexico. *J. Biogeogr.* **7**: 83–99.
- JUNAK, S. A. AND R. PHILBRICK. 1994. The flowering plants of San Martín Island, Baja California, Mexico, pp. 429–427. In W. L. Halvorson and G. J. Maender [eds.], Fourth California Islands Symposium: update on the status of resources. Santa Barbara Museum of Natural History, Santa Barbara, California, USA.
- KANGAS, M. 2005. Vernal pools: a little known but critical habitat. *Frontiers in Ecology and the Environment* **3**: 286–286.
- KEELEY, J. AND P. H. ZEDLER. 1998. Characterization and global distribution of vernal pools, pp. 1–14. In C. W. Witham, E. T. Bauder, D. Belk, W. R. Ferren, Jr., and R. Ornduff [eds.], Ecology, conservation, and management of vernal pool ecosystems. Proceedings from a 1996 conference. California Native Plant Society, Sacramento, USA.
- KEER, G. H. AND J. B. ZEDLER. 2002. Salt marsh canopy architecture differs with the number and composition of species. *Ecol. Applic.* **12**: 456–473.
- KIRKPATRICK, J. B. AND C. F. HUTCHINSON. 1977. The community composition of California coastal sage scrub. *Vegetatio* **35**: 21–33.
- LAZCANO SAHAGÚN, C. 2004. San Quintín, entre la tierra y el mar: una historia compartida. Primera llegada por tierra a La Bahía de San Quintín, descubrimiento de los valles de Santo Domingo y el Rosario, pp. 6–7. In Voces de la Península—Revista de Geografía e Historia de Baja California, no. 2.
- LENZ, L. W. 1986. Marcus E. Jones: Western geologist, mining engineer and botanist. Rancho Santa Ana Botanic Garden, Claremont, California, USA. 486 p.

- LINDQUIST, D. 2006. Property frenzy in Baja California. Union-Tribune in Bahía de las Banderas. <http://www.banderasnews.com/0604/re-bajafrenzy.htm>.
- LINDSAY, G. 1955. Notes concerning the botanical explorers and exploration of lower California, Mexico. Published by author, Stanford University, California, USA.
- LUHR, J. F., J. J. ARANDA-GÓMEZ, AND T. B. HOUSH. 1995. San Quintín volcanic field, Baja California Norte, México: geology, petrology, and geochemistry. *Journal of Geophysical Research* **100**(B7): 10353–10380.
- MCVAUGH, R. 1956. Edward Palmer: plant explorer of the American West. University of Oklahoma Press, Norman, USA. 430 p.
- MINNICH, R. A. AND E. FRANCO-VIZCAINO. 1998. Land of chamise and pines: historical descriptions of vegetation in northern Baja California. *Univ. Calif. Publ. Bot.* **80**: 1–166.
- MOERMAN, D. E. 1998. Native American ethnobotany. Timber Press, Portland, Oregon, USA. 940 p. <http://herb.umd.umich.edu/>.
- MOONEY, H. A. 1977. Southern coastal scrub, pp. 471–489. In M. G. Barbour and J. Major [eds.], *Terrestrial vegetation of California*. John Wiley and Sons, New York, USA. 1002 p.
- MOORE, J. D. 1999. Archaeology in the forgotten peninsula: prehistoric settlement and subsistence strategies in Northern Baja California. *Journal of California and Great Basin Anthropology* **21**: 17–44.
- MORAN, R. 1981. Vernal pools in northwest Baja California, Mexico, pp. 173–184. In S. Jain and P. Moyle [eds.], *Vernal pools and intermittent streams*. University of California Davis. 1981. Institute of Ecology Publication no. 28.
- MORZARIA-LUNA, H., J. C. CALLAWAY, G. SULLIVAN, AND J. B. ZEDLER. 2004. Relationship between topographic heterogeneity and vegetation patterns in a Californian salt marsh. *J. Veg. Sci.* **14**: 523–530.
- MUNZ, P. A. 1974. A flora of Southern California. University of California Press, Berkeley, USA. 1086 p.
- MYERS, N., R. A. MITTERMEIER, C. G. MITTERMEIER, G. A. B. DA-FONSECA, AND J. KENT. 2000. Biodiversity hotspots for conservation priorities. *Nature* **403**: 853–858.
- NEUENSCHWANDER, L. F., T. H. THORSTED, JR., AND R. J. VOGL. 1979. The salt marsh and transitional vegetation of Bahía de San Quintín. *Bull. S. Calif. Acad. Sci.* **78**: 163–182.
- ORTEGAS-ROSAS, C. I., J. GUIOT, M. C. PEÑALBA, AND M. E. ORTIZ-ACOSTA. 2008. Biomization and quantitative climate reconstruction techniques in northwestern Mexico, with an application to four Holocene pollen sequences. *Global Planet. Change* **61**: 242–266.
- PALACIOS, E. AND E. MELLINK. 2000. Nesting waterbirds on Islas San Martín and Todos Santos, Baja California. *Western Birds* **31**: 184–189.
- PEINADO, M., F. ALCARAZ, J. DELGADILLO, AND I. AGUADO. 1994. Fitogeografía de la península de Baja California, México. *Anales Jard. Bot. Madrid* **51**: 255–277.
- , ———, J. L. AGUIRRE, J. DELGADILLO, AND I. AGUADO. 1995a. Shrubland formations and associations in mediterranean-desert transitional zones of northwestern Baja California. *Vegetatio* **117**: 165–179.
- , ———, ———, AND ———. 1995b. Major plant communities of warm North American deserts. *J. Veg. Sci.* **6**: 79–94.
- PHELTS-RAMOS, S. 2004. San Quintín, entre la tierra y el mar: una historia compartida. El antiguo molino de trigo de San Quintín y su gradual desmatamiento, pp. 8–12. In *Voces de la Península—Revista de Geografía e Historia de Baja California*, no. 2.
- QUIRÓZ-VÁSQUEZ, P. 2005. Composition of the epifaunal community associated with the seagrass *Zostera marina* in San Quintín Bay, Baja California. *Bull. S. Calif. Acad. Sci.* **104**: 100–113.
- RAMÍREZ VELARDE, D. 2004. San Quintín, entre la tierra y el mar: una historia compartida. Ranchos de San Quintín, pp. 16–19. In *Voces de la Península—Revista de Geografía e Historia de Baja California*, no. 2.
- RAVEN, P. H. AND D. I. AXELROD. 1978. Origin and relationships of the California flora. *Univ. Calif. Publ. Bot.* **72**: 1–134.
- RHODE, D. 2002. Early holocene juniper woodland and chaparral taxa in the central Baja California peninsula, Mexico. *Quatern. Research* **57**: 102–108.
- RIEMANN, H. AND E. EZCURRA. 2005. Plant endemism and natural protected areas in the peninsula of Baja California, Mexico. *Biol. Conservation* **122**: 141–150.
- AND ———. 2007. Endemic regions of the vascular flora of the peninsula of Baja California, Mexico. *J. Veg. Sci.* **18**: 327–336.
- RODRIGUEZ, A. S. L., S. ANDELMAN, M. I. BAKARR, L. BOITANI, T. M. BROOKS, R. M. COWLING, L. D. C. FISHPOOL, G. A. B. DA FONSECA, K. J. GASTON, M. HOFFMANN, J. S. LONG, P. A. MARQUET, J. D. PILGRIM, R. L. PRESSEY, J. SCHIPPER, W. SECHREST, S. N. STUART, L. G. UNDERHILL, R. W. WALLER, M. E. J. WATTS, AND Y. XIE. 2004. Effectiveness of the global protected area network in representing species diversity. *Nature* **428**(6983): 640–643.
- RUIZ-CAMPOS, G., E. PALACIOS, J. A. CASTILLO-GUERRERO, S. GONZÁLEZ-GUZMÁN, AND E. H. BATCHE-GONZÁLEZ. 2005. Composición espacial y temporal de la avifauna de humedales pequeños costeros y hábitat adyacentes en el noroeste de Baja California, México. *Ci. Mar.* **31**: 1–24.
- RUNDEL, P. W. 2007. Sage scrub, pp. 208–228. In M. G. Barbour, T. Keeler-Wolf, and A. A. Schoenherr [eds.], *Terrestrial vegetation of California*, 3rd ed. University of California Press, Berkeley, USA.
- , P. A. BOWLER, AND T. W. MULROY. 1972. A fog-induced lichen community in northwestern Baja California, with two new species of *Desmazieria*. *Bryologist* **75**: 501–508.
- SANKEY, J. T., T. R. VAN DEVENDER, AND W. H. CLARK. 2001. Late holocene plants, Cataviña, Baja California. *S. W. Naturalist* **46**: 1–7.
- SCHULTZ, T. A., F. J. RADOVSKY, AND P. D. BUDWISER. 1970. First insular record of *Notiosorex crawfordi*, with notes on other mammals of San Martín Island, Baja California, Mexico. *Journal of Mammalogy* **51**: 148–150.
- SHREVE, F. 1936. The transition from desert to chaparral in Baja California. *Madroño* **3**: 257–264.
- SOTO, H. J. A. 1987. Identificación taxonómica de malezas en cultivo de tomate (*Lycopersicon esculentum* Mill.) en la región de San Quintín, B.C. Tesis de Licenciatura, Escuela Superior de Ciencias—Universidad Autónoma de Baja California, Ensenada, B.C., Mexico. 62 p.
- SPRAGUE, J. G., N. B. MILLER, AND J. L. SUMICH. 1978. Observations of gray whales in Laguna de San Quintín, northwestern Baja California, Mexico. *Journal of Mammalogy* **59**: 425–427.
- STEVENS, P. F. 2001 onwards. Angiosperm Phylogeny Website, vers. 9. <http://www.mobot.org/MOBOT/research/APweb/> (Jun 2008, and later updates).
- SUTTON, D. A. 1988. A revision of the tribe Antirrhineae. Natural History Museum, Oxford University Press, New York, USA. 575 p.
- TAYLOR, L. D. 1996. Gunboat diplomacy's last fling in the New World: the British seizure of San Quintín, April 1911. *The Americas* **52**: 521–543.
- THOMSON, P. H. 1993. *Dudleya* and *Hasseanthus*. Lamb Printers, Perth, Australia. 248 p.
- THORNE, R. F. 1976. The vascular plant communities of California, pp. 1–31. In J. Letting [ed.], *Plant communities of Southern California*. California Native Plant Society Special Publication no. 2.
- . 1989. The vascular plants of Bahía San Quintín and adjacent areas, Baja California, Mexico. *Crossosoma* **15**(2): 5–8.
- . 1993. Phytogeography, pp. 132–153. In *Flora of North America* Editorial Committee, *Flora of North America North of Mexico*, vol. 1. New York, USA.
- AND S. A. JUNAK. 1989. The vascular plants of Isla San Martín, Baja California, Mexico. *Crossosoma* **15**(1): 5–7.
- VANDERPLANK, S. E. 2011. Rare plants of California in Greater San Quintín, Baja California, pp. 381–387. In J. W. Willoughby,



- B. K. Orr, K. Schierenbeck, and N. Jensen [eds.], Proceedings of the CNPS Conservation Conference: Strategies and Solutions, 17–19 Jan 2009, California Native Plant Society, Sacramento, California, USA.
- AND S. MATA. 2010a. The succulent scrub of San Martín Island. *Cact. Succ. J.* **82**: 252–258.
- AND ———. 2010b. Threats to an extreme endemic: *Chenopodium flabellifolium* (Amaranthaceae) on Isla San Martín. *Crossosoma*. **36**: 50–56.
- , D. HANNON, J. OCHOA, AND D. BELL. 2009. Noteworthy collection: Mexico: *Salvia brandegeei*. *Madroño* **56**: 135–135.
- WELLS, P. V. 1976. Macrofossil analysis of wood rat (*Neotoma*) middens as a key to the Quaternary vegetational history of arid Americas. *Quatern. Research* **6**: 223–248.
- . 2000. Pleistocene macrofossil records of four-needled pinyon or juniper encinal in the northern Vizcaino Desert, Baja California del Norte. *Madroño* **47**: 189–194.
- WEST, J. M. 2000. San Quintín Bay, pp. 36–37. In J. B. Zedler [ed.], Handbook for restoring tidal wetlands. CRC Press, Boca Raton, Florida, USA.
- WIGGINS, I. 1980. The flora of Baja California. Stanford University Press, Stanford, California, USA. 1025 p.

Appendix 1. Table of taxa listed by Thorne (1989) as occurring in San Quintín but not seen in the field in the present study; voucher specimens were not cited and no specimens of these species were encountered in herbaria for the study area. \* indicates non-native taxa.

Family	Taxon
Asteraceae	<i>Baccharis brachyphylla</i> A.Gray
Asteraceae	<i>Chaenactis furcata</i> Stockw.
Asteraceae	* <i>Tagetes erecta</i> L.
Asteraceae	<i>Viguiera deltoidea</i> A.Gray [now <i>Bahiopsis deltoidea</i> (A.Gray) E.E.Schill. & Panero]
Brassicaceae	* <i>Capsella bursa-pastoris</i> (L.) Medik.
Brassicaceae	<i>Tropidocarpum gracile</i> Hook.
Cactaceae	<i>Echinocactus polycephalus</i> Engelm. & J.M.Bigelow var. <i>polycephalus</i>
Euphorbiaceae	<i>Chamaesyce micromera</i> (Boiss. ex Engelm.) Wooton & Standl.
Fabaceae	<i>Astragalus insularis</i> Kellogg var. <i>insularis</i>
Fabaceae	<i>Lathyrus laetiflorus</i> subsp. <i>glaber</i> C.L.Hitchc. subsp. <i>glaber</i> [now <i>L. vestitus</i> Nutt. var. <i>alefeldii</i> (T.White) Isley]
Fabaceae	* <i>Phaseolus vulgaris</i> L.
Fabaceae	<i>Trifolium amplexens</i> Torr. & A.Gray
Lamiaceae	<i>Salvia carduacea</i> Benth.
Papaveraceae	<i>Eschscholzia australis</i> Greene
Poaceae	<i>Alopecurus howellii</i> Vasey
Poaceae	<i>Aristida glauca</i> (Nees) Walp.
Poaceae	* <i>Parapholis incurva</i> (L.) C.E.Hubb.
Polygonaceae	<i>Chorizanthe turbinata</i> Wiggins
Rhamnaceae	<i>Condalia globosa</i> var. <i>pubescens</i> I.M.Johnst.

Appendix 2. Checklist of taxa in the maritime succulent scrub habitat; non-native, sensitive, endemic, and rare species are identified. Non-native species are denoted (\*). Categories of endemism and rarity follow B. O'Brien, J. Delgadillo, S. Junak, T. Oberbauer, J. Rebman, H. Riemann, and S. Vanderplank: *Rare, endangered, and endemic vascular plants of the California Floristic Province (CFP) portion of northwestern Baja California, Mexico (in prep.)*. Endemism: 5—endemic to CFP Baja California; 6—near-endemics of CFP Baja California (extending from the Baja California CFP into the Californian CFP); 7—near-endemics of CFP Baja California (extending into the Vizcaino Desert); 8—present in CFP Baja California, but extending farther to the south or east in the peninsula, and endemic to the Baja California peninsula (one or both states). Rarity: 1A—plants of CFP Baja California presumed extinct and/or extirpated; 1B—rare and endangered in CFP Baja and elsewhere; 2—rare in CFP Baja California but more common elsewhere; 3—plants needing more information; 4—rare but not currently threatened with extinction in CFP Baja California. Sensitive denotes that the taxon is either rare, endemic (or near-endemic), or, in the case of *Lophocereus schottii*, on the Mexican list of species at risk (NOM-059).

Family	Taxon	Sensitive	Endemic	Rare
Agavaceae	<i>Agave shawii</i> subsp. <i>shawii</i>	Yes	6	4
Aizoaceae	* <i>Malephora crocea</i>			
Aizoaceae	* <i>Mesembryanthemum crystallinum</i>			
Aizoaceae	* <i>Mesembryanthemum nodiflorum</i>			
Alliaceae	<i>Allium peninsulare</i>	Yes		2
Amaranthaceae	<i>Aphanisma blitoides</i>	Yes		4
Amaranthaceae	<i>Atriplex coulteri</i>	Yes		1B
Amaranthaceae	<i>Atriplex elegans</i>			
Amaranthaceae	<i>Atriplex julacea</i>			
Amaranthaceae	<i>Atriplex pacifica</i>	Yes		1B
Amaranthaceae	<i>Chenopodium californicum</i>			
Amaranthaceae	<i>Chenopodium flabellifolium</i>	Yes	5	1B
Anacardiaceae	<i>Rhus integrifolia</i>			
Apiaceae	<i>Apiastrum angustifolium</i>			
Apiaceae	<i>Daucus pusillus</i>			

## Appendix 2. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Apiaceae	<i>Drymaria viscosa</i>			
Themidaceae	<i>Dichelostemma capitatum</i> var. <i>capitatum</i>			
Asphodelaceae	* <i>Aloe maculata</i>			
Asteraceae	<i>Amauria rotundifolia</i>	Yes	8	
Asteraceae	<i>Amblyopappus pusillus</i>			
Asteraceae	<i>Ambrosia chenopodiifolia</i>			
Asteraceae	<i>Artemisia californica</i>			
Asteraceae	* <i>Centaurea melitensis</i>			
Asteraceae	<i>Chaenactis glabriuscula</i> var. <i>glabriuscula</i>			
Asteraceae	<i>Coreopsis californica</i>			
Asteraceae	<i>Coreopsis maritima</i>	Yes	6	1B
Asteraceae	<i>Deinandra fasciculata</i>			
Asteraceae	<i>Encelia californica</i>			
Asteraceae	<i>Eriophyllum confertiflorum</i> var. <i>confertiflorum</i>			
Asteraceae	<i>Hazardia berberidis</i>	Yes	5	1B
Asteraceae	<i>Isocoma menziesii</i> var. <i>menziesii</i>			
Asteraceae	<i>Lasthenia gracilis</i>			
Asteraceae	<i>Layia platyglossa</i>			
Asteraceae	<i>Logfia arizonica</i>			
Asteraceae	<i>Logfia filaginoides</i>			
Asteraceae	<i>Malacothrix similis</i>	Yes	5	1B
Asteraceae	<i>Perityle emoryi</i>			
Asteraceae	<i>Pseudognaphalium biolettii</i>			
Asteraceae	<i>Pseudognaphalium leucocephalum</i>			
Asteraceae	<i>Rafinesquia californica</i>			
Asteraceae	<i>Senecio aphanactis</i>	Yes		1B
Asteraceae	<i>Senecio californicus</i>			
Asteraceae	<i>Senecio lyonii</i>	Yes		2
Asteraceae	* <i>Sonchus oleraceus</i>			
Asteraceae	* <i>Sonchus tenerrimus</i>			
Asteraceae	<i>Stephanomeria diegensis</i>			
Asteraceae	<i>Stephanomeria exigua</i>			
Asteraceae	<i>Stylocline gnaphaloides</i>			
Asteraceae	<i>Trixis californica</i> var. <i>californica</i>			
Asteraceae	<i>Uropappus lindleyi</i>			
Boraginaceae	<i>Amsinckia inepta</i>	Yes	5	1B
Boraginaceae	<i>Cryptantha intermedia</i>			
Boraginaceae	<i>Cryptantha maritima</i>			
Boraginaceae	<i>Cryptantha pondii</i>	Yes	5	3
Boraginaceae	<i>Eucrypta chrysanthemifolia</i> var. <i>bipinnatifida</i>			
Boraginaceae	<i>Eucrypta chrysanthemifolia</i> var. <i>chrysanthemifolia</i>			
Boraginaceae	<i>Pectocarya peninsularis</i>			
Boraginaceae	<i>Pectocarya recurvata</i>			
Boraginaceae	<i>Phacelia distans</i>			
Boraginaceae	<i>Phacelia hirtuosa</i>	Yes	5	1B
Boraginaceae	<i>Phacelia ixodes</i>	Yes	5	4
Boraginaceae	<i>Phacelia parryi</i>			
Boraginaceae	<i>Pholistoma membranaceum</i>	Yes		3
Boraginaceae	<i>Pholistoma racemosum</i>			
Boraginaceae	<i>Plagiobothrys collinus</i> var. <i>ursinus</i>	Yes		1B
Brassicaceae	* <i>Brassica tournefortii</i>			
Brassicaceae	<i>Caulanthus lasiophylla</i>			
Brassicaceae	<i>Descurainia pinnata</i> subsp. <i>pinnata</i>			
Brassicaceae	<i>Draba cuneifolia</i>			
Brassicaceae	<i>Hornungia procumbens</i>	Yes		3
Brassicaceae	<i>Lepidium lasiocarpum</i> var. <i>latifolium</i>	Yes		3
Brassicaceae	<i>Lepidium nitidum</i>			
Brassicaceae	<i>Lepidium oblongum</i>			
Brassicaceae	* <i>Lepidium pinnatifidum</i>			
Brassicaceae	<i>Sibara brandegeana</i>	Yes	8	2
Cactaceae	<i>Bergerocactus emoryi</i>	Yes	6	4
Cactaceae	<i>Cylindropuntia alcahes</i> var. <i>nov.</i>	Yes	7	
Cactaceae	<i>Cylindropuntia prolifera</i>			

## Appendix 2. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Cactaceae	<i>Cylindropuntia rosarica</i>	Yes	5	4
Cactaceae	<i>Echinocereus maritimus</i> var. <i>maritimus</i>	Yes	8	4
Cactaceae	<i>Ferocactus fordii</i> var. <i>fordii</i>	Yes	8	2
Cactaceae	<i>Ferocactus viridescens</i> var. <i>viridescens</i>	Yes	6	
Cactaceae	<i>Lophocereus schottii</i> var. <i>schottii</i>	Yes		
Cactaceae	<i>Mammillaria brandegeei</i> var. <i>brandegeei</i>	Yes	7	4
Cactaceae	<i>Mammillaria dioica</i>	Yes		2
Cactaceae	<i>Mammillaria louisae</i>	Yes	5	1B
Cactaceae	<i>Myrtillocactus cochal</i>	Yes		
Cactaceae	* <i>Opuntia ficus-indica</i>			
Cactaceae	<i>Opuntia</i> aff. <i>littoralis</i>			
Cactaceae	<i>Opuntia</i> cf. <i>oricola</i>	Yes		2
Cactaceae	<i>Stenocereus gummosus</i>			
Capparaceae	<i>Peritoma arborea</i>			
Caryophyllaceae	<i>Cardionema ramosissima</i>			
Caryophyllaceae	<i>Loeflingia squarrosa</i>			
Convolvulaceae	<i>Cuscuta subinclusa</i>			
Crassulaceae	<i>Crassula connata</i>			
Crassulaceae	<i>Dudleya anthonyi</i>	Yes	5	1B
Crassulaceae	<i>Dudleya anthonyi</i> × <i>D. cultrata</i>	Yes	5	1B
Crassulaceae	<i>Dudleya attenuata</i> subsp. <i>attenuata</i>	Yes		
Crassulaceae	<i>Dudleya cultrata</i>			
Cucurbitaceae	<i>Marah macrocarpus</i> var. <i>macrocarpus</i>			
Ephedraceae	<i>Ephedra californica</i>			
Euphorbiaceae	<i>Euphorbia misera</i>			
Euphorbiaceae	<i>Euphorbia polycarpa</i>			
Euphorbiaceae	<i>Euphorbia pondii</i>	Yes	5	1B
Fabaceae	<i>Astragalus fastidius</i>	Yes		2
Fabaceae	<i>Astragalus insularis</i> var. <i>quentinus</i>	Yes	8	1B
Fabaceae	<i>Astragalus trichopodus</i> var. <i>lonchus</i>			
Fabaceae	<i>Lotus hamatus</i>			
Fabaceae	<i>Lotus strigosus</i>			
Fabaceae	<i>Lotus watsonii</i>	Yes	5	1B
Fabaceae	<i>Lupinus bicolor</i>			
Fabaceae	<i>Lupinus concinnus</i>			
Fabaceae	<i>Lupinus sparsiflorus</i>			
Fabaceae	<i>Lupinus succulentus</i>			
Fabaceae	<i>Lupinus truncatus</i>			
Fabaceae	<i>Phaseolus filiformis</i>			
Fabaceae	<i>Trifolium willdenovii</i>			
Fabaceae	<i>Vicia ludoviciana</i> var. <i>ludoviciana</i>	Yes		2
Gentianaceae	<i>Zeltnera venusta</i>			
Geraniaceae	* <i>Erodium cicutarium</i>			
Geraniaceae	* <i>Erodium moschatum</i>			
Geraniaceae	<i>Erodium texanum</i>			
Grossulariaceae	<i>Ribes tortuosum</i>	Yes	8	2
Sapindaceae	<i>Aesculus parryi</i>	Yes	7	4
Lamiaceae	<i>Salvia brandegeei</i>	Yes		1b
Lamiaceae	<i>Salvia columbariae</i>			
Liliaceae	<i>Calochortus splendens</i>			
Malvaceae	<i>Malacothammus fasciculatus</i>			
Malvaceae	<i>Sphaeralcea ambigua</i>			
Malvaceae	<i>Sphaeralcea axillaris</i>			
Malvaceae	<i>Sphaeralcea fulva</i>	Yes	5	4
Nyctaginaceae	<i>Abronia umbellata</i> subsp. <i>umbellata</i>			
Nyctaginaceae	<i>Mirabilis laevis</i> var. <i>crassifolia</i>			
Onagraceae	<i>Oenothera wigginsii</i>	Yes	5	1B
Orobanchaceae	<i>Castilleja exserta</i> subsp. <i>exserta</i>			
Orobanchaceae	<i>Castilleja subinclusa</i> subsp. <i>subinclusa</i>			
Papaveraceae	<i>Eschscholzia californica</i> var. <i>californica</i>			
Papaveraceae	<i>Platystemon californicus</i>			
Papaveraceae	<i>Stylomecon heterophylla</i>			
Phrymaceae	<i>Mimulus aurantiacus</i> var. <i>puniceus</i>			



## Appendix 2. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Plantaginaceae	<i>Collinsia heterophylla</i> var. <i>heterophylla</i>			
Plantaginaceae	<i>Gambelia juncea</i>			
Plantaginaceae	<i>Nuttallanthus canadensis</i>			
Plantaginaceae	<i>Neogaerrhinum strictum</i>	Yes		2
Plantaginaceae	<i>Plantago erecta</i>			
Plantaginaceae	<i>Plantago ovata</i> var. <i>insularis</i>			
Plantaginaceae	<i>Sairocarpus pusillus</i>			
Plantaginaceae	<i>Sairocarpus watsonii</i>			
Poaceae	<i>Aristida adscensionis</i>			
Poaceae	<i>Aristida californica</i> var. <i>californica</i>			
Poaceae	* <i>Avena fatua</i>			
Poaceae	<i>Bothriochloa barbinodis</i>			
Poaceae	<i>Bromus arizonicus</i>	Yes		4
Poaceae	<i>Bromus berterioanus</i>			
Poaceae	<i>Bromus carinatus</i>			
Poaceae	* <i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>			
Poaceae	* <i>Bromus madritensis</i> subsp. <i>rubens</i>			
Poaceae	* <i>Festuca</i> cf. <i>bromoides</i>			
Poaceae	* <i>Festuca myuros</i>			
Poaceae	<i>Festuca octoflora</i>			
Poaceae	<i>Hordeum murinum</i> subsp. <i>glaucum</i>			
Poaceae	* <i>Lamarckia aurea</i>			
Poaceae	<i>Melica frutescens</i>			
Poaceae	<i>Melica imperfecta</i>			
Poaceae	<i>Muhlenbergia microsperma</i>			
Poaceae	<i>Stipa lepida</i>			
Polemoniaceae	<i>Gilia angelensis</i>			
Polemoniaceae	<i>Leptosiphon laxus</i>	Yes	5	1B
Polemoniaceae	<i>Linanthus dianthiflorus</i>			
Polemoniaceae	<i>Navarretia hamata</i> subsp. <i>leptantha</i>			
Polygonaceae	<i>Chorizanthe chaetophora</i>	Yes	5	1B
Polygonaceae	<i>Chorizanthe interposita</i>	Yes	5	4
Polygonaceae	<i>Chorizanthe jonesiana</i>	Yes	5	1B
Polygonaceae	<i>Chorizanthe procumbens</i>			
Polygonaceae	<i>Eriogonum fasciculatum</i> var. <i>fasciculatum</i>			
Polygonaceae	<i>Eriogonum thurberi</i>			
Polygonaceae	<i>Harfordia macroptera</i> var. <i>galioides</i>	Yes		4
Polygonaceae	<i>Lastarriaea coriacea</i>			
Polygonaceae	<i>Pterostegia drymarioides</i>			
Polypodiaceae	<i>Polypodium californicum</i>			
Portulacaceae	<i>Calandrinia ciliata</i>			
Portulacaceae	<i>Cistanthe maritima</i>	Yes		4
Portulacaceae	<i>Claytonia perfoliata</i> subsp. <i>mexicana</i>			
Pteridaceae	<i>Aspidotis californica</i>	Yes		4
Pteridaceae	<i>Cheilanthes brandegeei</i>	Yes	8	
Pteridaceae	<i>Notholaena californica</i> var. <i>californica</i>			
Pteridaceae	<i>Pellaea andromedifolia</i>			
Pteridaceae	<i>Pellaea mucronata</i> var. <i>mucronata</i>			
Pteridaceae	<i>Pentagramma triangularis</i> subsp. <i>viscosa</i>			
Ranunculaceae	<i>Delphinium parryi</i> subsp. <i>maritimum</i>	Yes		2
Resedaceae	<i>Oligomeris linifolia</i>			
Rosaceae	<i>Rosa minutifolia</i>	Yes	6	4
Rubiaceae	<i>Galium aparine</i>			
Saxifragaceae	<i>Jepsonia parryi</i>			
Simmondsiaceae	<i>Simmondsia chinensis</i>			
Solanaceae	<i>Lycium andersonii</i>			
Solanaceae	<i>Lycium brevipes</i>			
Solanaceae	<i>Lycium californicum</i>			
Solanaceae	<i>Nicotiana clevelandii</i>			
Solanaceae	* <i>Nicotiana glauca</i>			
Solanaceae	<i>Physalis crassifolia</i>			
Solanaceae	<i>Solanum americanum</i>			
Solanaceae	<i>Solanum palmeri</i>	Yes	5	1B

## Appendix 2. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Themidaceae	<i>Bloomeria crocea</i> var. <i>crocea</i>			
Urticaceae	<i>Hesperocnide tenella</i>			
Urticaceae	<i>Parietaria hespera</i> var. <i>californica</i>	Yes		4
Urticaceae	<i>Parietaria hespera</i> var. <i>hespera</i>			
Violaceae	<i>Viola pedunculata</i>	Yes		4
	Total:	60	34	53

Appendix 3. Checklist for the vegetation of the dunes and beaches; non-native, sensitive, endemic, and rare species are identified. Non-native taxa are denoted (\*). See Appendix 2 for key to categories of rarity and endemism (sensu B. O'Brien et al. in prep.).

Family	Taxon	Sensitive	Endemic	Rare
Agavaceae	<i>Agave shawii</i> subsp. <i>shawii</i>	Yes	6	4
Agavaceae	<i>Yucca schidigera</i>			
Aizoaceae	* <i>Carpobrotus chilensis</i>			
Aizoaceae	* <i>Malephora crocea</i>			
Aizoaceae	* <i>Mesembryanthemum crystallinum</i>			
Amaranthaceae	<i>Atriplex julacea</i>			
Amaranthaceae	<i>Atriplex leucophylla</i>			
Amaranthaceae	<i>Atriplex pacifica</i>	Yes		1B
Anacardiaceae	<i>Malosma laurina</i>			
Anacardiaceae	<i>Rhus integrifolia</i>			
Apiaceae	<i>Drymaria viscosa</i>			
Apocynaceae	<i>Funastrum arenarium</i>	Yes	8	2
Asteraceae	<i>Ambrosia chamissonis</i>	Yes		2
Asteraceae	<i>Chaenactis glabriuscula</i> var. <i>glabriuscula</i>			
Asteraceae	<i>Hazardia berberidis</i>	Yes	5	1B
Asteraceae	<i>Helianthus niveus</i> subsp. <i>niveus</i>	Yes		1B
Asteraceae	<i>Isocoma menziesii</i> var. <i>decumbens</i>	Yes	6	1B
Asteraceae	<i>Isocoma menziesii</i> var. <i>menziesii</i>			
Asteraceae	<i>Logfia filaginoides</i>			
Asteraceae	<i>Senecio californicus</i>			
Asteraceae	<i>Stephanomeria exigua</i>			
Boraginaceae	<i>Amsinckia intermedia</i>			
Boraginaceae	<i>Cryptantha patula</i>	Yes	5	1B
Boraginaceae	<i>Heliotropium curassavicum</i>			
Boraginaceae	<i>Pectocarya peninsularis</i>			
Boraginaceae	<i>Phacelia stellaris</i>	Yes		1B
Boraginaceae	<i>Plagiobothrys collinus</i>			
Brassicaceae	* <i>Brassica tournefortii</i>			
Brassicaceae	* <i>Cakile maritima</i>			
Brassicaceae	<i>Dithyrea maritima</i>	Yes		1B
Brassicaceae	<i>Hornungia procumbens</i>	Yes		3
Brassicaceae	<i>Lepidium lasiocarpum</i> var. <i>latifolium</i>	Yes		3
Brassicaceae	<i>Lepidium nitidum</i>			
Brassicaceae	<i>Lepidium oblongum</i>			
Cactaceae	<i>Bergerocactus emoryi</i>	Yes	6	4
Cactaceae	<i>Cylindropuntia alcahes</i> var. nov.	Yes	7	
Cactaceae	<i>Cylindropuntia molesta</i>	Yes	8	
Cactaceae	<i>Cylindropuntia prolifera</i>			
Cactaceae	<i>Cylindropuntia rosarica</i>	Yes	5	4
Cactaceae	<i>Echinocereus maritimus</i> var. <i>maritimus</i>	Yes	8	4
Cactaceae	<i>Ferocactus fordii</i> var. <i>fordii</i>	Yes	8	2
Cactaceae	<i>Lophocereus schottii</i> var. <i>schottii</i>	Yes		
Cactaceae	<i>Mammillaria dioica</i>	Yes		2
Cactaceae	<i>Mammillaria louisae</i>	Yes	5	1B
Cactaceae	<i>Stenocereus gummosus</i>			
Caryophyllaceae	<i>Achyronychia cooperi</i>			
Caryophyllaceae	<i>Cardionema ramosissima</i>			
Crassulaceae	<i>Dudleya cultrata</i>			
Ephedraceae	<i>Ephedra californica</i>			

## Appendix 3. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Euphorbiaceae	<i>Acalypha californica</i>			
Euphorbiaceae	<i>Croton californicus</i>			
Euphorbiaceae	<i>Euphorbia pondii</i>	Yes	5	1B
Euphorbiaceae	<i>Stillingia linearifolia</i>			
Fabaceae	<i>Astragalus anemophilus</i>	Yes	5	1B
Fabaceae	<i>Astragalus insularis</i> var. <i>quentinus</i>	Yes	8	1B
Fabaceae	<i>Lotus bryantii</i>	Yes	8	2
Fabaceae	<i>Lotus distichus</i>	Yes	5	1B
Fabaceae	<i>Lotus nuttallianus</i>	Yes	6	1B
Fabaceae	<i>Lotus strigosus</i>			
Geraniaceae	* <i>Erodium moschatum</i>			
Juncaceae	<i>Juncus acutus</i> subsp. <i>leopoldii</i>			
Boraginaceae	<i>Pholisma arenarium</i>	Yes		2
Nyctaginaceae	<i>Abronia maritima</i>	Yes		2
Nyctaginaceae	<i>Abronia umbellata</i> subsp. <i>umbellata</i>			
Onagraceae	<i>Camissoniopsis cheiranthifolia</i> subsp. <i>suffruticosa</i>			
Onagraceae	<i>Camissoniopsis lewisii</i>	Yes		4
Onagraceae	<i>Camissoniopsis proavita</i>	Yes	5	4
Onagraceae	<i>Eulobus californicus</i>			
Onagraceae	<i>Eulobus crassifolius</i>	Yes		2
Onagraceae	<i>Oenothera wigginsii</i>	Yes	5	1B
Orobanchaceae	<i>Orobanche parishii</i> subsp. <i>brachyloba</i>	Yes		1B
Plantaginaceae	<i>Gambelia juncea</i>			
Plantaginaceae	<i>Nuttallanthus canadensis</i>			
Plantaginaceae	<i>Plantago ovata</i>			
Poaceae	<i>Aristida californica</i> var. <i>californica</i>			
Poaceae	<i>Aristida purpurea</i> var. <i>longiseta</i>			
Poaceae	<i>Bothriochloa barbinodis</i>			
Poaceae	* <i>Bromus madritensis</i> subsp. <i>rubens</i>			
Poaceae	<i>Distichlis spicata</i>			
Poaceae	* <i>Festuca myuros</i>			
Poaceae	* <i>Hordeum murinum</i> subsp. <i>glaucum</i>			
Poaceae	<i>Leymus triticooides</i>			
Poaceae	* <i>Schismus barbatus</i>			
Poaceae	<i>Stipa speciosa</i>			
Polemoniaceae	<i>Eriastrum filifolium</i>			
Polygonaceae	<i>Chorizanthe chaetophora</i>	Yes	5	1B
Polygonaceae	<i>Chorizanthe inequalis</i>	Yes	5	1B
Polygonaceae	* <i>Emex spinosa</i>			
Polygonaceae	<i>Eriogonum scalare</i>	Yes	8	2
Polygonaceae	<i>Nemacaulis denudata</i> var. <i>denudata</i>	Yes		1B
Polygonaceae	<i>Nemacaulis denudata</i> var. <i>gracilis</i>			2
Polygonaceae	* <i>Rumex crispus</i>			
Portulacaceae	<i>Calyptridium monandrum</i>			
Ranunculaceae	<i>Clematis pauciflora</i>			
Rhamnaceae	<i>Adolphia californica</i>			
Rhamnaceae	<i>Rhamnus insula</i>	Yes	6	
Rosaceae	<i>Heteromeles arbutifolia</i>			
Simmondsiaceae	<i>Simmondsia chinensis</i>			
Solanaceae	<i>Lycium brevipes</i>			
Solanaceae	<i>Solanum hindsianum</i>			
	Total:	39	24	35



Appendix 4. Checklist for the saltmarsh habitat; non-native, sensitive, endemic, and rare species are identified. Non-native taxa are denoted (\*). See Appendix 2 for key to categories of rarity and endemism (sensu B. O'Brien et al. in prep.).

Family	Taxon	Sensitive	Endemic	Rare
Aizoaceae	* <i>Mesembryanthemum crystallinum</i>			
Aizoaceae	* <i>Mesembryanthemum nodiflorum</i>			
Amaranthaceae	<i>Allenrolfea occidentalis</i>			
Amaranthaceae	<i>Arthrocnemum subterminale</i>			
Amaranthaceae	<i>Atriplex julacea</i>			
Amaranthaceae	<i>Atriplex leucophylla</i>			
Amaranthaceae	* <i>Atriplex lindleyi</i>			
Amaranthaceae	* <i>Atriplex semibaccata</i>			
Amaranthaceae	* <i>Atriplex suberecta</i>			
Amaranthaceae	<i>Atriplex watsonii</i>	Yes		4
Amaranthaceae	<i>Salicornia bigelovii</i>			
Amaranthaceae	<i>Sarcocornia pacifica</i>			
Amaranthaceae	<i>Suaeda esteroa</i>	Yes		1B
Amaranthaceae	<i>Suaeda nigra</i>			
Amaranthaceae	<i>Suaeda taxifolia</i>			
Asteraceae	<i>Jaumea carnosa</i>	Yes		2
Bataceae	<i>Batis maritima</i>			
Boraginaceae	<i>Plagiobothrys collinus</i> var. <i>fulvescens</i>			
Caryophyllaceae	<i>Spergularia macrotheca</i> var. <i>macrotheca</i>			
Caryophyllaceae	<i>Spergularia salina</i>			
Convolvulaceae	<i>Cressa truxillensis</i>			
Convolvulaceae	<i>Cuscuta occidentalis</i>			
Convolvulaceae	<i>Cuscuta pacifica</i> var. <i>pacifica</i>			
Frankeniaceae	<i>Frankenia palmeri</i>	Yes		4
Frankeniaceae	<i>Frankenia salina</i>			
Juncaceae	<i>Juncus acutus</i> subsp. <i>leopoldii</i>			
Juncaginaceae	<i>Triglochin maritima</i>	Yes		2
Orobanchaceae	<i>Cordylanthus maritimus</i> subsp. <i>maritimus</i>	Yes		1B
Plumbaginaceae	<i>Limonium californicum</i>	Yes		4
Poaceae	<i>Distichlis bajaensis</i>	Yes	8	4
Poaceae	<i>Distichlis littoralis</i>			
Poaceae	<i>Distichlis spicata</i>			
Poaceae	<i>Spartina foliosa</i>	Yes		4
Solanaceae	<i>Lycium brevipes</i>			
Tamaricaceae	* <i>Tamarix chinensis</i>			
	Total:	8	0	8

Appendix 5. Checklist for the riparian areas; non-native, sensitive, endemic, and rare species are identified. Non-native taxa are denoted (\*). See Appendix 2 for key to categories of rarity and endemism (sensu B. O'Brien et al. in prep.).

Family	Taxon	Sensitive	Endemic	Rare
Aizoaceae	* <i>Mesembryanthemum crystallinum</i>			
Aizoaceae	* <i>Tetragonium tetragonoides</i>			
Amaranthaceae	<i>Atriplex californica</i>			
Amaranthaceae	<i>Atriplex canescens</i> subsp. <i>canescens</i>			
Amaranthaceae	<i>Atriplex julacea</i>			
Amaranthaceae	* <i>Beta vulgaris</i> subsp. <i>maritima</i>			
Anacardiaceae	<i>Malosma laurina</i>			
Anacardiaceae	<i>Toxicodendron diversilobum</i>			
Apocynaceae	<i>Asclepias subulata</i>			
Asteraceae	<i>Ambrosia confertiflora</i>			
Asteraceae	<i>Ambrosia monogyra</i>			
Asteraceae	<i>Artemisia dracunculus</i>			
Asteraceae	<i>Artemisia tridentata</i> subsp. <i>tridentata</i>			
Asteraceae	<i>Baccharis pilularis</i> var. <i>consanguinea</i>			
Asteraceae	<i>Baccharis salicifolia</i>			
Asteraceae	<i>Baccharis sarothroides</i>			
Asteraceae	<i>Bahiopsis laciniata</i>	Yes	6, 7	
Asteraceae	<i>Bahiopsis triangularis</i>	Yes		2

## Appendix 5. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Asteraceae	<i>Baileya pleniradiata</i>			
Asteraceae	<i>Bebbia juncea</i> var. <i>aspera</i>			
Asteraceae	<i>Brickellia californica</i>			
Asteraceae	<i>Conyza canadensis</i>			
Asteraceae	* <i>Cotula coronopifolia</i>			
Asteraceae	<i>Encelia asperifolia</i>	Yes	8	
Asteraceae	<i>Encelia farinosa</i> var. <i>farinosa</i>			
Asteraceae	<i>Ericameria palmeri</i> var. <i>palmeri</i>	Yes	6	1B
Asteraceae	* <i>Glebionis carinata</i>			
Asteraceae	* <i>Glebionis coronaria</i>			
Asteraceae	<i>Gnaphalium palustre</i>			
Asteraceae	<i>Helianthus niveus</i> subsp. <i>niveus</i>	Yes		1B
Asteraceae	<i>Heterotheca grandiflora</i>			
Asteraceae	<i>Hulsea mexicana</i>	Yes	6	4
Asteraceae	<i>Isocoma menziesii</i> var. <i>menziesii</i>			
Asteraceae	<i>Iva hayesiana</i>			
Asteraceae	<i>Pluchea sericea</i>			
Asteraceae	<i>Pseudognaphalium beneolens</i>	Yes		
Asteraceae	<i>Pseudognaphalium leucocephalum</i>			
Asteraceae	<i>Stephanomeria exigua</i>			
Boraginaceae	<i>Cryptantha clevelandii</i> var. <i>florosa</i>			
Boraginaceae	<i>Eriodictyon angustifolium</i>			
Boraginaceae	<i>Eriodictyon sessilifolium</i>	Yes	5	4
Boraginaceae	<i>Heliotropium curassavicum</i>			
Boraginaceae	<i>Nama hispidum</i> var. <i>spatulatum</i>	Yes		2
Boraginaceae	<i>Tiquilia plicata</i>			
Brassicaceae	* <i>Brassica tournefortii</i>			
Brassicaceae	<i>Lepidium nitidum</i>			
Brassicaceae	<i>Lepidium virginicum</i> subsp. <i>menziesii</i>			
Brassicaceae	* <i>Raphanus sativus</i>			
Cactaceae	<i>Cylindropuntia alcahes</i> var. nov.	Yes	7	
Cactaceae	<i>Cylindropuntia cholla</i>	Yes	8	
Cactaceae	<i>Cylindropuntia rosarica</i>	Yes	5	4
Cactaceae	<i>Opuntia</i> cf. <i>phaeacantha</i>			
Campanulaceae	<i>Nemacladus sigmoideus</i>			
Caprifoliaceae	<i>Sambucus caerulea</i> var. <i>mexicana</i>			
Caryophyllaceae	<i>Achyronychia cooperi</i>			
Convolvulaceae	<i>Calystegia macrostegia</i> subsp. <i>tenuifolia</i>			
Convolvulaceae	* <i>Convolvulus arvensis</i>			
Cyperaceae	<i>Bolboschoenus maritimus</i>			
Cyperaceae	* <i>Cyperus</i> cf. <i>esculentus</i>			
Equisetaceae	<i>Equisetum laevigatum</i>			
Ericaceae	<i>Arctostaphylos glauca</i>			
Euphorbiaceae	<i>Acalypha californica</i>			
Euphorbiaceae	<i>Croton californicus</i>			
Euphorbiaceae	* <i>Ricinus communis</i>			
Euphorbiaceae	<i>Stillingia linearifolia</i>			
Fabaceae	<i>Amorpha apiculata</i>	Yes	5	1B
Fabaceae	<i>Astragalus</i> aff. <i>palmeri</i>			
Fabaceae	<i>Astragalus fastidius</i>	Yes		2
Fabaceae	<i>Astragalus gruinus</i>	Yes	5	1B
Fabaceae	<i>Astragalus hornii</i> var. <i>minutiflorus</i>	Yes	7	1B
Fabaceae	<i>Astragalus prorifer</i>	Yes	8	4
Fabaceae	<i>Lotus heermannii</i>			
Fabaceae	<i>Lotus nuttallianus</i>	Yes	6	1B
Fabaceae	<i>Lotus purshianus</i>			
Fabaceae	<i>Lotus rigidus</i>			
Fabaceae	<i>Lotus watsonii</i>	Yes	5	1B
Fabaceae	<i>Lupinus</i> cf. <i>longifolius</i>			
Fabaceae	* <i>Melilotus albus</i>			
Fabaceae	* <i>Melilotus indicus</i>			
Fabaceae	<i>Pickeringia montana</i> subsp. <i>tomentosa</i>	Yes		2
Fabaceae	<i>Prosopis glandulosa</i> var. <i>torreyana</i>			

## Appendix 5. Continued.

Family	Taxon	Sensitive	Endemic	Rare
Fabaceae	<i>Trifolium microcephalum</i>			
Geraniaceae	* <i>Erodium cicutarium</i>			
Juncaceae	<i>Juncus acutus</i> subsp. <i>leopoldii</i>			
Juncaceae	<i>Juncus articus</i> var. <i>mexicanus</i>			
Lamiaceae	<i>Hyptis emoryi</i> var. <i>emoryi</i>			
Lamiaceae	<i>Monardella linoidea</i> subsp. <i>stricta</i>	Yes		2
Lamiaceae	<i>Salvia apiana</i>			
Lamiaceae	<i>Salvia munzii</i>			
Loasaceae	<i>Eucnide cordata</i>	Yes	8	
Loasaceae	<i>Mentzelia multiflora</i> subsp. <i>longiloba</i>			
Loasaceae	<i>Petalonyx linearis</i>			
Malvaceae	<i>Malacothamnus fasciculatus</i>			
Malvaceae	<i>Sphaeralcea fulva</i>	Yes	5	4
Myrtaceae	* <i>Eucalyptus camaldulensis</i>			
Onagraceae	<i>Camissoniopsis hirtella</i>			
Onagraceae	<i>Camissoniopsis lewisii</i>	Yes		4
Onagraceae	<i>Eulobus californicus</i>			
Orobanchaceae	<i>Castilleja exserta</i> subsp. <i>exserta</i>			
Orobanchaceae	<i>Cordylanthus orcuttianus</i>	Yes		4
Orobanchaceae	<i>Orobanche parishii</i> subsp. <i>brachyloba</i>	Yes		1B
Papaveraceae	<i>Argemone munita</i>			
Papaveraceae	<i>Eschscholzia californica</i> var. <i>californica</i>			
Papaveraceae	<i>Romneya trichocalyx</i>			
Phrymaceae	<i>Mimulus pilosus</i>			
Plantaginaceae	<i>Penstemon spectabilis</i> subsp. <i>subinteger</i>	Yes	8	4
Plantaginaceae	<i>Sairocarpus coulterianus</i>			
Platanaceae	<i>Platanus racemosa</i>			
Poaceae	* <i>Bromus madritensis</i> subsp. <i>rubens</i>			
Poaceae	* <i>Cynodon dactylon</i>			
Poaceae	<i>Distichlis littoralis</i>			
Poaceae	<i>Distichlis spicata</i>			
Poaceae	<i>Muhlenbergia microsperma</i>			
Poaceae	* <i>Schismus barbatus</i>			
Polemoniaceae	<i>Eriastrum filifolium</i>			
Polemoniaceae	<i>Ipomopsis effusa</i>	Yes	6	4
Polemoniaceae	<i>Ipomopsis tenuifolia</i>	Yes	6	
Polemoniaceae	<i>Navarretia atractyloides</i>			
Polygonaceae	<i>Eriogonum fasciculatum</i> var. <i>polifolium</i>			
Polygonaceae	<i>Eriogonum hastatum</i>	Yes	5	4
Polygonaceae	<i>Eriogonum thurberi</i>			
Polygonaceae	<i>Nemacaulis denudata</i> var. <i>denudata</i>	Yes		1B
Polygonaceae	<i>Persicaria punctata</i>			
Polygonaceae	<i>Rumex hymenosepalus</i>			
Portulacaceae	<i>Calyptridium monandrum</i>			
Myrsinaceae	* <i>Anagallis arvensis</i>			
Ranunculaceae	<i>Clematis pauciflora</i>			
Rhamnaceae	<i>Ceanothus</i> aff. <i>bolensis</i>	Yes	5	1B
Rhamnaceae	<i>Ceanothus leucodermis</i>			
Rosaceae	<i>Adenostoma fasciculatum</i>			
Rosaceae	<i>Aphanes occidentalis</i>	Yes		2
Salicaceae	<i>Salix exigua</i> var. <i>hindsiana</i>			
Salicaceae	<i>Salix lasiolepis</i>			
Scrophulariaceae	<i>Buddleja sessiflora</i>			
Solanaceae	<i>Lycium brevipes</i>			
Solanaceae	<i>Lycium fremontii</i>			
Solanaceae	* <i>Nicotiana glauca</i>			
Solanaceae	<i>Solanum americanum</i>			
Solanaceae	* <i>Solanum sarrachoides</i>			
Tamaricaceae	* <i>Tamarix chinensis</i>			
Typhaceae	<i>Typha domingensis</i>			
	Total:	29	17	24



Appendix 6. Checklist of taxa frequenting shell middens; non-native, sensitive, endemic, and rare species are identified. Non-native species are denoted (\*). See Appendix 2 for key to categories of rarity and endemism (sensu B. O'Brien et al. in prep.).

Family	Taxon	Sensitive	Endemic	Rare
Asteraceae	<i>Helianthus niveus</i> subsp. <i>niveus</i>	Yes		1B
Asteraceae	* <i>Gamochaeta stagnalis</i>			
Boraginaceae	<i>Cryptantha maritima</i>			
Cactaceae	<i>Bergerocactus emoryi</i>	Yes	6	4
Cactaceae	<i>Cylindropuntia alcahes</i> var. <i>nov.</i>	Yes	7	
Cactaceae	<i>Cylindropuntia cholla</i>	Yes	8	
Cactaceae	<i>Cylindropuntia molesta</i>	Yes	8	
Cactaceae	<i>Cylindropuntia prolifera</i>			
Cactaceae	<i>Cylindropuntia rosarica</i>	Yes	5	4
Cactaceae	<i>Echinocereus maritimus</i> var. <i>maritimus</i>	Yes	8	4
Cactaceae	<i>Ferocactus fordii</i> var. <i>fordii</i>	Yes	8	2
Cactaceae	<i>Lophocereus schottii</i> var. <i>schottii</i>	Yes		
Cactaceae	<i>Mammillaria dioica</i>	Yes		2
Cactaceae	<i>Opuntia</i> cf. <i>oricola</i>	Yes		2
Poaceae	<i>Hordeum intercedens</i>	Yes		1B
Polygonaceae	<i>Chorizanthe inequalis</i>	Yes	5	1B
Polygonaceae	<i>Nemacaulis denudata</i> var. <i>gracilis</i>	Yes		2
	Total:	14	8	10

Appendix 7. Checklist for taxa of vernal pool habitats; sensitive, endemic, and rare species are identified. See Appendix 2 for key to categories of rarity and endemism (sensu B. O'Brien et al. in prep.). (All taxa are native).

Family	Taxon	Sensitive	Endemic	Rare
Apiaceae	<i>Eryngium aristulatum</i> var. <i>parishii</i>	Yes	6	1B
Asteraceae	<i>Centromadia perennis</i>	Yes	5	1B
Asteraceae	<i>Matricaria occidentalis</i>			
Asteraceae	<i>Psilocarphus brevissimus</i>	Yes		1B
Boraginaceae	<i>Plagiobothrys leptocladus</i>	Yes		1A
Cyperaceae	<i>Eleocharis macrostachya</i>	Yes		2
Onagraceae	<i>Epilobium pygmaeum</i>	Yes		1B
Solanaceae	<i>Petunia parviflora</i>			
Verbenaceae	<i>Verbena menthifolia</i>			
	Total:	6	2	6

Appendix 8. List of ruderal species from Greater San Quintín that were commonly found along roadsides and were not assigned to a specific habitat.

Family	Species
Amaranthaceae	<i>Amaranthus albus</i>
Amaranthaceae	<i>Amaranthus</i> cf. <i>hybridus</i>
Amaranthaceae	<i>Bassia hyssopifolia</i>
Amaranthaceae	<i>Dysphania ambrosioides</i>
Amaranthaceae	<i>Salsola tragus</i>
Anacardiaceae	<i>Schinus terebinthifolius</i>
Apiaceae	<i>Foeniculum vulgare</i>
Asteraceae	<i>Verbesina encelioides</i> subsp. <i>encelioides</i>
Brassicaceae	<i>Hirschfeldia incana</i>
Brassicaceae	<i>Sisymbrium irio</i>
Brassicaceae	<i>Sisymbrium orientale</i>
Fabaceae	<i>Medicago polymorpha</i>
Fabaceae	<i>Medicago sativa</i>

Appendix 8. Continued.

Family	Species
Geraniaceae	<i>Erodium brachycarpum</i>
Lamiaceae	<i>Marrubium vulgare</i>
Malvaceae	<i>Malva parviflora</i>
Poaceae	<i>Cenchrus ciliaris</i>
Poaceae	<i>Cenchrus clandestinus</i>
Poaceae	<i>Hordeum vulgare</i>
Poaceae	<i>Phalaris minor</i>
Poaceae	<i>Polypogon monspeliensis</i>
Poaceae	<i>Sorghum halepense</i>
Polygonaceae	<i>Polygonum argyrocoleon</i>
Polygonaceae	<i>Polygonum aviculare</i>
Polygonaceae	<i>Rumex</i> cf. <i>persicarioides</i>
Polygonaceae	<i>Rumex pulcher</i>
Solanaceae	<i>Datura wrightii</i>
Verbenaceae	<i>Vitex trifolia</i>