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Leymus condensatus (C. Presl) A. Love [Elymus c. C. Presl] GIANT RYE. Scarce. Locally common on NE slope, E side of TSS, 11 May 1979, Moran 27221 (SD); TSS, 15 Mar 1980, Thorne et al. 53948 (RSA-POM).

Melica imperfecta Trin. COAST RANGE MELIC. Common.

TS, Mar-Jun 1897, Anthony 203 (RSA-POM); terrace between S Cove and N Fish Camp, central onshore portion of TSS, 24 Aug 1968, Philbrick & Benedict B68-432; TSS, 15 Mar 1980, Thorne et al. 53936 (RSA-POM).

Muhlenbergia microsperma (DC.) Kunth LITTLESEED MUHLY. Occasional.

TS, Mar-Jun 1897, Anthony 195; abundant in portions of island, N Fish Camp, central eastern portion of TSS, 28-29 Apr 1978, Philbrick & Junak B78-89; above Landing Cove, TSS, 28 Apr 1978, Philbrick & Junak B78-101.

*Phalaris minor Retz. MEDITERRANEAN CANARY GRASS. Scarce.

TS, 29 May 1926, Pierce s.n. (POM 98721); local on grassy flat, E side of TSS, 11 May 1979, Moran 27226 (RSA-POM,SD); rocky ocean bluff, extreme S end of N Fish Camp, central eastern portion of TSS, 28–29 Apr 1978, Philbrick & Junak B78-77.

- Poa secunda J.S. Presl subsp. secunda [P. scabrella (Thurb.) Vasey] ONE-SIDED BLUEGRASS. Scarce. Only near N Landing, TSS, elev. ca. 20 m, 15 Mar 1980, Thorne et al. 53921 (RSA-POM).
- *Polypogon monspeliensis (L.) Desf. RABBITSFOOT GRASS. Scarce.
- S-facing slope of main ridge, SW portion of TSS, 28 Apr 1978, Philbrick & Junak B78-131; occasional near S Landing, TSS, 11 May 1979, Moran 27204 (SD).
- Stipa diegoensis Swallen [Achnatherum d. (Swallen) Barkworth] SAN DIEGO COUNTY NEEDLEGRASS. Common. N Fish Camp, central eastern portion of TSS, 28-29 Apr 1978, Philbrick & Junak B78-92; TSS, 15 Mar 1980, Thorne et al. 53945 (RSA-POM); SE shore, TSN, 21 Apr 1985, Philbrick s.n. (SBBG 103833).
- *Vulpia myuros var. hirsuta (Hackel) Asch. & Graebner [Festuca megalura Nutt.] FOXTAIL FESCUE. Occasional. Common, TSS, 7 Apr 1948, Moran 2820 (UC).

Vulpia octoflora (Walter) Rydb. var. octoflora SIX-WEEKS FESCUE. Reported for Todos Santos by Gould and Moran (1981), but we have seen no specimen.

Zosteraceae (Eel-Grass Family)

Phyllospadix torreyi S. Watson SURF-GRASS. Abundance on Todos Santos not known; needs further study. SE anchorage, TSN, 21 Apr 1985, Philbrick s.n. (SBBG 103836).

The Flowering Plants of San Martin Island, **Baja California**, Mexico

Steven A. Junak¹ and Ralph Philbrick²

¹Santa Barbara Botanic Garden, 1212 Mission Canyon Road, Santa Barbara, CA 93105 Tel. (805) 682-4726: Fax (805) 563-0352

> ²29 San Marcos Trout Club, Santa Barbara, CA 93105 Tel. (805) 967-0875

Abstract. San Martin Island is situated 5 km off the Baja California coast near San Quintin. The island's climate is arid and a maritime scrub vegetation, dominated by drought-resistant shrubs and cacti, covers most of the rough lava substrate. There are also small areas dominated by coastal strand, coastal sand dune, alkali flat, and coastal salt marsh vegetation. A total of 80 native plant taxa have now been documented for the island, representing 27 families and 72 genera. Even though the island is only 5 km offshore, 3 plant taxa endemic to the California Islands occur there. One species (Chenopodium flabellifolium) is known only from San Martin Island. The vegetation has been disturbed by human activities, as well as by nonnative animal and plants, periodic fires, and breeding seabird colonies. Although more than 18% of the known flora on San Martin is introduced, most of the nonnative plants are not widespread on the island.

Although many botanists have visited San Martin Island during the last 100 yr, surprisingly little specific information has been published about the plant life. In some cases, data were lost before observations could be published. Human visitation, for both scientific and recreational purposes, has increased dramatically in the last decade, raising the demand for information about the flora. We hope to spark further interest in this picturesque island by providing here: (1) an introduction to the island's geography and vegetation, (2) a description of historical changes, (3) a short history of botanical exploration, and (4) an annotated checklist of the flowering plants.

Keywords: San Martin Island; Isla San Martin; San Quintin; Bahia de San Quintin; California Islands; Baja California; Mexico; flora; vegetation; botanical exploration.

Introduction

Like several of the islands off the west coast of Baja California, San Martin is known for a spectacular springtime flora. Following adequate rainfall, the volcanic slopes of this small island are ablaze with a colorful array of flowering shrubs, cacti, herbaceous perennials, and annuals. Interspersed with these flowering plants are rough lava rocks, many covered with conspicuous lichens.

In spite of the island's small size and limited ecological diversity, its flora includes an endemic Goosefoot (Chenopodium flabellifolium). In addition, several plant species are known only from San Martin Island and the adjacent mainland near San Quintin. The most eye-catching of these restricted endemics is the San Quintin liveforever (Dudleya anthonyi), which has giant rosettes of powdery white leaves on sprawling trunks that can be up to 2 ft long.

Physical Environment

Eight islands lie off the west coast of Baja California between the United States/Mexico border and Punta Eugenia, 575 km (357 mi) south of the international border. Ranging in size from 0.4 to 348 km² (0.2 to 134 mi²), 7 of the islands are on the continental shelf and 6 lie within 23 km (14 mi) of the coastline. San Benito Island is 66 km (41 mi) from the nearest point on the peninsular mainland but only 27 km (17 mi) from neighboring Cedros Island. Guadalupe, however, is a truly oceanic island situated 252 km (157 mi) off the Baja California coast.

San Martin is part of this loosely associated group of islands, with its center located near latitude 30º 29' N, longitude 116° 07' W., about 260 km (162 mi) south of the border between the United States and Mexico. Of the island group, San Martin lies the closest to the mainland (Fig. 1), only 5 km (3 mi) off the coast, just west of the Bay of San Quintin. Roughly circular with an area of 2.3 km² (0.9 mi²), the island is dominated by a 151-m (497-ft) cinder cone and crater located near the center of the island

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Figure 1. Map of San Martin Island and vicinity. (Scale is approximate.)



Figure 2. Map of San Martin Island. (Scale and topographic features are approximate. Contour interval = 50 ft.)

(see Fig. 2). A smaller peak, Picacho San Martin, is situated just north of the crater and reaches an elevation of about 143 m (471 ft). The island's terrain gradually drops off from these high points to a relatively flat terrace around the perimeter. Steep coastal bluffs and a rocky shoreline surround much of the northern and western portions of the island.

The geologic substrate of the island's northern and central portions is a rough basalt of Pleistocene/Pliocene age (Gastil et al. 1975). The basalt, perforated by numerous lava tubes, has many loose rocks on the surface but only scattered patches of soil. Habitat diversity in this portion of the island is limited, as there are no large canyons, no freshwater springs, and there has been little soil development.

In the southern part of the island the basalt is covered by loose sand. A conspicuous feature at the southeast side is a shallow saltwater lagoon surrounded by low-lying sandy flats. A sandy beach and low sand dunes line a small cove on the southeastern end of the island (Hassler Cove).

Although there are no weather records for San Martin Island, the climate can be estimated from 4 stations on the adjacent peninsula. Limited precipitation and temperature records, for 4-13 yr spans, are available for Colonia Guerrero (latitude 30º 43' N, longitude 116º 02' W, elevation 40 m), Las Escobas (30º 34' N, 115º 59' W, elevation 24 m), Santa Maria del Mar (30º 23' N, 115º 50' W), and El Socorro (30º 20' N, 115º 46' W) (Hastings 1964). All of these stations have an arid climate, with mean annual precipitation amounts ranging from 105.7 to 137.1 mm (4.2 to 5.5 in). About 84-90% of the precipitation at these 4 sites falls in the winter, between November and March. Frequent overcast and fogs provide additional moisture in this portion of Baja California (Rundel et al. 1972).

Mean annual temperatures at the peninsular sites are 15.5-18.5º C (60-65º F). Typically, January is the coldest month, with mean monthly temperatures ranging from 11.2 to 14.9° C (52 to 59° F) at the 4 stations. The warmest month is typically August, with mean monthly temperatures ranging from 20.2 to 22.7º C (68 to 73º F).

The human residents on San Martin Island live in a seasonal fish camp just behind the beach at Hassler Cove and in a smaller group of buildings just north of the fish camp. Trails lead around the perimeter of the island and up to the crater from the lagoon area. A navigation light, formerly on the edge of the crater, is now situated near the shoreline on the west side.

Historical Changes

The vegetation has been disturbed by human activities, introduced animals, periodic fires, and large colonies of breeding seabirds. Introduced animals that have been seen at various times by the authors or reported by other visitors to San Martin Island include domestic cats, dogs, and rabbits. Numerous cats "in caves near the landing" were reported to R. Philbrick by a fisherman on the island in October 1968, Rabbits were reportedly brought to the island in about 1974 or 1975 (V. Yadon 1978, pers. comm. to R. Philbrick, 1978; C. R. Feldmeth 1981, pers.

Table 1. Dates of first known records of introduced plants on San Martin Island

Plant	Date of first known record
Chenopodium murale	1896
Mesembryanthemum crystallinum	1897
Sonchus tenerrimus	1897
onchus oleraceus	1948
romus madritensis subsp. rubens	1963
akile maritima	1963
rodium cicutarium	1963
amarckia aurea	1963
riticum aestivum	1963
ordeum murinum subsp. glaucum	1968
lanum americanum	1968
odium moschatum	1974
vena fatua	1979
omus hordeaceus	1980
alva parviflora	1980
ordeum murinum subsp. leporinum	1981
riplex semibaccata	1985
esembryanthemum nodiflorum	1991

comm. to R. Philbrick) but we have not seen any. A fisherman on the island reported that cats and rabbits were still present in 1980 (1980 pers. comm. to S. Junak). At least 2 dogs have lived at the fish camp in March 1987 and in April 1988. These dogs harass the sea lions that haul out around the perimeter of the island. The sea lions disturb low-lying vegetation near the shore, especially as they try to escape from dogs or people. Additional disturbance of the vegetation around the perimeter of the island has been caused by breeding colonies of seabirds, including brown pelicans and Brandt's cormorants (Bostic 1975).

Brush fires occasionally burn portions of the island and, at least in the short term, can affect the composition of the flora. Evidence of these fires was seen by the authors in 1968 (in many small areas), 1980 (in backdunes just south of the fish camp at Hassler Cove and on coastal terraces on the east side of the island), and 1988 (on the south slopes of the crater). We saw very little regeneration of native perennials in one such burned area with a deep layer of ashes (observed in April 1980, probably within a few months of the burn, on a coastal terrace north of Hassler Cove). Many plants of Lycium and Opuntia aff. prolifera appeared to have been killed by the fire; a few Lycium individuals had stump sprouts. Annual plants colonizing the burned site were weeds (Chenopodium murale, Mesembryanthemum crystallinum, and Sonchus oleraceus).

For the most part, the disturbances described above appear to have been concentrated on the relatively gentle slopes around the perimeter of the island. Loose, rough ava rocks and spiny shrubs have discouraged human travover the steeper slopes away from the coast, and larger razing animals (e.g., burros) are absent. Hence, much of he inland vegetation has suffered only minor disturbance. The widespread and dominant plants probably have apparntly changed little since the first botanical observations early a century ago (based on Brandegee 1900).

At least 18 nonnative plant taxa have reached San Aartin Island, most of them since the 1940s. The dates of he first known records of these nonnative taxa are listed Table 1. Mesembryanthemum crystallinum is now the nost abundant of the introduced plants and, at least in ome years, is the dominant plant in disturbed areas round the perimeter of the island. The other plants introuced to San Martin Island grow in scattered populations nd do not dominate large areas.

listory of Botanical Exploration

Ornithologist Alfred W. Anthony reportedly visited San Martin Island in 1887 or 1888 (Nelson 1921), but if he collected any plants, we haven't seen them. The first known botanical specimens from San Martin Island were collected by Charles F. Pond, a U.S. Navy Lieutenant on the U.S.S. Ranger. On 25 May 1889, he collected Abronia maritima, Ambrosia chamissonis, Atriplex julacea, Phacelia ixodes, and Suaeda taxifolia. Pond also visited Los Coronados, Cedros, San Benito, and Asuncion islands between December 1888 and June 1889 (Nelson 1921; Notre Dame-Greene Herbarium 1987) and apparently sent his Baja California collections to E. L. Greene (Greene 1889).

In 1896, A. W. Anthony chartered a schooner and explored the west coast of Baja California (Nelson 1921). During this voyage, he collected plants on San Martin Island on 16 July 1896.

In the spring of 1897, A. W. Anthony and other naturalists visited the islands off the west coast of Baja California on Anthony's schooner Wahlberg (Brandegee 1900; Moran 1952). Anthony and T. S. Brandegee collected botanical specimens at San Martin Island on 12-13 March 1897. Anthony collected numerous duplicates and offered these for sale (Anthony 1897):

I offer for sale sets of about 300 plants, from the islands of Todos Santos, San Martin, Guadaloupe [sic], Cerros [sic], Natividad, San Benedicto, Socorro, and Clarion, with a few from Lower California, at 10 cents a specimen. The numbers are consecutive with my collection of 1896, a few sets of which are still to be had.

A number of institutions apparently bought Anthony's collections as they are widely distributed.

Anthony's companion on the voyage, T. S. Brandegee, reported that he found 40 plant taxa on the island. listed 16 of the plants seen (14 native and 2 introduced), and briefly described the plant life (Brandegee 1900):

The guano poachers consider it a barren island and so it usually is, but our visit happened after abundant rains, and forty species of plants were found along the beach and among the rocks. The species of Rhus were absent, and the tallest forms of vegetation were a few plants of Cereus gummosus [Stenocereus g.] and C. cochal [Myrtillocactus c.]. The only insular plants found were Eschscholzia ramosa and Perityle grayi [P. emorvil. Others, growing on the mainland and deserving of mention, were Hosackia watsoni [Lotus w.], Perityle rotundifolia [Amauria r.], Franseria bipinnatifida [Ambrosia chamissonis], its most southern known habitat, Senecio lyoni, found first on Santa Catalina, Phacelia ixodes and P. parryi. Mesembryanthemum crystallinum, Encelia californica, Amblyopappus pusillus, Leptosyne maritima [Coreopsis m.], Sonchus tenerrimus, Euphorbia misera and other vegetation common to these northern Mexican islands were abundant.

During the first quarter of the twentieth century, a series of expeditions sponsored by the California Academy of Sciences stopped at San Martin Island, but only a few botanical specimens have been preserved. The first of these trips was in the spring of 1903, when the academy organized a journey aboard the schooner Mary Sachs. F. E. Barkelew reportedly collected botanical specimens on San Martin Island, but they were apparently lost in the San Francisco fire in April 1906 (Nelson 1921). The schooner Academy stopped at San Martin Island on 11 July 1905, while enroute to the Galapagos Islands (Slevin 1931). The botanist on this second California Academy voyage, Alban Stewart, collected a few specimens from San Martin Island, including Ambrosia chamissonis. On a third voyage sponsored by the Academy, Herbert L. Mason (1925) collected 20 numbers from San Martin Island on 8 June 1925. Mason was the botanist aboard the U.S. mine sweeper Ortolan when she stopped on the return trip from an expedition to the Revillagigedo Islands. Eastwood (1929) listed some of the plants he collected.

John T. Howell of the California Academy of Sciences visited the island on 19 August 1932, collecting 14 numbers during a few hours ashore (Howell 1932). During the rest of the 1930s, and most of the 1940s and 1950s, there was apparently a lull in botanical collecting on San Martin Island. On 5 May 1948, Reid V. Moran made one of the few collecting trips to the island during this period and obtained 32 numbers (Moran & Lindsay 1949). Moran later became curator of botany at the San Diego Museum of Natural History. George E. Lindsav collected plants on San Martin on 10 February 1950; he subsequently became director of the San Diego Museum of Natural History and later still of the California Academy of Sciences (see Mitich 1989).

Botanical activity on the island increased during the 1960s. Reid Moran collected 78 numbers on San Martin Island on 10-11 April 1963, while on an expedition aboard the yacht Gringa. Ralph N. Philbrick and Michael R. Benedict of the Santa Barbara Botanic Garden collected 74 numbers on 19-20 October 1968.

In the 1970s, additional botanical trips were made to San Martin Island, especially by Reid Moran. Moran visited the island on 21 April 1970, collecting 26 numbers on the return trip from an expedition to Guadalupe Island. R. Mitchell Beauchamp of San Diego visited San Martin on 12 February 1971. Moran made additional trips to San Martin on 28 May 1971, 29 March 1974, and 13 May 1979, collecting a total of 20 numbers on the 3 trips. Other collectors during this decade included Edward F. Anderson (on 12 January 1973), Raymond Gilmore (on 21 February 1973), John Kipping (on 16 December 1973), and James Henrickson of California State University at Los Angeles (on 22 January 1975). Ralph Philbrick returned to the island on 23 January 1975 and Michael Benedict made collections on 27 February of the same year. Christopher Davidson of the Los Angeles County Museum of Natural History collected plants on San Martin on 24 February 1977. Elizabeth McClintock of the California Academy of Sciences, and Wilda Ross made planet collections on 20 February 1978.

During the 1980s, a number of trips were made to the island by botanists from Rancho Santa Ana and Santa Barbara botanic gardens. Ralph Philbrick, Steven A. Junak, and Mary C. Hochberg of the Santa Barbara Botanic Garden explored the island on 8-9 April 1980. Ralph Philbrick returned on 30 June 1983. Robert F. Thorne, systematist and herbarium curator at Rancho Santa Ana Botanic Garden, visited the island on 5 February 1985, 21 February 1986, and 9 February 1987. Steve Junak and Ralph Philbrick collected a number of specimens on 6 February 1985 and Steve Junak returned on 25 March 1987. While on a return trip from Guadalupe Island, Reid Moran, Robert Thorne, Steve Junak, and other botanists visited San Martin on 1 April 1988. Thorne and Junak (1989) published an updated checklist for the island which included 92 vascular plant taxa.

Since the beginning of the 1990s, Steve Junak has made 2 additional trips to San Martin Island, on 17 March 1991 and 20 March 1993.

In summary, about 20 botanists have collected specimens during more than 30 trips to San Martin Island. Undoubtedly additional botanists, especially from

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Mexico, have also visited the island but we are not aware of their trips. No comprehensive surveys of San Martin Island have been made to date. Most of the botanical collectors have spent only 1-2 dy on the island during any one trip and have concentrated their efforts in the southern and eastern portions. More thorough exploration will probably result in new plant records for the island.

Vegetation

The distribution of terrestrial vegetation on San Martin Island appears to be correlated with geologic substrate, past and present disturbance patterns, and topographic features such as elevation, slope aspect, and slope angle. The dominant plant community on the island is maritime cactus scrub. Species characteristic of coastal strand, coastal sand dune, alkali flat, and coastal salt marsh communities cover limited areas, while disturbed areas around the island's perimeter are dominated by introduced annual plants.

The basalt in the northern and central portions of the island supports a diverse maritime cactus scrub, with no trees and with few shrubs taller than 2 m. The largest plants are the cacti Myrtillocactus cochal and Stenocereus gummosus. Dominants include the shrubs and suffrutescent perennials Encelia californica, Euphorbia misera, Lycium andersonii, L. brevipes, L. californicum, and Senecio lyonii; the cacti Ferocactus fordii and Opuntia aff. prolifera; and the conspicuous succulents Dudleya anthonyi and D. cultrata. The cover of these perennial species is not continuous, and short-lived or ephemeral plants dominate some areas. Large numbers of winter annuals, including Amauria rotundifolia, Amsinckia inepta, Antirrhinum nuttallianum, Aphanisma blitoides, Cryptantha intermedia, Phacelia ixodes, and Pholistoma racemosum occur in some of the open sites between the larger plants after adequate rainfall. Other winter annuals. like Hesperocnide tenella and Parietaria hespera, are locally common in the microhabitats created by large, loose lava rocks or dense shrub cover. An ephemeral vine arising from a perennial tuber (Marah macrocarpus) and a perennial herb with a subterranean corm (Dichelostemma capitatum) are locally common but are active only while soil moisture is high.

Introduced annuals dominate the lava flats at the northern and western ends of the island, which have apparently been heavily disturbed by seabird activity. Mesembryanthemum crystallinum covers large areas around the island's perimeter, while Chenopodium murale and Malva parviflora are common in scattered patches.

Sandy areas in the southeastern portion of the island support patches of depauperate coastal strand, coastal sand dune, alkali flat, and coastal salt marsh vegetation. Many of the plants found around the margins of San

In rocky intertidal and subtidal habitats around the margin of the island, Phyllospadix scouleri and P. torrevi occur in a surf-grass community. Patches of Zostera *marina* grow in sandy subtidal areas at Hassler Cove.

Flora

The known flora of San Martin Island includes 98 vascular plant taxa representing 27 families and 72 genera (see Appendix). No ferns have been collected on the island, and there are no native trees. The largest families are the Poaceae (16 taxa), Asteraceae (12 taxa), Chenopodiaceae (11 taxa), Cactaceae (7 taxa), and Solanaceae (7 taxa). The following genera have 3 or more native and nonnative species on the island: Atriplex, Bromus, Lycium, Phacelia, and Vulpia.

A total of 80 native plant taxa have been found on San Martin Island to date. At least 85% of the island's native taxa are found in the San Quintin area on the adjacent mainland (based on Neuenschwander et al. 1979, and Thorne 1989). Many of the island's plant taxa are endemic to Baja California and 3 taxa are restricted to the California Islands and not found on the adjacent mainland. The 3 California Island endemics are: Calystegia macrostegia subsp. macrostegia, Chenopodium flabellifolium (known only from San Martin Island), and Eschscholzia ramosa. Plant families with the highest number of native taxa include Asteraceae (10 taxa), Chenopodiaceae (9 taxa), Poaceae (9 taxa), Cactaceae (7 taxa), and Solanaceae (6 taxa). With 4 native species on the island. Atriplex is the largest genus; Lycium, Phacelia, and Vulpia are each represented by 3 native taxa. The island's native flora includes 7 shrubs, 6 suffrutescent perennials, 10 succulents (including 7 species of cacti), 20 perennial herbs (including 3 submerged marine aquatics), and 37 annual herbs.

At least 18 plant taxa in 8 families and 13 genera have been introduced to San Martin Island, primarily since the 1940s (see Table 1). These introductions represent more than 18% of the island's total flora. By comparison, known percentages of nonnative plants on the other islands off the west coast of Baja California range from about 9% (Natividad Island) to about 50% (San Geronimo Island). Fifteen of the nonnative plants are

Quintin Bay on the adjacent mainland can be found in this part of the island (Neuenschwander et al. 1979). Dominant species in the back dunes near Hassler Cove include Abronia maritima, Atriplex julacea, A. leucophylla, Cakile maritima, Camissonia cheiranthifolia, Lycium brevipes. Mesembryanthemum crystallinum. Opuntia aff. prolifera, and Suaeda taxifolia. Sandy flats near the island's lagoon are dominated by Abronia maritima, Atriplex julacea, A. watsonii, Distichlis spicata, Lycium brevipes, Mesembryanthemum crystallinum, Salicornia subterminalis, S. virginica, and Suaeda taxifolia.

from Europe, 2 taxa are native to South Africa, and 1 species is native to Australia. The plant family with the highest number of nonnative taxa is the Poaceae (7 taxa). with the genera Bromus and Hordeum each represented by 2 nonnative taxa. The Aizoaceae, Asteraceae, Chenopodiaceae, and Geraniaceae each include 2 nonnative taxa on the island, as do the genera Mesembryanthemum, Sonchus, and Erodium. All of the introduced plant taxa are herbaceous, 2 of them perennial and 16 annual.

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APPENDIX

Annotated Catalog of the Flowering Plants of San Martin Island

Plants listed in this table are arranged alphabetically by family within two major plant groups (dicotyledonous and monocotyledonous flowering plants). Taxa presumed to be introduced to Baja California and/or San Martin Island by human activities are preceded by an asterisk (*). The list does not include plant taxa which have been planted at the fish camp unless they are surviving without cultivation in other parts of the island.

For most taxa, nomenclature follows Wiggins (1980) or Hickman (1993). Abbreviations of author names have been mostly standardized according to Brummitt and Powell (1992). Common names are mostly according to Abrams (1923-1960) and Hickman (1993), with a few additions from Beauchamp (1986), Coyle and Roberts (1975), Gould and Moran (1981), and Martinez (1979).

Abundance ratings (rare, scarce, occasional, common, and abundant) and distribution descriptions are based on the observations of the authors. Descriptions of abundance and distribution will undoubtedly need refinement in the future as the island is more fully explored.

Most of the place names used by recent collectors are shown on the map in Figure 2. Some taxa are listed with no definite location on the island, as most early collectors did not include specific locality data on their specimen labels.

A maximum of three voucher specimens are cited for each taxon and these are arranged chronologically by date of collection. Label data on voucher specimens have been edited for consistency. Specimens are deposited in the herbarium at the Santa Barbara Botanic Garden (SBBG) unless otherwise indicated. Herbarium accession numbers are cited as needed. Herbarium abbreviations are those used in Holmgren et al. (1990).

DICOTYLEDONOUS FLOWERING PLANTS

Aizoaceae (Iceplant Family)

*Mesembryanthemum crystallinum L. CRYSTALLINE ICEPLANT Common; around perimeter of island, especially on lava flats on west side.

Common on sandspit, 5 May 1948, Moran 3036 (UC); edge of lagoon, 19-20 Oct 1968, Philbrick & Benedict B68-538.

*Mesembryanthemum nodiflorum L. SLENDER-LEAVED ICEPLANT, SMALL-FLOWERED ICEPLANT Rare; lava flats in southwestern portion of island.

Recorded in field notes of S. Junak on 17 Mar 1991 but not collected.

Asteraceae (Sunflower Family)

Amauria rotundifolia Benth. Common; on lava in southeastern portion of island. Endemic to Baja California. San Martin Island, Mar-Jun 1897, Anthony 218 (RSA-POM); S-facing slope of crater, elev. ca. 300 ft, 19-20 Oct 1968, Philbrick & Benedict B68-576; lower terrace, E side of island, along trail between village and N portion of island, 23 Jan 1975, Philbrick B75-66.

Amblyopappus pusillus Hook. & Arn. PINEAPPLE WEED Common; on lava throughout island. Common on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10515 (RSA-POM,SD); grassy opening in lava, ca. 0.25 mi N of fish camp (NW edge of Sand Spit), E portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-602; common, S side of Picacho San Martin, along trail to crater, elev. ca. 250 ft, 20 Mar 1993, Junak 5373.

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[Ambrosia camphorata (Greene) W.W. Payne. Reported by Eastwood (1929) as Franseria camphorata on the basis of a misidentified specimen. Mason2071 is Ambrosia Chamissonis.]

Ambrosia chamissonis (Less.) Greene SILVER BEACH WEED, BEACH-BUR Scarce; sand dunes near Hassler Cove. On sandy beach, 12 Feb 1971, Beauchamp 1565 (RSA-POM); infrequent, 0.5 mi NW of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49595); on dunes of sandspit, S of Hassler Cove, elev. ca. 5 m, 21 Feb 1986, Thorne 61574 (RSA-POM).

Coreopsis maritima (Nutt.) Hook. f. SEA-DAHLIA Occasional; lava on slopes of central peaks. Lava rock, 5 May 1948, Moran 3059 (UC); upper N-facing slope of Picacho San Martin, 19-20 Oct 1968, Philbrick & Benedict B68-581; San Martin Island, 24 Feb 1977, Davidson 5540 (SD).

Encelia californica Nutt. BUSH SUNFLOWER Common; on lava, especially on southeastern slopes of central peaks; also seen in stabilized sand dunes near Hassler Cove. Lava rock, 5 May 1948, Moran 3042 (UC); just above NW edge of lagoon, 19-20 Oct 1968, Philbrick & Benedict B68-547; trail along E side of island, 24 Feb 1977, Davidson 5530 (SD).

Gnaphalium bicolor Bioletti BICOLORED EVERLASTING Scarce; on lava in southeastern portion of island. Lava, just NW of sandspit, between fish camp and lagoon, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-559; scattered on edge of flat behind village, 27 Feb 1975, Benedict s.n. (SBBG 49557); scattered in lava boulders, SE side of island, just N of dunes behind fishing village at Hassler Cove, elev. ca. 20 ft, 6 Feb 1985, Junak 2442.

Perityle emoryi Torr. EMORY'S ROCK DAISY Rare; on lava in southeastern portion of island. Elev. ca. 10 m, 21 Feb 1986, Thorne 61595 (RSA-POM); locally common, SW-facing slope on S flank of main peak, W of trail between lagoon and peak, elev. ca. 400 ft, 1 Apr 1988, Junak 3615.

Rafinesquia californica Nutt. CALIFORNIA CHICORY Occasional; on lava in eastern and southeastern portions of island. Occasional on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10494 (SD); fairly common, E slope of island, elev. ca. 50 m, 21 Apr 1970, Moran 17476 (SD); in shade of rocks, ca. 0.25 mi W of lagoon, 27 Feb 1975, Benedict s.n. (SBBG 49685).

Senecio lyonii A. Gray LYON'S RAGWORT Occasional; on lava on slopes of central peaks, mostly in southeastern portion of island at elevations above 30 meters.

Colony of ca. 50 plants, S inner slope of summit crater, elev. ca. 150 m, 11 Apr 1963, Moran 10564; scattered amongst lava rocks, S end of island on lower flanks of Picacho San Martin, N of lagoon, elev. ca. 100 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94352); uncommon, NE-facing slope overlooking Hassler Cove, SE side of island, elev. ca. 100 ft, 30 Jun 1983, Junak 1693.

*Sonchus oleraceus L. COMMON SOW-THISTLE Common; on lava in widely scattered localities, especially in southwestern portion of island.

San Martin Island, 5 May 1948, Moran 3041 (UC); ca. 0.25 mi N of fish camp (NW edge of sandspit), E portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-603; NE-facing slope of Picacho San Martin, elev. ca. 400 ft, 23 Jan 1975, Philbrick B75-76.

*Sonchus tenerrimus L. SLENDER SOW-THISTLE Occasional; on lava in southeastern portion of island. Occasional on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10496 (RSA-POM,SD,UC,US); 0.125 mi SW of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49555); scattered near lagoon, at bottom of trail to crater, elev. ca. 20 ft, 1 Apr 1988, Junak 3590.

Uropappus lindleyi (DC.) Nutt. [Microseris I, (DC.) A, Grav] SILVER PUFFS Scarce; on lava in southeastern portion of island.

Rare on S-facing slope, S side of island, just N of margin of lagoon W of Hassler Cove, elev. ca. 20 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94343); amid lava rocks, elev. ca. 100m, 21 Feb 1986, Thorne 61605 (RSA-POM).

Boraginaceae (Borage Family)

Amsinckia inepta J.F. Macbr. FIDDLENECK Common: on lava in southeastern portion of island. Endemic to San Martin Island and the coastal portion of the adjacent mainland (Ray & Chisaki 1957, Thorne 1989).

San Martin Island, Mar-Jun 1897, Anthony 217 (GH); lower terrace, E side of island, along trail between village and N portion of island, 23 Jan 1975, Philbrick B75-65; N side of Hassler Cove, just above ocean, 6 Feb 1985, Philbrick & Junak B85-2.

Cryptantha intermedia (A. Gray) Greene Occasional; on lava in southeastern portion of island. Locally common on lava rock near lagoon, elev. ca. 10 m, 11 Apr 1963, Moran 10539 (RSA-POM,SD); scattered, sandy open area, 0.25 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 50060); locally common along trail, S portion of island on lower slopes of Picacho San Martin, elev. ca. 200 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 103540).

Heliotropium curassavicum L. [H. c. var. oculatum (A. Heller) I.M. Johnst.] HELIOTROPE Scarce; on sandy flats at south end of island.

Lava boulder flat, trail between crater and lagoon, S of crater, elev. ca. 275 ft, 23 Jan 1975, Philbrick B75-81; scattered, dunes between lagoon and fishing village at Hassler Cove, elev. ca. 10 ft, 25 Mar 1987, Junak 3143.

Brassicaceae (Mustard Family)

*Cakile maritima Scop. SEA ROCKET Scarce; in sandy areas near Hassler Cove. First known collection of this taxon from San Martin Island was made in 1963.

Only two seen, on upper beach, sandspit at Hassler Cove, 10 Apr 1963, Moran 10530 (SD); dunes of sandspit, S of Hassler Cove, elev. ca. 10 m, 5 Feb 1985, Thorne 58632 (RSA).

Descurainia pinnata subsp. halictorum (Cockerell) Detl. TANSY MUSTARD, PAMITA Occasional; on lava in southeastern portion of island.

Lower terrace, E side of island, along trail between village and N portion of island, 23 Jan 1975, Philbrick B75-68; occasional, 0.25 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49686); inland from lagoon, southerly of village, 27 Feb 1975, Benedict s.n. (SBBG 91240).

[Lepidium lasiocarpum Torr. & A. Gray Reported for San Martin Island by Thorne and Junak (1989) on the basis of a mis-identified specimen. Benedict s.n. (SBBG 49592) is Lepidium oblongum var. insulare.]

Lepidium oblongum var. insulare C.L. Hitchc. LENTEJILLA Scarce; on lava in southeastern portion of island. Commonly scattered in dry areas between rocks, 0.25 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49592); 0.25 mi W of lagoon, 27 Feb 1975, Benedict s.n. (SBBG 91237); rare in open sites, S end of island, on terrace N of lagoon near Hassler Cove, elev. ca. 30 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94347).

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Cactaceae (Cactus Family)

Bergerocactus emoryi (Engelm.) Britton & Rose SNAKE CACTUS, GOLDEN-SPINED CEREUS Rare; localized colony on lava at southwestern end of island.

One small colony on brink of sea cliff at S side, elev. ca. 25 m, 13 May 1979, Moran 27240 (SD); SW of high point, with rocks 20 ft back from bluff, 6 Feb 1985, Philbrick & Junak B85-12.

Echinocereus maritimus (M.E. Jones) K. Schum. COASTAL MOUND CACTUS Scarce; on lava in southeastern portion of island. Endemic to Baja California.

Terrace ca. 0.25 mi N of fish camp (NW edge of sandspit), E portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-607.

Ferocactus fordii (Orcutt) Britton & Rose var. fordii FORD'S FIRKIN CACTUS Occasional; on lava throughout island. Endemic to Baja California.

Lava, just above NW edge of lagoon, elev. ca. 15 ft. 19-20 Oct 1968, Philbrick & Benedict B68-533.

Mammillaria dioica M.K. Brandegee FISH-HOOK CACTUS, BISNAGUITA Occasional; on lava in southeastern portion of island.

Lava, N edge of lagoon, 19-20 Oct 1968, Philbrick & Benedict B68-542; SE-facing slope, lava between lagoon and crater, SE portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-575.

Myrtillocactus cochal (Orcutt) Britton & Rose COCHAL Scarce; on lava in southeastern portion of island. Endemic to Baja California.

San Martin Island, 8 June 1925, Mason 2084 (CAS); Rocky slopes, 19 Aug 1932, Howell 10723 (CAS).

Opuntia aff. prolifera Engelm. COASTAL CHOLLA Common; on lava and sand in widely scattered localities throughout island; very dense in some areas. Plants on San Martin Island differ from those on the California Channel Islands with respect to stem joint color and fruit shape.

Sand just interior from dunes near fish camp and NW edge of sandspit, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-556.

Stenocereus gummosus (Engelm.) A.C. Gibson & K.E. Horak [Machaerocereus g. (Engelm.) Britton & Rose] PITAYA AGRIA Occasional; on lava in southeastern portion of island. Lava, just NW of sandspit, between fish camp and lagoon, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-560; just above lagoon, S end of island, elev. ca. 50 ft, 23 Jan 1975, Philbrick B75-88.

Chenopodiaceae (Goosefoot Family)

Aphanisma blitoides Moq. APHANISMA Common; on lava in widely scattered localities throughout island. Floor of summit crater, elev. ca. 150 m, 11 Apr 1963, Moran 10563 (SD); lava boulder flat, along trail between crater and lagoon, S of crater, elev. ca. 300 ft, 23 Jan 1975, Philbrick B75-79; scattered on NEfacing slope overlooking Hassler Cove, SE side of island, elev. ca. 100 ft, 30 Jun 1983, Junak 1694.

Atriplex julacea S. Watson Scarce; localized on sandy flats at south end of island. Endemic to Baja California. San Martin Island, 25 May 1889, Pond s.n. (ND-G 15362); locally common, sandflat SW of the lagoon, elev. ca. 5 m, 11 Apr 1963, Moran 10569; sand behind fish camp, near NW edge of Sand Spit, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-555.

Atriplex leucophylla (Moq.) D. Dietr. SEASCALE Scarce; localized populations on sandy flats at south end of island. Locally common, E edge of lagoon near Hassler Cove, elev. ca. 10 ft, 30 Jun 1983, Junak 1682.

Atriplex pacifica A. Nelson SOUTH COAST SALTSCALE Rare; on lava flats in southern portion of island. Occasional on lava, 21 Apr 1970, Moran 17464 (SD).

*Atriplex semibaccata R.Br. AUSTRALIAN SALTBUSH Occasional; on lava and sand in southeastern portion of island. Locally common, E side of island ca. 0.125 mi N of fishing village at Hassler Cove, along trail to N portion of island, 6 Feb 1985, Junak & Philbrick 2445; rare on rocks on NW side of lagoon, S end of island, elev. ca. 20 ft, 1 Apr 1988, Junak 3623.

Atriplex watsonii A. Nelson MATSCALE Scarce; localized poulations on sandy flats near lagoon. Upper beach of lagoon, 11 Apr 1963, Moran 10538 (SD.UC): sand at edge of lagoon, 19-20 Oct 1968. Philbrick & Benedict B68-531; sand behind fish camp, near NW edge of Sand Spit, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-553.

Chenopodium flabellifolium Standl. SAN MARTIN ISLAND GOOSEFOOT Scarce; on lava in southeastern portion of island, primarily on slopes of the crater. Endemic to San Martin Island. Crawford and Evans (1978) investigated the taxonomic relationships of this endemic species and concluded that its closest relative is the widespread Chenopodium fremontii.

Trail between crater and lagoon, elev. ca. 350 feet, 23 Jan 1975, Philbrick B75-78; in rocks behind village, 27 Feb 1975, Benedict s.n. (SBBG 93840); rare in lava rocks, S end of island, on lower slopes of Picacho San Martin, just NW of fishing village at Hassler Cove, elev. ca. 50 feet, 8 Apr 1980, Junak et al. s.n. (SBBG 94341).

*Chenopodium murale L. NETTLE-LEAF GOOSEFOOT Common; on lava and sand throughout island, especially at lower elevations.

San Martin Island, 16 July 1896, Anthony s.n. (UC 135951); SE-facing slope, lava between lagoon and crater, SE portion of island, elev. ca. 30 feet, 19-20 Oct 1968, Philbrick & Benedict B68-565; locally common, backdunes at S end of fishing village at Hassler Cove, 20 Mar 1993, Junak 5379.

Salicornia subterminalis Parish [Arthrocnemum s. Standl.] PARISH'S GLASSWORT Scarce; localized populations on sandy flats near lagoon.

Locally common, dunes between lagoon and fishing village at Hassler Cove, elev. ca. 10 ft, 25 Mar 1987, Junak 3136.

Salicornia virginica L. PICKLEWEED Scarce; localized populations on sandy flats near lagoon. Near southerly edge of lagoon, elev. ca. 2 ft, 23 Jan 1975, Philbrick B75-90; Hassler Cove, lagoon area, elev. ca. 2 ft, 6 Feb 1985, Philbrick & Junak B85-15; locally common, dunes between lagoon and fishing village at Hassler Cove, elev. ca. 10 ft, 25 Mar 1987, Junak 3137.

Suaeda taxifolia (Standl.) Standl. [S. californica var. pubescens Jeps.] SEABLITE, SEEPWEED Occasional; on lava and sandy flats in southeastern portion of island.

San Martin Island, 19 Aug 1932, Howell 10716 (RSA-POM); saline area just NW of sandspit, between fish camp and lagoon, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-563.

Convolvulaceae (Morning-Glory Family)

Calystegia macrostegia (Greene) Brummitt subsp. macrostegia ISLAND MORNING-GLORY Rare; not seen recently. Endemic to San Miguel, Santa Rosa, Santa Cruz, Anacapa, San Martin, and Guadalupe islands. San Martin Island, Mar-Jun 1897, Anthony 206 (RSA-POM,SD,US).

Crassulaceae (Stonecrop Family)

Crassula connata (Ruiz Lopez & Pavon) A. Berger [C. erecta (Hook. & Arn.) A. Berger] PYGMY WEED Occasional; on lava in widely scattered localities throughout island.

San Martin Island, Mar-Jun 1897, Anthony 220 (UC); lower terrace, E side of island, along trail between village and N portion of island, 23 Jan 1975, Philbrick B75-69; area riddled with craggy caverns, Nfacing slope of island summit, elev. ca. 250 ft, 23 Jan 1975, Philbrick B75-73.

Dudleva anthonyi Rose SAN QUINTIN LIVE-FOREVER Common; on lava and sand throughout island except for lower elevations at northwestern and northern ends; locally abundant at lower elevations in southeastern portion of island. Endemic to San Martin Island and adjacent mainland.

San Martin Island, Jul-Oct 1896, Anthony 123 (RSA-POM); San Martin Island, 8 Jun 1925, Mason 2068 (RSA-POM); lava, just NW of sandspit, between fish camp and lagoon, Hassler Cove, 19-20 Oct 1968, Philbrick & Benedict B68-557.

Dudleya anthonyi Rose X D. cultrata Rose Occasional; on lava and sand throughout island with the parental species. Morphological and cytological characteristics of this natural hybrid were studied by Moran (1951). San Martin Island, 5 May 1948, Moran 3058 (UC),

Dudleva cultrata Rose Common; on lava and sand throughout island except for lower elevations at northwestern and northern ends. Endemic to San Martin Island and adjacent peninsula. Lava rock, 5 May 1948, Moran 3057 (UC); edge of lagoon, 19-20 Oct 1968, Philbrick & Benedict B68-537; sand, 100 yards inland, W of lagoon, 27 Feb 1975, Benedict s.n. (SBBG 49702).

Cucurbitaceae (Gourd Family)

Marah macrocarpus (Greene) Greene CHILICOTHE, WILD-CUCUMBER Occasional; on lava, primarily in southeastern portion of island.

Occasional on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10527 (SD); San Martin Island, 12 Feb 1967, Beauchamp 1554 (SD); frequent on volcanic slopes above small fishing camp near cove, 22 Jan 1975, Henrickson 14531 (RSA-POM).

Cuscutaceae (Dodder Family)

Cuscuta californica Hook. & Arn. WITCH'S HAIR Rare; known from a single collection. On lava rock near lagoon, elev. ca. 10 m, not seen elsewhere, 11 Apr 1963, Moran 10541 (RSA-POM,SD).

Euphorbiaceae (Spurge Family)

Chamaesyce polycarpa (Benth.) Millsp. SMALL-SEEDED SANDMAT [C. p. var. hirtella (Boiss.) Millsp., Euphorbia p. Benth.] Rare; known from a single collection. In sand, back beach of lagoon, 27 Feb 1975, Benedict s.n. (SBBG 86744).

Euphorbia misera Benth. CLIFF SPURGE Occasional: on lava throughout island. Lava rock, 5 May 1948, Moran 3061 (UC); notch between crater and Picacho San Martin, 19-20 Oct 1968, Philbrick & Benedict B68-578; common, on S side of main crater along trail from village, elev. ca. 120 ft, 1 Apr 1988, Junak 3619.

Fabaceae (Pea Family)

Lotus watsonii (Vasev & Rose) Greene.

Occasional; on lava, primarily in southeastern portion of island, Rather scarce, on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10507; lava boulder flat, trail between crater and lagoon, elev. ca. 275 ft, 23 Jan 1975, Philbrick B75-83; occasional on rocky Sfacing slope, S portion of island, on S slope of Picacho San Martin along trail to peak, elev. ca. 200 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94351).

Junak, S. A. and Philbrick, R.

Lotus strigosus (Nutt.) Greene var. strigosus BISHOP'S LOTUS Rare; on lava in southeastern portion of island. Rare on lava flats, S portion of island on lower slopes of Picacho San Martin, just N of lagoon, elev. ca. 30 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94338); rare, S of main peak along trail between summit and lagoon, elev. ca. 200 ft, 20 Mar 1993, Junak 5369.

Lupinus sparsiflorus var. pondii (Greene) C.P. Sm. Scarce; on lava, localized in open sites near summit and on south side of crater.

One plant on E edge of summit crater, elev. ca. 150 m. not seen elsewhere on island, 11 Apr 1963, Moran 10566 (SD); locally common on rocky S-facing slope, S portion of island, on S slope of Picacho San Martin, just N of foot of peak, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 97950); localized population, S flanks of main crater, elev. ca. 350 ft. 17 Mar 1991, Junak 4500.

Geraniaceae (Geranium Family)

*Erodium cicutarium (L.) L'Her. REDSTEM FILAREE Occasional; on lava in southeastern portion of island. Occasional locally, on lava rock near lagoon, elev. ca. 10 m, 11 Apr 1963, Moran 10540 (SD); on lava rock, along path N of village near Hassler Cove, elev. ca. 10 m, 5 Feb 1985, Thorne 58619 (RSA-POM).

**Erodium moschatum* (L.) L'Her. WHITESTEM FILAREE Rare: known from a single collection. On flat near Hassler Cove, elev. ca. 5 m. 29 Mar 1974, Moran 21212 (SD).

Hydrophyllaceae (Waterleaf Family)

Phacelia hirtuosa A. Gray Rare; known from a single collection. Endemic to Baja California. Rare, S portion of island, on lava slopes just N of lagoon, 8 Apr 1980, Junak et al. s.n. (SBBG 103599).

Phacelia ixodes Kellogg ISLAND MISERY Common; on lava throughout island. Endemic to northwestern part of Baja California. This plant should be avoided as it can cause severe contact dermatitis in humans.

San Martin Island, Mar-Jun 1897, Anthony 219; lava, terrace ca. 0.25 mi N of fish camp (NW edge of Sand Spit), E portion of island, elev. ca. 3 ft, 19-20 Oct 1968, Philbrick & Benedict B68-608.

Phacelia parryi Torr. PARRY'S PHACELIA Scarce; localized on lava in open sites both inside and on south side of crater.

Colony of ca. 50 plants on floor of summit crater, elev. ca. 150 m, 11 Apr 1963, Moran 10561 (SD); locally common in open, recently burned site, steep SW-facing slope on S flank of Picacho San Martin, elev. ca. 400 ft, 1 Apr 1988, Junak 3614; locally common, S flanks of main crater, elev. ca. 350 ft, 17 Mar 1991, Junak 4501.

Pholistoma racemosum (Nutt.) Constance Common; on lava throughout island.

SE-facing slope, lava between lagoon and crater, SE portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-568; lower terrace, E side of island, along trail between village and N portion of island, 23 Jan 1975, Philbrick B75-62; N side of Hassler Cove, just above ocean, 6 Feb 1985, Philbrick & Junak B85-1.

Malvaceae (Mallow Family)

*Malva parviflora L. CHEESEWEED Occasional; in disturbed sites at low elevations around perimeter of island, especially in southwestern portion.

Rare in disturbed areas, E side of island, on flats N of fishing village at Hassler Cove, elev. ca. 30 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94350); locally common on flats above coastal bluffs, 100 m E of lighthouse at NW corner of the island, 6 Feb 1985, Junak & Philbrick 2447; localized population, backdunes at S end of fishing village at Hassler Cove, 20 Mar 1993, Junak 5378.

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Nyctaginaceae (Four-O'Clock Family)

Abronia maritima S. Watson STICKY SAND-VERBENA Scarce; localized in sand dunes near Hassler Cove. On sandspit, 5 May 1948, Moran 3034 (UC); fairly common on upper beach and dunes, sandspit at Hassler Cove, elev. ca. 5 m, 10 Apr 1963, Moran 10529 (SD); sand at edge of lagoon, 19-20 Oct 1968, Philbrick & Benedict B68-532.

Mirabilis californica A. Gray. WISHBONE BUSH Occasional; on lava, primarily in southeastern portion of island. Lava rock, 5 May 1948, Moran 3052 (UC); upper N-facing slope of Picacho San Martin, 19-20 Oct 1968, Philbrick & Benedict B68-580; near entrance to large lava tube, ca. 0.5 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 94318),

Onagraceae (Evening Primrose Family)

Camissonia californica (Torrey & A. Gray) Raven FALSE-MUSTARD Scarce; localized on lava in open sites on south side of crater.

Rare on rocky S-facing slope, S portion of island, on S slope of Picacho San Martin, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 103541); locally common in open, recently burned site, steep SWfacing slope on S flank of Picacho San Martin, elev. ca. 400 ft, 1 Apr 1988, Junak 3612.

Camissonia cheiranthifolia subsp. suffruticosa (S. Watson) Raven BEACH-PRIMROSE Scarce; localized in sand dunes near Hassler Cove. Plants on San Martin Island are more prostrate than usual for this subspecies and represent a maritime ecotype (Raven 1969).

Sand at edge of lagoon, 19-20 Oct 1968, Philbrick & Benedict B68-534.

Papaveraceae (Poppy Family)

Eschscholzia ramosa Greene ISLAND POPPY Rare; on lava in southern portion of island. Endemic to Santa Rosa, Santa Cruz, Santa Barbara, San Nicolas, Santa Catalina, San Clemente, Los Coronados, Todos Santos, San Martin, Guadalupe, San Benito, Cedros, and Natividad islands. San Martin Island, Mar-Jun 1897, Anthony 224 (GH); scarce on NE slope of island, elev. ca. 25 m, 21

Apr 1970, Moran 17472 (SD); above lagoon, 30 Jun 1983, Philbrick B83-7.

Stvlomecon heterophylla (Benth.) G.C. Taylor WIND POPPY Rare; localized on north-facing lava slope inside crater.

Rare, N-facing slope inside main crater, elev. ca. 450 ft, 1 Apr 1988, Junak 3618.

Polygonaceae (Buckwheat Family)

Pterostegia drymarioides Fischer & C. Meyer FAIRY MIST Common; in shaded sites on lava throughout island. Floor of summit crater, elev. ca. 150 m, 11 Apr 1963, Moran 10562; lava boulder flat along trail between crater and lagoon, S of crater, elev. ca. 275 ft, 23 Jan 1975, Philbrick B75-80; occasional, shaded protected areas among rocks, 0.5 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49590).

Portulacaceae (Purslane Family)

Calandrinia ciliata (Ruiz Lopez & Pavon) DC. [C. c. var. menziesii (Hook.) J.F. Macbr.] RED MAIDS Rare; on lava on south side of crater.

Rare on rocky slope, near summit of Picacho San Martin on E side of crater rim, elev. ca. 450 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94342); rare, only 2 plants seen on S-facing slope, S flanks of Picacho San Martin, elev. ca. 260 ft, 25 Mar 1987, Junak 3141 (RSA-POM.SBBG).

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Calandrinia maritima Nutt. SEA KISSES, SEASIDE CALANDRINIA Occasional; primarily on lava, in widely scattered localities throughout much of island.

Rare on this occasion, 0.5 mi NW of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49577); sand, 0.25 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49687); scarce, S slope of Picacho San Martin along trail to summit, elev. ca. 240 ft. 1 Apr 1988, Junak 3608.

Claytonia perfoliata subsp. mexicana (Rydb.) John M. Miller & K.L. Chambers MINER'S LETTUCE Scarce; in shaded sites on lava throughout island.

Bowl of craggy lava boulders near base of cliff, NE of Picacho San Martin, elev. ca. 250 ft, 23 Jan 1975, Philbrick B75-75; shaded nook in rocks, 0.5 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49576); rare, SE flank of Picacho San Martin, on top of smaller peak with wooden cross overlooking Hassler Cove, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 103544).

Rubiaceae (Coffee Family)

Galium aparine L. CLEAVERS, GOOSE-GRASS Rare; on lava in southeastern portion of island. Possibly introduced to San Martin Island.

Lava rock, 5 May 1948, Moran 3060 (UC); occasional on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10525 (SD); 0.5 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49561).

Scrophulariaceae (Figwort Family)

Antirrhinum nuttallianum subsp. subsessile (A. Gray) D. Thompson NUTTALL'S SNAPDRAGON occasional; on lava throughout island.

SE-facing slope, lava between lagoon and crater, SE portion of island, elev. ca. 200 ft, 19-20 Oct 1968, Philbrick & Benedict B68-574; occasional in rocky nooks, 0.25 mi W of Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49562).

Solanaceae (Nightshade Family)

- Datura wrightii Regel JIMSON WEED Rare; known from a single collection. Only one seen, on lava of NE slope, elev, ca. 25 m, 21 Apr 1970, Moran 17470 (SD).
- Lycium andersonii A. Gray DESERT TOMATO Occasional; on lava in scattered locations throughout island. On lava rock near lagoon, elev. ca. 10 m, 11 Apr 1963, Moran 10543 (SD); NW slope of island, elev. ca. 50 m, 11 Apr 1963, Moran 10551 (SD); trail between crater and lagoon, S of notch between crater and Picacho San Martin, elev. ca. 200 ft, 23 Jan 1975, Philbrick B75-87.
- Lycium brevipes Benth. var. brevipes FRUTILLA Common; on lava throughout island. Fairly common on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10519 (SD); near S edge of lagoon, elev. ca. 2 ft, 23 Jan 1975, Philbrick B75-89.
- Lycium californicum Nutt. CALIFORNIA BOXTHORN Occasional; on lava throughout island. Occasional on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10520 (SD); NE shore, elev. ca. 10 ft, 23 Jan 1975, Philbrick B75-70.
- Nicotiana clevelandii A. Gray CLEVELAND'S TOBACCO Rare; on lava in southeastern portion of island. San Martin Island, 21 Feb 1973, Gilmore s.n. (SD 84629); rare in lava rocks, S end of island, just N of lagoon on lower slopes of Picacho San Martin, elev. ca. 50 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94340).

*Solanum americanum Miller [S. nodiflorum Jacq.] WHITE NIGHTSHADE Scarce; on lava in eastern portion of island. NE-facing slope, middle E side of Picacho San Martin, E portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-594; scattered on E-facing slope, SE flank of Picacho San Martin, on E side of smaller peak with wooden cross overlooking Hassler Cove, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94344).

Solanum palmeri Vasey & Rose PALMER'S NIGHTSHADE Scarce: on lava in eastern and southeastern portions of island. Endemic to Baja California.

San Martin Island, Jul-Oct 1896, Anthony 30 (US); only two here, E slope of island, elev. ca. 20 m. 11 Apr 1963, Moran 10550; scattered in lava rocks on S-facing slope, S end of island, just N of lagoon on lower slopes of Picacho San Martin, elev. ca. 50 ft. 8 Apr 1980, Junak et al. s.n. (SBBG 94339).

Urticaceae (Nettle Family)

- Hesperocnide tenella Torrey WESTERN NETTLE Scarce; on lava in eastern portion of island. Scarce on lava, in shade under rocks, Hassler Cove, elev. ca. 10 m, 10 April 1963, Moran 10499 (SD); scattered on E-facing slope shaded by lava rocks. SE flank of Picacho San Martin, on E side of smaller peak with wooden cross overlooking Hassler Cove, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94346).
- Parietaria hespera var. californica B.D. Hinton WESTERN PELLITORY Common; on lava and sand throughout island. San Martin Island, Mar-Jun 1897, Anthony 226; commonly scattered in sandy areas between rocks, 0.25 mi inland from Hassler Cove, 27 Feb 1975, Benedict s.n. (SBBG 49578); scattered in lava rocks, near S end of island on lower slopes of Picacho San Martin, elev. ca. 50 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94354).

MONOCOTYLEDONOUS FLOWERING PLANTS

Alliaceae (Onion Family)

Dichelostemma capitatum (Benth.) A.W. Wood [D. pulchellum (Salisb.) A.A. Heller] BLUE DICKS Occasional; on lava in southeastern portion of island. Lava rock, 5 May 1948, Moran 3051 (UC); N side of Hassler Cove, just above ocean, 6 Feb 1985,

Philbrick & Junak B85-4.

Poaceae (Grass Family)

*Avena fatua L. WILD OATS Scarce; on lava in southeastern portion of island. N side of Hassler Cove, just above ocean. 6 Feb 1985, Philbrick & Junak B85-5 (RSA-POM,SBBG); on path near village, elev. ca. 10 m, 21 Feb 1986, Thorne 61581 (RSA-POM); along path N of village at Hassler Cove, 1 Apr 1988, Thorne 63160 (RSA-POM),

Bromus carinatus Hook. & Arn. CALIFORNIA BROME Occasional; on Java in scattered locations throughout island. Although B. arizonicus has been reported for northwestern Baja California (Wiggins 1980), other authors (Soderstrom and Beaman 1968, Gould and Moran 1981) have presented evidence that all plants in this geographic region, including San Martin Island, can be referred to B. carinatus. Rather scarce, lava rock W of Hassler Cove, elev. ca. 25 m. 11 Apr 1963, Moran 10547 (SD); locally common on E slope, elev. ca. 100 m, 29 Mar 1974, Moran 21214 (SD).

*Bromus hordeaceus L. [B. mollis L.] SOFT CHESS, SOFT BROME Rare; known from a single collection. Rare, S side of Picacho San Martin, along trail between crater and lagoon, 7 Apr 1980, Junak et al. s.n. (SBBG 103538).

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*Bromus madritensis subsp. rubens (L.) Husnot [B. r. L.] RED BROME, FOXTAIL BROME Scarce; disturbed sites on lava in southeastern portion of island.

Locally common on lava rock near lagoon, elev. ca. 10 m, not seen elsewhere, 11 Apr 1963, Moran 10544 (SD); on path near village, elev. ca. 10 m, 21 Feb 1986, Thorne 61582 (RSA-POM); uncommon along trail between summit and lagoon, elev. ca. 150 ft, 1 Apr 1988, Junak 3602.

Bromus trinii Desv. CHILEAN CHESS Scarce; on lava and sand in southeastern portion of island. Possibly introduced to San Martin Island.

Lava rock, 5 May 1948, Moran 3048 (UC); sand near mouth of arroyo, ca. 0.25 mi NW of village, 27 Feb 1975, Benedict s.n. (SBBG 97386); scattered on E-facing slope, SE flanks of Picacho San Martin, on E side of smaller peak with wooden cross overlooking Hassler Cove, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94345).

Distichlis spicata (L.) Greene ZACATE SALADO, SALTGRASS Scarce; localized populations on sandy flats around perimeter of island.

Common on sandflat, sandspit at Hassler Cove, elev. ca. 5 m, 10 Apr 1963, Moran 10535 (RSA-POM,SD); dominant on bottom of small deposition basin, on saline flats near cove, E side of island, elev. ca. sea level, 22 Jan 1975, Henrickson 14550 (RSA-POM); lowest terrace, N end of island, 6 Feb 1985, Philbrick & Junak B85-11.

*Hordeum murinum subsp. glaucum (Steud.) Tzvelev [H. g. Steud] SUMMER FOXTAIL, GLAUCOUS BARLEY Scarce; open sites on lava and sand in southeastern portion of island.

Grassy openings in lava, ca. 0.25 mi N of fish camp (NW edge of sandspit), E portion of island, 19-20 Oct 1968, Philbrick & Benedict B68-604,

*Hordeum murinum subsp. leporinum (Link) Arcang. [H. l. Link] WINTER FOXTAIL, HARE BARLEY Scarce; open sites on lava and sand at southwestern and southeastern ends of island.

At village, elev. ca. 10 m, 21 Feb 1986, Thorne 61580 (RSA-POM).

*Lamarckia aurea (L.) Moench GOLDENTOP Scarce: localized populations on lava near crater and in southeastern portion of island.

Small colony in crevices of lava flow, NW of crater, elev. ca. 100 m, 11 Apr 1963, Moran 10555 (SD); localized patch 18 inches in diameter, NE-facing slope, middle E side of Picacho San Martin, E portion of the island, 19-20 Oct 1968, Philbrick & Benedict B68-590; locally common along trail, S portion of island, on lower slopes of Picacho San Martin, elev, ca. 200 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 94351).

Melica imperfecta Trin. COAST RANGE MELIC Scarce; on lava in eastern portion of island. Rather scarce on lava rock, Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10517 (SBBG,SD); local on E slope, elev. ca. 50 m, 21 Apr 1970, Moran 17474 (SD).

Monanthochloe littoralis Engelm. SALT-CEDAR, SHORE GRASS Scarce; localized populations on sandy flats at south end of island.

Locally abundant, sandflat SW of lagoon, elev. ca. 5 m, 11 Apr 1963, Moran 10570 (RSA-POM,SD); terrace ca. 0.25 mi N of fish camp (NW edge of sandspit), E portion of island, elev. ca. 10 ft, 19-20 Oct 1968, Philbrick & Benedict B68-606.

Muhlenbergia microsperma (DC.) Kunth LITTLESEED MUHLY Occasional; on lava and sand throughout island. Trail between crater and lagoon, S of notch between crater and Picacho San Martin, elev. ca. 250 ft, 23 Jan 1975, Philbrick B75-85; sand near mouth of arroyo, ca. 0.25 mi NW of village, 27 Feb 1975, Benedict s.n. (SBBG 49693); along path N of village near Hassler Cove, elev. ca. 10 m, 5 Feb 1985, Thorne 58609 (RSA-POM).

*Triticum aestivum L. WHEAT Rare; known from a single collection. Only two seen, on lava rock at Hassler Cove, elev. ca. 10 m, 10 Apr 1963, Moran 10501 (SD).

Vulpia microstachys var. pauciflora (Beal) Lonard & Gould PACIFIC FESCUE Distribution on San Martin Island unknown.

Reported for the island by Gould and Moran (1981).

Vulpia octoflora var. hirtella (Piper) Henrard SIX-WEEKS FESCUE Distribution on San Martin Island unknown. Reported for the island by Gould and Moran (1981).

Vulpia octoflora (Walter) Rydb. var. octoflora SIX-WEEKS FESCUE Scarce; on lava in widely scattered localities throughout island.

Infrequent, on volcanic slopes above small fishing camp near cove, 22 Jan 1975, Henrickson 14543 (RSA-POM); rare, SE flank of Picacho San Martin, on top of smaller peak with wooden cross overlooking Hassler Cove, elev. ca. 300 ft, 8 Apr 1980, Junak et al. s.n. (SBBG 103543).

Zosteraceae (Eel-Grass Family)

Phyllospadix scouleri Hook. SURF-GRASS Occasional; rocky intertidal and subtidal habitats along southeastern shore of island. Further studies are needed to understand and document the distribution of this taxon and the other members of this family.

On wave-washed rocks N of Hassler Cove, just below sea level, 1 Apr 1988, Stewart 4620a (RSA-POM).

Phyllospadix torrevi S. Watson SURF-GRASS Occasional; rocky intertidal and subtidal habitats along southeastern shore of island.

On wave-washed rocks N of village along Hassler Cove, below sea level at low tide, 1 Apr 1988, Thorne 63158 (RSA-POM).

Zostera marina L. EEL-GRASS Occasional; sandy subtidal habitats in vicinity of Hassler Cove. Drifting in surf, landing area near fish camp, northwest edge of sandspit, Hassler Cove, 19-20 October 1968, Philbrick & Benedict B68-552; washed up on beach at Hassler Cove, 20 Mar 1993, Junak 5380.

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