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ADDITIONS TO THE VASCULAR FLORA OF SAN CLEMENTE ISLAND, LOS ANGELES COUNTY, CALIFORNIA, WITH NOTES ON CLARIFICATIONS AND DELETIONS

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ABSTRACT

The number of vascular plant taxa reported from San Clemente Island, California, is briefly summarized. Recent additions to the vascular flora are presented and, with one exception, representative voucher specimens are cited as substantiation. Of the taxa discussed, 68 are previously unreported taxa, and six are substantiations of previously dubious reports. An additional dozen taxa are cited in relation to clarifications or deletions. Based on current knowledge, we estimate the known flora to consist of 396 species with an additional 19 infraspecific taxa represented. Of these 415 taxa, 69.2% (272 species/15 additional subspecies or varieties) are considered indigenous to the island.

Key words: California, California Channel Islands, Californian Floristic Province, flora, floristics, San Clemente Island, Southern Channel Islands.

INTRODUCTION

The California Channel Islands are located in the southern California bight and comprise eight islands. These are generally divided into the Northern Channel Islands (San Miguel, Santa Rosa, Santa Cruz, and Anacapa) and the Southern Channel Islands (Santa Barbara, San Nicolas, Santa Catalina, and San Clemente).

San Clemente is the southernmost of the Channel Islands, and has its center at about 32°55′N-118°30′W. With an area of roughly 56 square mi (145 square km), it is the second largest of the Southern Channel Islands, and largely consists of weathered volcanic substrates. The island is narrow—approximately 1 mi (1.6 km) wide at The Isthmus on the N end, 4.3 mi (6.9 km) wide toward the S third, and ca. 20.5 mi (33 km) long—with a NW-SE axis. The NE side of the island is marked by short, deep canyons on a dramatically steep escarpment. The southwesterly slopes of the island are generally more gradual, with longer canyons and a distinctive series of wave-cut terraces formed over geologic time. The maximal elevation on the island is the "Thirst" triangulation point at 1965 ft (599 m), but this is essentially a large knoll, perched atop the eastern escarpment, which forms the culmination of the extensive uplands.

The first botanical collections on San Clemente Island were made in April 1885 by William S. Lyon and the Rev. Joseph C. Nevin, amateur botanists of the Los Angeles area (Raven 1963). Their collections were studied by Asa Gray, who described several new species from the material. Lyon (1886), the first to itemize the vascular plants on San Clemente Island, listed 81 taxa for the island as a result of his trip. Over subsequent decades, sporadic collections were made by additional botanists, including T. S. Brandegee, Blanche Trask, Philip Munz, Frank Peirson, LeRoy Abrams, and Ira Wiggins. Floristic summaries of the California Channel Islands were published by Brandegee (1890), Alice Eastwood (1941), and Meryl Dunkle (1950). Dunkle's report was based on 11 years of observations made by field botanists of the Channel Islands Biological Survey of the Natural History Museum of Los Angeles County. He had personally collected on San Clemente Island in April and November of 1939. Over the years, with the various activities of numerous botanists, erroneous reports for the islands began to accumulate. Eastwood's synopsis, for example, was based not only on herbarium collections but also included many "field observations" (without vouchers) and additional undocumented reports.

In the early 1960s, in order to clear the slate of erroneous reports and establish a more accurate listing of the vascular plants on San Clemente Island, Peter

Table 1. Vascular plants reported for San Clemente Island by various workers (‡).

	Native Species*	Nonnative Species*	Total no. of Species*	Total**
Lyon, 1886	71/— (87.7%)	10/— (12.3%)	81/—	81
Raven, 1963	226/5 (77.3%)	66/2 (22.7%)	292/7	299
Wallace, 1985	243/11 (76.0%)	76/4 (24.0%)	319/15	334
This paper†	272/15 (69.2%)	124/4 (30.8%)	396/19	415

(‡) = Number of taxa have been refigured based on reports and taxonomic schemes currently accepted by the authors, and native vs. nonnative status have also been redetermined for some taxa based on current knowledge of phytogeographic patterns; hence, the figures given here may differ slightly from the figures originally presented in the cited works.

* = Additional infraspecific taxa (subspecies, varieties) if more than one is recognized in the flora.

** = To avoid ambiguity, these are total taxa recognized in the flora at or below the species level, but excludes taxa above that level.

† = Note: Sporadic natural hybrids (e.g., *Abronia maritima* × *A. umbellata*; *Lotus argophyllus* var. *ornithopus* × *L. dendroideus* var. *traskiae*; *Trifolium gracilentum* × *T. palmeri*) are excluded from these figures, but **Pelargonium* ×*hortorum,* as stabilized "hybrid species," is included. *Rhus ovata* is tentatively retained, although at present no extant voucher specimen is known to exist in substantiation of its former occurrence on the island. Also, two taxa of debatable native status have been arbitrarily tallied here as native, namely (*?) *Bromus berterianus* (*B. trinii*) and (*?) *Madia sativa.*

Raven (1963) published a flora which he based on surveys of herbarium specimens at several major herbaria, a thorough review of previous reports for the island, and collections which he made during three trips to the island (totaling 13 days) in 1962. With two exceptions (*Rhus ovata* and *Brassica nigra*), previously reported taxa for which no herbarium specimens could be located were necessarily excluded. In his flora, Raven reported a total of 299 vascular plant taxa. Two years later, Raven (1965) added one additional taxon, *Gnaphalium luteo-album,* which he had collected earlier but overlooked in the preparation of his flora.

In the late 1960s, Robert Thorne (1969) made 11 additions on the basis of contemporary taxonomic innovations coupled with collections that he obtained on a trip to the island in 1966: *Phyllospadix scouleri, Deschampsia danthonioides, Vulpia myuros* var. *myuros* (as *Festuca m.*), *Brodiaea kinkiensis* (reported in earlier floras as *B. filifolia*), *Spergularia villosa, Delphinium variegatum* ssp. *kinkiense* (as *D. kinkiense*), *D. v.* ssp. *thornei* (the delphiniums previously had been reported under the misapplied name of *D. parryi*), *Erodium botrys, Callitriche marginata* (now including *C. longipedunculata,* reported by Raven), *Opuntia oricola,* and *Lomatium insulare.*

In the late 1970s, the U.S. Navy contracted with R. Mitchel Beauchamp to survey the island for sensitive species. This work also resulted in the addition of several interesting taxa (Beauchamp 1987*a*). Those reported by Beauchamp were *Cyrtomium falcatum,* the exceedingly rare *Sibara filifolia* (previously known only from historical collections on Santa Cruz and Santa Catalina Islands), *Saxifraga californica,* and *Orobanche uniflora.*

Finally, a comparative synopsis of the vascular plants on the California Channel Islands and Guadalupe Island, Mexico, was published by Gary D. Wallace (1985). In it, he included taxa that had accumulated in herbaria but which had not been formally reported for the island, along with a couple of taxonomic innovations. Among the taxa that he first reported for San Clemente Island were *Apium graveolens, Gnaphalium beneolens, Microseris douglasii* ssp. *douglasii, Senecio flaccidus* var. *douglasii* (as *S. douglasii* var. *d.*), *Stephanomeria diegensis, Amsinckia spectabilis* var. *spectabilis, Lepidium oblongum, L. virginicum* var. *pubescens, Raphanus sativus, Silene laciniata* ssp. *major, Salicornia virginica, Salsola australis* (as *S. iberica*), *Ricinus communis, Lupinus bicolor* ssp. *microphyllus, Medicago polymorpha* var. *brevispina, Medicago sativa, Centaurium davyi, Camissonia robusta, Polygonum argyrocoleon, Aphanes occidentalis* (as *Alchemilla o.*), *Bromus arizonicus, Dactylis glomerata, Ehrharta calycina,* and *Ruppia maritima.* This has been the last floristic compilation which specifically includes San Clemente Island.

General Remarks on the Taxa Presented

In the intervening years, sporadic fieldwork on the island has brought additional records to light. Below, we itemize taxa which are being formally reported from the island for the first time, but we have also added a few taxa which were earlier considered dubious reports. Most of the collections reported here have been made by the authors; however, we have included additions made by other workers if it appears that these records have not been published elsewhere. A couple of previously reported taxa are also necessarily included here for the sake of clarifying taxonomic ambiguities. Otherwise, we have attempted to avoid itemization of taxa which have been merely affected by nomenclatural changes since the works by Raven (1963) or Wallace (1985). Finally, we have taken this opportunity to exclude a few taxa that to us appear to be erroneous reports, and have presented a brief numerical summary of the vascular plant taxa on San Clemente Island (Table 1). The number of addi-

tions presented here that are not reflected in the treatments by Raven (1963; 1965), Thorne (1969), Wallace (1985), or Beauchamp (1987*a*; 1987*b*) totals 73.

For convenience, the entries in the text are arranged alphabetically by binomial, and species that we consider nonnative are indicated by a preceding asterisk (*). Limited discussion of each addition is provided where relevant. In the citation of label data, elevations of collection sites and distances from locative features have been given in either feet (ft) or meters (m). We have generally retained these as they appear on the original herbarium specimen labels. Elevational units of contemporary United States Geological Survey (USGS) topographic maps covering the island appear in feet, and it is felt that in some cases converting these figures to a metric unit could lead to ambiguities, particularly when reference is made to bench marks (BM) which are identified by their elevation in feet. Since the 1970s, the U.S. Navy has attempted to standardize local place names in use on San Clemente Island, but current USGS topographic maps covering the island still lack most of them. Labels for recent collections on the island generally reflect these standardized Navy names. However, place names applied by collectors to identify previously unnamed physiographic features, or potentially ambiguous names, are generally presented here in quotation marks. For each specimen cited (with the exception of the first, *q.v.*), herbaria where vouchers are deposited are cited by the standardized acronyms in Holmgren et al. (1990). These are largely the Rancho Santa Ana Botanic Garden (RSA) and the Santa Barbara Botanic Garden (SBBG). The small herbarium at the Stone Field Station on San Clemente Island, in which some voucher specimens are deposited, lacks an official acronym and for convenience is here designated as "xSTO." Duplicates of some collections have been disseminated to additional herbaria, but no attempt is made here to itemize all herbaria housing a particular voucher.

Additions

ALLOPHYLLUM GLUTINOSUM (Benth.) A.D.Grant & V.E.Grant (POLEMONIACEAE). Steep easterly escarpment 148°, and 310 m SSE of Jack (*not* Jack Point), within a few m of a solitary, prominent *Prunus lyonii* and the only known *Coreopsis gigantea,* elev. ca. 475 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5129* (specimen not extant).

Reported on San Clemente by Dunkle (1950 p. 312) as *Gilia gilioides* var. *glutinosa,* but discounted by Raven for lack of a documenting specimen. The collection cited above was apparently the first specimen taken to document the species' occurrence on the island. By misfortune, the solitary plant was later lost in transit. Although we still lack a specimen, the report is included here *fide* the collectors. It is important that the locality be revisited and another herbarium specimen collected for final substantiation of the report. At the site, this taxon was apparently uncommon in the understory of platyopuntia scrub (*Opuntia littoralis* and *O. oricola*), but was associated with a rich assemblage of herbaceous and suffrutescent species including *Sanicula arguta, Galium catalinense* ssp. *acrispum, Trifolium palmeri, T. willdenovii, Vicia exigua* var. *hassei, Claytonia perfoliata, Pholistoma racemosum, Solanum douglasii, Gilia nevinii, Daucus pusillus, Pellaea andromedifolia* var. *pubescens, Filago arizonica, F. californica, Calandrinia ciliata* var. *menziesii, Thysanocarpus laciniatus, Pterostegia drymarioides, Eriophyllum confertiflorum, Amsinckia intermedia, Cryptantha intermedia, Allium praecox,* and others.

*ANAGALLIS ARVENSIS L. (PRIMULACEAE). SW end of paved area at old airfield, localized in disturbed site, elev. ca. 900 ft, 14 May 1996, *Junak SCl-448* (SBBG). China Canyon, rare in canyon bottom, ca. 0.5 mi inland from bridge across mouth of canyon, elev. ca. 170 ft, 29 May 1996, *Junak SCl-540* (SBBG).

Apparently a recent arrival on the island, this taxon has now been found at Wilson Cove and at the old airfield, and is locally common in the upper portion of China Canyon.

*ASPHODELUS FISTULOSUS L. (ASPHODELACEAE). North head of the island, on sandy NE-facing terrace off the E end of the runway [ca. 140 ft elev.], 13 April 1992, *Ross & Kellogg 6137* (RSA).

This herbaceous perennial has been reported as a sporadic escape in southern California and was apparently naturalized at the Camp Pendleton Marine Corps Base in San Diego County. The population on the island is localized but consists of a substantial number of individuals that were setting abundant seed at the time of collection.

ASTER SUBULATUS Michx. var. LIGULATUS Shinners [*A. exilis* Elliott] (Asteraceae). Lemon Tank, locally common on dry, rocky W-facing bank on E side of reservoir, elev. ca. 1060 ft, 25 July 1996, *Junak SCl-658* (RSA, SBBG).

Currently known from this single location on San Clemente Island.

ATHYSANUS PUSILLUS (Hook.) Greene (BRASSICACEAE). "Island Woodland Study Site" at 1150 ft, 12 May 1976, *Sward 211* (×STO).

This appears to be the only known collection of this diminutive native annual on the island. Regrettably, the ambiguous locality information precludes an accurate knowledge of the collection site.

BRICKELLIA CALIFORNICA (Torr. & A.Gray) A.Gray (ASTERACEAE). Lower portion of Horse Canyon, localized population on W-facing slope in canyon bottom, elev. ca. 100 ft, 2 October 1996, *Junak SCl-703* (RSA, SBBG).

Originally reported for the island by Dunkle (1950), but excluded from the flora by subsequent workers for lack of a voucher. This appears to be the first substantiation of its presence on San Clemente Island, but is known only from this single location. This shrub is common on Santa Cruz, Anacapa, and Santa Catalina islands.

*BROMUS CATHARTICUS Vahl [*B. unioloides* Kunth, *B. willdenovii* Kunth] (POACEAE). Wilson Cove, in disturbed sites, elev. ca. 150 ft, 8 November 1990, *Junak SCl-130* (SBBG). Vicinity of Wilson Cove settlement, 87° E, ca. 770 m distant from "Harbor" knoll (648 ft), or 178° S, 770 m distant from 32-foot BM at Wilson Cove, locally naturalized on disturbed sandy soil [360 ft elev.], 11 April 1992, *Ross & Kellogg 6122* (RSA). Wilson Cove settlement, between the Navy store and fire station, growing through cracks in blacktop at roadside, elev. ca. 150 ft, 13 April 1992, *Ross & Kellogg 6136* (RSA). N portion of island, localized patch along road to Range Technical Area (leading to Buildings #60223–60226 and #6024160242), 0.2 mi from San Clemente

Ridge Road, elev. ca. 740 ft, 16 April 1996, *Junak SCI-351* (SBBG). SW end of paved area at old airfield, localized in disturbed site, elev. ca. 900 ft, 14 May 1996, *Junak SCI-449* (SBBG).

A pernicious weed on the mainland that has apparently begun to spread on the island. It has only recently been found outside of the Wilson Cove area. It is likely that this annual to short-lived perennial species will rapidly expand its range if not extirpated soon. Several other weedy bromes (*B. diandrus, B. hordeaceus, B. rubens*) are already well established throughout the island and beyond the scope of any normal weed-abatement program.

*Carpobrotus edulis (L.) N.E.Br. (Aizoaceae). Wilson Cove, common along roadside just downhill from Navy Exchange building, elev. ca. 100 ft, 25 April 1991, *Junak SCI-207* (SBBG).

Until recently, this taxon was commonly scattered on the island, especially in sandy sites. Its range has now been dramatically reduced by eradication efforts of the U.S. Navy.

*Chamaesyce maculata (L.) Small [*Euphorbia m.* L.] (Euphorbiaceae). N end of island, just SE of Passenger Terminal building, scattered on disturbed flats, elev. ca. 200 ft, 9 November 1990, *Junak SCI-144* (RSA, SBBG).

Currently known from a single collection; apparently a recent introduction.

*Chamaesyce serpens (Kunth) Small [*Euphorbia s.* Kunth] (Euphorbiaceae). Wilson Cove, rare in disturbed area next to office of Officer in Charge, elev. ca. 150 ft, 3 January 1995, *Junak & Stone SCI-242* (SBBG). Wilson Cove settlement, on SE side of Galley (Bldg 60103), USGS San Clemente Island North 7.5′ Quad., near 33°00′10″N-118°33′12″W, elev. ca. 160 ft, localized prostrate annual growing in sidewalk crack and in adjacent gravel, 19 May 1995, *Ross & Elvin 8576* (RSA).

This annual weed is currently known only from these collections and appears to be restricted to Wilson Cove.

*Chenopodium multifidum L. (Chenopodiaceae). E side of island, single large plant with seedlings, localized in crack in pavement at parking area at Stone field station, elev. ca. 1500 ft, 8 May 1996, *Junak SCI-437* (SBBG).

Currently known from a single location on San Clemente Island; also known from Santa Rosa and San Nicolas islands. It has been spreading on Santa Rosa in recent years but has not been seen recently on San Nicolas.

*Chloris virgata Sw. (Poaceae). N end of island, just SE of Passenger Terminal building, uncommon along disturbed roadside, elev. ca. 200 ft, 9 November 1990, *Junak SCI-143* (RSA, SBBG).

Currently known from a single collection; apparently a recent introduction.

*Chrysanthemum coronarium L. (Asteraceae). S end of island, along China Point Road ca. 1 mi S of intersection with San Clemente Ridge Road, scattered along disturbed roadside, elev. ca. 1100 ft, 29 May 1996, *Junak SCI-546* (RSA, SBBG).

This taxon, which appears to have been introduced to San Clemente Island with road gravel, should be eradicated as soon as possible. It is quite invasive in northwestern Baja California.

Claytonia perfoliata Donn *ex* Willd. ssp. perfoliata (Portulacaceae). E side of island at Lemon Tank, on canyon wall, elev. ca. 1000 ft, 23 April 1967, *Boutin 1676* (SBBG), det. J. M. Miller 1991. E side coastal escarpment approximately 2/5 way between Jack (*not* Jack Point) and the mouth of Larkspur Canyon, ca. 5200 ft due E of the 909-foot BM, elev. ca. 500 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5121* (RSA), det. J. M. Miller 1991.

It will likely come as a surprise to see this common, widespread taxon listed here as an addition to the flora. *Claytonia perfoliata sensu lato* has certainly been reported for the island earlier, but continuing monographic studies by John M. Miller and Kenton Chambers (Miller 1978; Miller and Chambers 1993) are resulting in a revised classification scheme for the highly variable *C. perfoliata* complex. The collections cited above appear to represent the only typical ones made on the island. Based on annotated specimens at RSA-POM, all remaining collections of the species made on San Clemente Island have been reidentified as *C. perfoliata* ssp. *mexicana* (Rydb.) J.M.Miller & K.L.Chambers.

Coreopsis gigantea (Kellogg) H.M.Hall (Asteraceae). E side of island, steep slope 322 m S of U.S. Navy site called "Jack," single plant in grassy area surrounded for several m on all sides by dense stands of *Opuntia,* 500 ft elev., 6 April 1990, *Boyd, Ross, & Fritsch 4172* (RSA).

Dunkle (1950, pp. 292 & 307) reported this species as occurring on San Clemente Island, apparently on the basis of personal observation. In a general discussion of *Coreopsis*-associated plant communities on the Channel Islands, he mentioned its particular vulnerability to grazing and browsing animals: "Since the branches grow at right angles to the main trunk, the *Coreopsis* shrub forms an intricate tangle which would be almost impossible to penetrate were it not for the extreme brittleness of the plant. A comparatively light touch will break off branches or even the main trunk. This fact might account for its disappearance where extensive grazing has occurred" (Dunkle 1950, p. 279). At the time that Dunkle visited the island in 1939, *Coreopsis* must already have been a rare plant. Raven (1963), did not encounter it on his visits to the island and, unable to locate a single herbarium specimen to substantiate its presence, necessarily excluded it as undocumented. With its exclusion from the island flora, this taxon became notable in its absence, since it is known on all the other Channel Islands as well as Guadalupe Island to the south.

The collection cited above apparently represents the first documentation of this species from San Clemente Island. The solitary plant that was encountered probably owed its survival to the fact that it was surrounded by a nearly impenetrable *Opuntia* scrub and, hence, was protected from browsing by the feral goats on the island. At the time of its discovery, a single flowering branch-tip was taken as a voucher. [For a partial list of associated species at the site, see the entry for *Allophyllum glutinosum,* above.] The solitary plant was revisited 17 May 1991 by Ross, Orlando Mistretta, and Mike Hammitt and was found to have put on considerable healthy growth in the intervening year. Many flowering and fruiting capitula were present and, while no additional herbarium vouchers were taken, some of the achenes were collected for the RSA Endangered Species Program. We had assumed that if there was one persisting individual, then there could well be more individuals persisting elsewhere on the steep eastern escarpment. This appears to be the case, as Jennifer Stone (pers. comm., May 1995) has now reported observing many plants of *C. gigantea* on the escarpment directly below "Jack." With the recent removal of the last feral goats from the island, this species may now be able to gradually re-establish itself.

*Cotula australis (Sieber *ex* Spreng.) Hook.*f.* (Asteraceae). Wilson Cove, on SE side of Galley (Bldg 60103), USGS San Clemente Island North 7.5′ Quad., near 33°00′10″N–118°33′12″W, elev. ca. 160 ft, localized and locally uncommon annual, growing in sidewalk crack and in adjacent gravel, 19 May 1995, *Ross & Elvin 8575* (RSA).

This exotic annual is a common and widespread weed on the

southern California mainland in disturbed settings, particularly in yards and gardens, but tends to be sporadic and uncommon in areas of undisturbed native vegetation. Even depauperate plants of *C. australis* may produce dozens of seeds in a capitulum; hence, establishment in a disturbed area may be rapid. This recent introduction would be a good candidate for control measures, as it is probably still restricted to the Wilson Cove settlement.

CUSCUTA CALIFORNICA Hook. & Arn. var. BREVIFLORA Engelm. [*C. occidentalis* Millsp.] (CONVOLVULACEAE). Sand dunes of coastal terrace at West Cove, SW of the new landing field, elev. ca. 20 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5087* (RSA).

This is apparently the first collection of this parasite from the island and was made on *Astragalus nevinii,* a San Clemente Island endemic. According to Raven (1963), the only previously reported *Cuscuta* taxon was *C. californica* var. *californica,* based on *Trask 187* (US). This is also the same and only collection of *Cuscuta* cited by Wallace (1985). It should be noted that if the taxon reported above were recognized at the specific level, as it was by the monographer T. G. Yuncker (1932), the name *C. occidentalis* has nomenclatural priority.

DRABA CUNEIFOLIA Nutt. *ex* Torr. & A.Gray var. INTEGRIFOLIA S.Watson (BRASSICACEAE). SW end of island, lower half of China Canyon, thin soil on rock outcrops, 7 April 1990, *Boyd, Ross, & Arnseth 4232* (RSA).

Not previously reported and apparently quite rare on the island, only a very few plants being seen at the collection site. Due to the paucity of specimens, a solitary plant was taken as a voucher. This taxon is extremely rare on Santa Cruz and Santa Catalina islands, and rare on San Nicolas Island (Thorne 1967; Junak and Vanderwier 1990; Junak et al. 1995).

*ECHINOCHLOA CRUS-GALLI (L.) P.Beauv. (POACEAE). Lemon Tank, localized population at edge of water, along N side of reservoir, elev. ca. 1080 ft, 25 July 1996, *Junak SCI-655* (SBBG).

Currently known from a single collection; apparently a recent introduction.

*ERODIUM BRACHYCARPUM (Godr.) Thell. [*E. obtusiplicatum* (Maire, Weiller, & Wilcz.) J.T.Howell] (GERANIACEAE). Twin Dams, margin of shallow pond at the westerly of the two earthen dams and around mesic inlet draw, elev. 1555–1575 ft, 18 May 1991, *Ross, Mistretta, & Hammitt 5191* (RSA). W side of island, ridgetop at the "armpit" junction of the upper two forks of Box Canyon on area affected by recent burn, elev. ca. 1538 ft, 21 May 1991, *Ross 5400* (RSA).

This weedy annual has probably been established on the island for many years and overlooked by previous workers due to its superficial resemblance to *E. botrys* (Cav.) Bertol., with which it sometimes co-occurs. *Erodium botrys* appears to be the more common taxon on San Clemente Island, however. *Erodium brachycarpum* is reportedly native to southern Europe (Taylor 1993), but may actually have its origins along the Mediterranean coast of northern Africa.

*ESCHSCHOLZIA CALIFORNICA Cham. (PAPAVERACEAE). E side of island, Wilson Cove, 24 April 1967, *Boutin 1719* (RSA, SBBG). Wilson Cove, along road by water treatment facility, apparently planted originally and now escaping to surrounding area, elev. ca 50 ft, 23 July 1996, *Junak SCI-630* (SBBG).

Currently known only from a disturbed site just E of the Wilson Cove settlement, where the plants appear to be the typical var. *californica,* a perennial form which occurs on some of the Channel Islands and on dunes and bluffs along the coast of California.

*EUCALYPTUS GLOBULUS Labill. (MYRTACEAE). N third of island, upper grassy flats 3700 ft SW of Jack Point lighthouse and 1810 ft SSW of 553-foot BM, elev. ca. 630 ft, 20 May 1991, *Ross 5363* (RSA). NW side of island, at W edge of terrace, S of Triangulation Station "Harbor," single tree planted at site of demolished metal building at old gunnery range, elev. ca. 400 ft, 27 September 1996, *Junak SCI-666* (RSA, SBBG).

Currently known on the island at Wilson Cove and at the two locations described above. In July 1981, there were four live trees, one dead trunk, and several saplings along the main island road near the location of *Ross 5363* (Junak, pers. observation). Of the various eucalypts introduced to southern California, this species is the one most commonly seen naturalizing (McClintock 1993; Junak et al. 1995). Future workers on the island should be prompt in removing any saplings which appear.

*FESTUCA ARUNDINACEA Schreb. (POACEAE). N end of island, along E side of San Clemente Ridge Road, ca. 0.8 mi S of airfield, single clump along road's edge, elev. ca. 350 ft, 17 May 1996, *Junak SCI-477* (RSA, SBBG).

Currently known from a single occurrence on San Clemente Island, this taxon is spreading on San Miguel, Santa Rosa, and San Nicolas islands. It should be eradicated as soon as possible.

*FICUS CARICA L. (MORACEAE). Tree 100 m S of "Mosquito Cove Canyon" at 5 m elev., 24 June 1979, *Ferguson 13* (×STO). Mosquito Cove, northernmost of two large trees persisting on NE-facing coastal slopes, elev. ca. 60 ft, 20 May 1996, *Junak SCI-516* (RSA, SBBG).

Currently known from a single location, where two large trees are persisting without cultivation. Flynn (1942) reported "two of the largest fig trees we have ever seen," a small ranch house, several other smaller buildings, and a mine shaft at Mosquito Cove. The fig trees were presumably planted by early ranchers or miners who lived there.

*FILAGO GALLICA L. [*Logfia g.* (L.) Cosson & Germ.] (ASTERACEAE). Central portion of island, along road to Peak 1603 and Camera Pad "Stone," localized population in recently burned grassland dominated by *Stipa pulchra,* elev. ca. 1500 ft, 15 May 1985, *Junak SCI-74* (RSA, SBBG). Central part of island on upland *Stipa pulchra* grassland, 268° W, 500 m distant from 1603-foot peak above Stone Field Station, elev. 1440 ft, 16 April 1992, *Ross 6201* (RSA). E side of island, scattered at the top of the E escarpment, just S of Twin Dams Canyon, ca. 0.8 mi NE of Camera Pad "Boulder 1," elev. ca. 1250 ft, 30 May 1996, *Junak SCI-553* (SBBG).

This weedy taxon is now scattered in the central portion of the island, mostly on the E side of San Clemente Ridge Road between camera pads "Stone" and "Boulder." It has spread rapidly on Santa Cruz Island (Junak et al. 1995).

GNAPHALIUM CALIFORNICUM DC. (ASTERACEAE). Central portion of island, along road to Peak 1603 and Camera Pad "Stone," rare on open flats, elev. ca. 1540 ft, 30 July 1981, *Junak SCI-39* (SBBG). SE portion of island, just S of Triangulation Point "Alta," rare in grassland, elev. ca. 1900 ft, 31 July 1981, *Junak SCI-40* (SBBG). N fork of Cave Canyon, locally common on N-facing slope, elev. ca. 1460 ft, 16 May 1985, *Junak SCI-95* (RSA, SBBG, SD). SW end of island, occasional in lower half of China Canyon, 7 April 1990, *Boyd, Ross, & Arnseth 4265A* (RSA). SE end of island, xeric sparsely vegetated slope of S and SW exposure, 396 m NNW of Guds [888-foot] marker, elev. 790–880 ft, 18 May 1991, *Ross, Mistretta, & Hammitt 5199* (RSA). Westerly fork of "Near-death Canyon," draining to Mosquito

Cove, occasional on southerly rocky outcrop, elev. ca. 1275 ft, 19 May 1991, *Ross, Mistretta, & Hammitt 5247* (RSA).

At present, this taxon is most common on the S half of San Clemente, and appears to be one of the native taxa increasing in numbers with the final removal of nonnative herbivores.

GNAPHALIUM MICROCEPHALUM Nutt. [*G. canescens* DC. ssp. *m.* (Nutt.) Stebbins & D.J.Keil] (ASTERACEAE). NW end of island, in central portion of sand dunes, small population of ca. 6 individuals in stabilized dunes, elev. ca. 150 ft, 31 July 1981, *Junak SCI-41* (SBBG). NE end of island, at SE corner of airfield runways, elev. ca. 200 ft, 31 July 1981, *Junak SCI-51* (SBBG). Lower Wilson Cove Canyon, bouldery rocky draw SW of and above pier operations, in dry rocky outcrops, elev. ca. 50–135 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5059* (RSA). "Spray Canyon," short canyon 2400 ft ENE of Spray (which in turn is 5200 ft N of Eel Point), W side of island, elev. ca. 260 ft, 22 May 1991, *Ross 5465* (RSA). Ridge between west fork of China Canyon and small lateral draw that meets it at 850 ft, 111° SE, 630 m distant from 1448-foot BM, locally scarce, SW slope of ridge at 1210 ft elev., 11 April 1992, *Ross & Kellogg 6115* (RSA). Central E side of island, steep rocky margin of rutted channel that drains from Nanny Canyon to the sea, ca. 200 m S of its effluence at the coast, ca. 200 ft elev., 14 April 1992, *Ross 6177* (RSA).

This taxon is widely distributed over the island but is nowhere common.

GNAPHALIUM STRAMINEUM Kunth [*G. chilense* Spreng.] (ASTERACEAE). NW end of island, in NE portion of sand dunes, rare in low spot in partially stabilized dunes, elev. ca. 200 ft, 8 May 1996, *Junak SCI-446* (SBBG). NE end of island, near SE corner of airfield runways, just E of intersection of Perimeter Road and road to Dolphin Bay, elev. ca. 200 ft, 17 May 1996, *Junak SCI-478* (SBBG).

Currently known from only two locations on the island.

*HAINARDIA CYLINDRICA (Willd.) Greuter [*Monerma c.* (Willd.) Coss. & Durand] (POACEAE). Central portion of island, along main road, roughly midway between intersection with road to Lemon Tank and intersection with road to Peak 1603 and field station at Camera Pad "Stone", elev. ca. 1250 ft, 14 May 1985, *Junak SCI-71* (RSA, SBBG). W side of island, locally common on clay flats along road at foot of Eel Point peninsula, elev. ca. 60 ft, 6 May 1996, *Junak SCI-415* (RSA, SBBG). Along E side of San Clemente Ridge Road, just N of intersection with road to Thirst Peak, locally common in disturbed sites, elev. ca. 1930 ft, 14 May 1996, *Junak SCI-453* (RSA, SBBG).

This taxon is now common in disturbed sites (especially roadsides) throughout much of San Clemente Island; it has apparently spread rapidly during the last 10 years. It is also known from San Miguel, Santa Cruz, and Santa Catalina islands (Junak et al. 1995).

*HEDYPNOIS CRETICA (L.) Dum.Cours. (ASTERACEAE). S end of island, just W of intersection of San Clemente Ridge Road and road to Observation Post #1 (Building #60901), localized population of ca. 50 individuals on disturbed flats adjacent to cement helicopter pad, elev. ca. 970 ft, 16 May 1996, *Junak SCI-470* (RSA, SBBG). W side of island, scattered along edge of road to Triangulation Point "Pole," ca. 0.1 mi from REWS facility, elev. ca. 1550 ft, 2 June 1996, *Junak SCI-599* (RSA, SBBG).

This weedy taxon, which was apparently introduced to at least one site on the island with road gravel or construction materials, should be eradicated as soon as possible. It has recently been collected at two locations on Santa Catalina Island as well.

HELIANTHUS ANNUUS L. (ASTERACEAE). S end of island, on shore of dessicating pond ca. 100 m SW of Vista O. P. Gate, elev. ca. 555 m, 15 September 1979, *Ferguson & Beauchamp 14* (SBBG, xSTO). SW side of island, in extreme upper reaches of Cave Canyon watershed, on W side of San Clemente Ridge Road near SHOBA gate, locally common on dry margins of large vernal pond, elev. ca. 1750 ft, 24 July 1996, *Junak & Stone SCI-638* (RSA, SBBG).

Currently known from only two collections on San Clemente Island.

*HERNIARIA CINEREA DC. [*H. hirsuta* L. ssp. *c.* (DC.) Cout.] (CARYOPHYLLACEAE). North Head, crusty sandy coastal flats WNW of the new landing field, elev. ca. 50 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5093* (RSA). Ridge between west fork of China Canyon and small lateral draw that meets it at 850 ft, 100° E, 490 m distant from 1448-foot BM, 1260 ft elev., 11 April 1992, *Ross & Kellogg 6116* (RSA). Extreme NE tip of island, at unnamed point ca. 1.3 mi from the intersection of Huey Road and Perimeter Road, locally abundant on stabilized sand and on disturbed or compacted soil, elev. ca. 30 ft, 22 April 1996, *Junak SCI-362* (RSA, SBBG). NW end of island, in NW Dunes ca. 0.28 mi SE of Camera Pad "Darter," locally common on NE-facing side of partially stabilized dune, elev. ca. 100 ft, 8 May 1996, *Junak SCI-441* (RSA, SBBG).

This weedy taxon is becoming locally common in several locations on San Clemente Island and already poses a potential threat to the endemic *Cryptantha traskiae* which occupies similar habitats. It is also known from San Miguel, San Nicolas (Junak and Vanderwier 1990), and Santa Catalina islands, as well as Guadalupe Island, Mexico (Wallace 1985). We strongly recommend that eradication measures be taken as soon as possible.

HUTCHINSIA PROCUMBENS (L.) Desv. (BRASSICACEAE). W side of island, at NE end of large stabilized sand dune just N of Eel Cove Canyon, localized population on NE-facing slope, elev. ca. 90 ft, 27 March 1996, *Junak SCI-256* (RSA, SBBG). W side of island, on rocky headland between Eel Cove Canyon and Seal Cove, rare on flats at top of coastal bluffs, elev. ca. 200 ft, 27 March 1996, *Junak SCI-260* (SBBG).

Currently known from only two locations on San Clemente Island; easily overlooked.

*HYPOCHOERIS RADICATA L. (ASTERACEAE). Wilson Cove settlement, lawn at bus stop on N side of Building 60112, elev. ca. 175 ft, 23 May 1991, *Ross 5507* (RSA).

Currently known only from the Wilson Cove area on San Clemente Island; otherwise known from the California Channel Islands from a single collection on San Nicolas Island (Junak and Vanderwier 1990). This species was still present in Wilson Cove in May 1995 and appeared to have expanded its range slightly into adjacent lawns and pavement cracks (Ross, pers. obs.).

ISOCOMA MENZIESII (Hook. & Arn.) G.L.Nesom var. menziesii [*Haplopappus venetus* (Kunth) S.F.Blake ssp. *oxyphyllus* (Greene) H.M.Hall] (ASTERACEAE). San Clemente Island, Calif. [without specific locality], 25 August 1894, *T. S. Brandegee s.n.* (RSA). Dunes at Horse Cove, S end of island, elev. ca. 10 ft, 12 April 1973, *Thorne 42922* (RSA), both det. by Nesom 1991.

These representative collections substantiate the presence of a third variety of *I. menziesii* on the island based on Guy Nesom's study of the genus (1991). The two taxa previously reported from the island are *I. m.* var. *decumbens* (as *Haplopappus venetus* ssp. *furfuraceus*) and *I. m.* var. *vernonioides* (as *H. venetus* ssp. *vernon-*

ioides). All three of the taxa appear to be scarce on San Clemente Island, and were probably significantly reduced in numbers by the browsing of goats prior to their removal.

*LACTUCA SERRIOLA L. (ASTERACEAE). Central portion of island, just S of old airfield, elev. ca. 860 ft, 30 July 1981, *Junak SCl-33* (SBBG). Wilson Cove, scattered in disturbed areas, elev. ca. 150 ft, 8 November 1990, *Junak SCl-134* (SBBG). Grassy slopes at the beginning of Larkspur Canyon drainage, 1600 ft SE of the 924-foot BM at the E end of the old airfield landing strip, elev. ca. 820–875 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5144* (RSA). Northern tributary of Canchalagua Canyon, ca. 1070 ft NNE of the 1135-ft triangulation point, USGS San Clemente Island South 7.5′ Quad., near 32°51′03″N-118°23′34″W, elev. ca. 840-880 ft, locally scattered on mesic northeasterly slope, 19 May 1995, *Ross et al. 8589* (RSA).

This weedy taxon is now abundant and widespread throughout much of San Clemente Island, especially in canyons at the SW end of the island.

*LATHYRUS ODORATUS L. (FABACEAE). Along the main N-S road between upper Larkspur Canyon and Marine Terrace Grade, ca. 960 ft due S of the center of the old airfield landing strip, USGS San Clemente Island Central 7.5′ Quad., near 32°56′38.6″N 118°31′32.8″W, elev. 875 ft, locally abundant annual naturalized in disturbed grassland around foundation of burned building, associated with *Bromus diandrus, Avena barbata, A. fatua, Medicago polymorpha, Sonchus oleraceus, Brassica geniculata,* scattered *Opuntia littoralis, etc.,* 20 May 1995, *Ross, Allan, & Elvin 8591* (RSA).

Widely cultivated as an ornamental and in southern California only rarely encountered as a waif. The population cited here, however, is clearly naturalized in the area.

*LAVATERA CRETICA L. (MALVACEAE). Head of Larkspur Canyon, E side of island, S of U.S. Navy site called "Jack," 700 ft elev., 6 April 1990, *Boyd et al. 4171* (RSA). Localized on grassy slopes at the beginning of Larkspur Canyon drainage, 900 ft SSE of the 924-foot BM at the E end of the old airfield landing strip, elev. ca. 875 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5140* (RSA). Noted at Stone Field Station, ca. 3 plants on W side of storage shed, elev. ca. 1525 ft, May 1991 (Ross pers. obs.).

Although considered an annual or biennial species in Flora Europaea (Fernandes 1968), several of the plants seen on San Clemente Island were clearly perennating. However, they probably do not persist as individuals for more than 3 to 5 years. This taxon is also known from Santa Rosa and Anacapa islands; it has been spreading rapidly on Middle Anacapa Island.

*LOBULARIA MARITIMA (L.) Desv. (BRASSICACEAE). Near warehouse on the W side of the main road near the old airfield, [elev. ca. 827 ft,] 15 September 1979, *Ferguson 5* (×STO). Around buildings at old airfield, on W side of main road, localized in disturbed sites, elev. ca. 830 ft, 28 July 1981, *Junak, Hochberg, & Ferguson SCl-17* (RSA, SBBG).

These are apparently the only reports of this weedy species on the island. The "sweet alyssum" of gardens, this taxon was likely introduced as an ornamental at the site and subsequently has been self-seeding and persisting in the vicinity.

LOTUS ARGOPHYLLUS (A.Gray) Greene var. ORNITHOPUS (Greene) Ottley ×L. DENDROIDEUS (Greene) Greene var. TRASKIAE (Noddin) Isely (FABACEAE). Wilson Cove Canyon, tufa cut curve, marine terrace, 32°59′50″N-118°33′35″W, population voucher, 30 April 1989, *Liston, Mistretta, & Rieseberg 804-2* (RSA). Eastern escarpment just below the mouth of Nanny Canyon where it opens onto a sloping terrace and flows northward, USGS San Clemente Island Central 7.5′ Quad., near 32°56′29″N-118°30′15″W, elev. ca. 285 ft, 14 April 1992, *Ross 6182* (RSA).

Plants of intermediate morphology and putative hybrid origin were first noted in the vicinity of Wilson Cove by Beauchamp in 1986 (Beauchamp 1987*b*). Subsequent molecular studies by Liston, Rieseberg, and Mistretta (Liston et al. 1990) using nuclear ribosomal DNA markers confirmed the hybrid origin of four individuals in the Wilson Cove area out of 38 plants sampled.

The Ross collection was from one of two hybrid individuals observed on a gentle, stabilized slope of coarse gravels. It was morphologically intermediate between the putative parents (presumably an F_1), with twiggy spreading, glabrescent branches. The voucher material taken was from a plant growing interlocked with *L. argophyllus* (presumably the seed parent), the nearest *L. dendroideus* being about 4 m away where it showed a preference for outcropped rocks. Other taxa associated with the hybrid at the site included *Poa secunda* (*P. scabrella*), *Stipa lepida, S. cernua, Melica imperfecta, Hemizonia clementina, Opuntia littoralis, Calystegia macrostegia* ssp. *amplissima, Eriophyllum confertiflorum, Malacothrix foliosa,* and *Rafinesquia californica.* It is likely that sporadic hybrids between these two taxa may be expected wherever they occur sympatrically.

The same putative hybrid was recently collected on a ridge S of Guds near the southern extreme of the island, amid a mixed population of *Lotus argophyllus* var. *ornithopus* and *L. a.* var. *adsurgens* (20 May 1995, *Ross 8595* [RSA]). The solitary anomalous plant was growing out from under the margin of an individual of *L. a.* var. *ornithopus* and stood in stark contrast to the two *Lotus* taxa present. *Lotus dendroideus* was not observed in the vicinity, however, and is not known from the extreme southern portions of the island. [The most southerly documented population appears to be "E side of island near Malo Point, third canyon S of Bryce, 8 April 1990, *Boyd, Ross, & Arnseth 4346* (RSA); this would put it 5800 m NW of the putative hybrid on the ridge near Guds.] Such a hybrid near Guds would apparently have to be the result of long-distance pollen dispersal by an insect vector. Because additional supporting evidence for the hybridity of this plant was not present at the site, this anomalous collection has not been cited with the other collections above.

[Although *Lotus argophyllus* var. *ornithopus* has been recently treated as a synonym of *L. a.* var. *argenteus* Dunkle (Isely 1993), the prior designation for this San Clemente Island material is retained here pending more detailed taxonomic studies.]

*LYTHRUM HYSSOPIFOLIUM L. (LYTHRACEAE). Upper portion of Waynuk Canyon, rare in rocky canyon bottom, elev. ca. 1250 ft, 20 May 1996, *Junak SCl-527* (SBBG). Lemon Tank, locally abundant on mudflats along NE margin of reservoir, elev. ca. 1080 ft, 25 July 1996, *Junak SCl-657* (RSA, SBBG).

Currently known from only two locations on San Clemente Island; apparently a recent introduction which will probably spread rapidly to other wetland areas.

*MALACOTHRIX SAXATILIS (Nutt.) Torr. & A.Gray var. TENUIFOLIA (Nutt.) A.Gray (ASTERACEAE). "Thought to be introduced accidently with rock aggregate," N of Wilson Cove, 20 August 1975, *Beauchamp 4014* (×STO). N end of beach at West Cove, occasional on S-facing coastal bluffs, elev. ca. 15 ft, 28 July 1981, *Junak, Hochberg, & Ferguson SCl-13* (RSA, SBBG, SD).

This somewhat variable herbaceous perennial has its center of distribution around the Los Angeles Basin and adjacent foothills, and also occurs as a native on Santa Catalina Island.

*MALEPHORA CROCEA (Jacq.) Schwantes (AIZOACEAE). Wilson Cove,

common in disturbed sites around BEQ/BOQ offices, elev. ca. 150 ft, 6 January 1995, *Junak SCI-248* (RSA, SBBG).

First noted on the island in May 1985, when a colony was seen on coastal flats just N of the mouth of Eel Cove Canyon (Junak, pers. obs.).

MARAH *aff.* FABACEUS (Naudin) Greene var. AGRESTIS (Greene) Stocking (CUCURBITACEAE). Tributary of first unnamed canyon E of Chenetti Canyon, draining to Pyramid Cove, 5650 ft ENE of Slope triangulation point (781-ft) and 8000 ft WNW of Guds triangulation point (888-ft), USGS San Clemente Island South 7.5′ Quad., near 32°50′15″N-118°23′20″W, elev. ca. 780 ft, solitary plant in rocky canyon bottom, . . . 20 May 1995, *Ross 8596* (RSA).

On the basis of morphology, this collection appears best treated as this taxon, although the spheric fruits are as much as 5 cm in diameter, rather than 1.5–2.5 cm (Ferris 1960).

MARAH MACROCARPUS (Greene) Greene var. MACROCARPUS (CUCURBITACEAE). W Fork of China Canyon, herbaceous perennial with long stems scandent through *Opuntia littoralis* scrub in sunny canyon bottom, . . . fruits . . . to 7.2 cm long with stout prickles to ca. 19 mm long, . . . USGS San Clemente Island South 7.5′ quadrangle, near 32°50′ 54″N-118°25′42″W, elev. ca. 1000 ft, 11 April 1992, *Ross & E. Kellogg 6110* (RSA).

The retention here of the "variety *macrocarpus*" assumes the validity of var. *micranthus* Stocking, which remains something of an enigmatic taxon.

MARAH MAJOR Dunn [*M. macrocarpus* (Greene) Greene var. *major* (Dunn) Stocking] (CUCURBITACEAE). "Spray Canyon," short canyon 732 m ENE of Spray (which in turn is 1585 m N of Eel Point), W side of the island, elev. ca. 225 ft, [seeds of one fruit 3, 38–39 mm long, 27–29 mm wide, 17–18 mm thick,] 22 May 1991, *Ross 5461* (RSA). Eastern escarpment just inside the mouth of Nanny Canyon before it opens onto a sloping terrace and flows northward, . . . mesic, partially shaded canyon slope, . . . fruits . . . to 10.2 cm long with prickles to 9 or 10 mm long, . . . fruits with . . . 4 or fewer seeds developing, these being very large and consistent with *M. major* or *M. guadalupensis,* USGS San Clemente Island Central 7.5′ quadrangle, near 32°56′22.5″N-118°30′19″W, elev. ca. 550 ft. 14 April 1992, *Ross 6160* (RSA).

Because the genus *Marah* is a common, widespread, and unshowy taxon in cismontane California, it has generally been taken for granted. Very little taxonomic work has been conducted in the genus, and very few herbarium specimens contain mature fruits and seeds, which are often critical to proper identification. For marahs on the California Channel Islands, the situation is particularly acute. The assumption has often been made that there is only one species to be found on the islands; hence, the variations exhibited by insular material have been explained away by oversimplifications rather than critical study. At present, there appear to be at least three taxonomic entities now documented on San Clemente Island alone. These three taxa are recorded in the citations above. The senior author is currently re-examining some of the type material of *Marah* from the islands, and has the intention of presenting elsewhere a slightly broader discussion of the taxonomic problems relating to the genus on California's Channel Islands.

*MYOPORUM LAETUM J.G.A.Forst. (MYOPORACEAE). NE end of island, along road to fuel dock pier at Dolphin Bay, localized escape on NE-facing slope, elev. ca. 100 ft, 31 July 1981, *Junak SCI-53* (RSA, SBBG, SD).

Currently known from a single collection on San Clemente Island, this taxon has spread rapidly on San Nicolas Island (Junak and Vanderwier 1990).

NAMA STENOCARPUM A.Gray (HYDROPHYLLACEAE). Drying ponds between Tower and Woody at N end of island, 400 ft, 13 January 1981, *Ferguson 63* (×STO). USGS San Clemente Island North quadrangle, SE of the airport, 29° and 1500 ft NNE of the 408-foot knoll, ca. 400 ft elev., 28 June 1992, *Kellogg s.n.* (RSA), verif. by Ross 1992.

This annual to short-lived perennial taxon is apparently rare on San Clemente and has not been reported from any of the other Channel Islands (*fide* Wallace 1985). According to information provided with the collection by Elizabeth Kellogg, the species was "found in a soil depression of heavy clay in grassland, seasonally wet, open, with *Malvella leprosa, Verbena bracteata, Avena barbata,* and a few *Typha latifolia.*" On the mainland, it ranges from Los Angeles County (where probably now extirpated) southward to San Diego County and Baja California, Mexico, and eastward to Texas and northern Mexico. In California, the species tends to occur on muddy shores of pools and merits concern due to increasing loss of habitat.

*NICOTIANA GLAUCA Graham (SOLANACEAE). N end of island, around photo maintenance building on E side of main road, just N of intersection with road to NOTS Pier, extremely localized population in disturbed area, elev. ca. 720 ft, 28 July 1981, *Junak, Hochberg, & Ferguson SCI-16* (RSA, SBBG). N end of island, on E side of San Clemente Ridge Road at intersection with road to Range Technical Area, localized colony at NE corner of Building #60208, elev. ca. 750 ft, 23 July 1996, *Junak SCI-628* (SBBG).

Known from a single location on San Clemente Island, where it persisted for at least 15 years; all known plants have now been removed. This invasive taxon is also known from Santa Cruz, San Nicolas, and Santa Catalina islands (Junak and Vanderwier 1990; Junak et al. 1995), as well as from Guadalupe Island, Mexico (Wallace 1985).

*OPUNTIA FICUS-INDICA (L.) Miller (CACTACEAE). Lower Wilson Cove Canyon, bouldery rocky draw SW of and above pier operations, elev. ca. 50–135 ft, 17 May 1991, *Ross, Mistretta, & Hammitt 5063* (RSA).

The population reported here consisted of one large colony well established just above the bed of the drainage. There appeared to be some introgression in some local plants of *Opuntia oricola,* but this could not be ascertained with confidence. Hybridization between *O. ficus-indica* and native Californian *Opuntia* species is generally discredited, but requires further study.

OROBANCHE FASCICULATA Nutt. (OROBANCHACEAE). E shore of island, rare on upper part of beach below Triangulation Point "Jack," elev. ca. 10 ft, 14 April 1996, *Junak & Stone SCI-332* (SBBG).

Currently known on San Clemente Island only from the location described above and from a small canyon nearby.

*OXALIS CORNICULATA L. (OXALIDACEAE). Wilson Cove, along road to pier, common along roadside, elev. ca. 100 ft, 14 May 1985, *Junak SCI-56* (CAS, RSA, SBBG, SD, US).

Currently known from a single collection on San Clemente. This taxon is also known, primarily from disturbed sites near habitations, on Santa Cruz, San Nicolas, and Santa Catalina islands (Junak and Vanderwier 1990; Junak et al. 1995; Thorne 1967).

*PASPALUM DILATATUM Poiret (POACEAE). Near Nots Pier, at mouth of draw below the Nots Pier road, 308° NW, 785 m distant from

Jack Point lighthouse, elev. ca. 16 ft, 13 April 1992, *Ross & Kellogg 6148* (RSA), verif. by J. R. Reeder.

This is the first report of a *Paspalum* on the island, this species having only been reported previously from Santa Catalina Island (*fide* Wallace 1985). The occurrence was a dense, localized patch which may represent a fairly recent introduction. Reportedly this was one of several weeds on the island targeted for eradication (E. Kellogg, pers. comm., 1992), but we have not yet heard whether it has been extirpated.

*PELARGONIUM ×HORTORUM L.H.Bailey (GERANIACEAE). Lower Wilson Cove Canyon, just W of the dock activities, large locally naturalized colony at ca. 25 ft elev., 22 May 1991, *Ross 5435* (RSA). Same date, two individuals noted as escapes farther up Wilson Cove Canyon amid the native vegetation at ca. 125 ft elev. (Ross, pers. obs.). Solitary plant on disturbed sandy flats SE side of the active runway, ca. 360 m SE of the air terminal, ca. 225 ft elev., 23 May 1991 (Ross, pers. obs.). Solitary plant adventive in the foundation crack of a building E of the runway, ca. 175 ft elev., 23 May 1991 (Ross, pers. obs.). About four escapes noted in Wilson Cove Canyon just W of the Navy Store, ca. 220 ft elev., 13 April 1992 (Ross, pers. obs.).

The "garden geranium" of the horticulture trade, this hybrid species has been planted as an ornamental about several buildings in the Wilson Cove settlement and about the airport at North Head. While not generally considered weedy by nature, its wind-disseminated seeds and drought-tolerance allow this plant to establish itself outside of cultivation. To date, the escapes noted have not traveled very long distances from their original introduction sites.

PELLAEA MUCRONATA (D.C.Eaton) D.C.Eaton var. MUCRONATA (ADIANTACEAE). SW end of island, ridgetop of the "armpit" where the two upper forks of Box Canyon join together, localized population (ca. 6 plants seen) at edge of ridgetop near drop into canyon, on clay soil amid volcanic rock outcrops, elev. ca. 1500 ft, 21 May 1991, *Ross 5399* (RSA). SW end of island, on E side of ridge between W and middle forks of Cave Canyon, rare on rocky ridgetop, elev. ca. 560 ft, 2 June 1996, *Junak SCl-616* (SBBG).

Reported on San Clemente by Dunkle (1950, p. 309), but discounted by Raven (1963) for lack of any documenting herbarium specimens. While we cannot know how common this taxon may once have been on the island, its occurrence now appears to be relictual and quite restricted.

*PENNISETUM SETACEUM Forssk. (POACEAE). N end of island, single individual along Perimeter Road just SW of airport landing strip, 30 April 1996, *Stone & Sward s.n.* (×STO).

Known from a single collection on the island; the only plant seen was eradicated.

*PHYLA NODIFLORA (L.) Greene [*Lippia n.* L.] (VERBENACEAE). Vicinity of Wilson Cove settlement, 87° E, ca. 770 m distant from "Harbor" knoll (648 ft.), or 178° S, 770 m distant from 32-foot BM at Wilson Cove [360 ft elev.], 11 April 1992, *Ross & Kellogg 6121* (RSA).

Herbaceous perennial, creeping and rooting adventitiously; apparently introduced as an ornamental groundcover around buildings and now locally naturalized in disturbed, sandy soils.

*PIPTATHERUM MILIACEUM (L.) Coss. [*Oryzopsis m.* (L.) Benth. & Hook. *ex* Asch. & Schweinf.] (POACEAE). N end of island, E of main road, along road to Wilson Cove, localized colony on disturbed roadside, elev. ca. 600 ft, 16 May 1985, *Junak SCl-120* (SBBG). N end of island, just SE of Passenger Terminal building at airfield, locally common in disturbed site, elev. ca. 200 ft, 9 Nov 1990, *Junak SCl-145* (SBBG). Uppermost reaches of the Wilson Cove Canyon drainage, 3300 ft NW of the 750-foot BM, elev. ca. 465 ft, 20 May 1991, *Ross 5358* (RSA).

This weedy perennial grass has already established itself in several areas on the N third of the island and appears to be spreading rapidly, particularly along the margins of the main N-S road. Serious efforts need to be made to extirpate this species from the island. Based on the rapid dispersal already evident, this will become a very serious, competitive weed in the years ahead unless it is eradicated promptly.

POLYCARPON DEPRESSUM Nutt. (CARYOPHYLLACEAE). W side of island, at NE end of large stabilized sand dune just N of Eel Cove Canyon, localized population on NE-facing slope, elev. ca. 90 ft, 27 March 1996, *Junak SCl-257* (SBBG).

This taxon is extremely rare on the California Channel Islands; it has also been collected on San Miguel, Santa Cruz, and Santa Catalina islands.

POTAMOGETON PECTINATUS L. (POTAMOGETONACEAE). E side of island, at westernmost of the Twin Dams, localized population, elev. ca. 1600 ft, 28 May 1996, *Junak SCl-532* (RSA, SBBG).

Currently known from a single location on San Clemente Island.

PSILOCARPHUS BREVISSIMUS Nutt. var. BREVISSIMUS (ASTERACEAE). Dessicated mud of temporary pool near reservoirs between Boulder and Horton, NE side of island, elev. ca. 1600 ft, 17 April 1966, *Thorne 36087* (RSA) [distributed as *P. tenellus* Nutt. var. *t.*], det. J. D. Morefield. SE portion of island, near Eagle Canyon, in artificial pool on E side of main road, ca. 0.75 mi S of SHOBA gate, locally common in center of drying pool, elev. ca. 1580 ft, 16 May 1985, *Junak SCl-110* (SBBG). Twin Dams, shallow pond at the westerly of the two earthen dams and mesic inlet draw, locally common on drying soil at pond margin and along inlet channel, elev. 1555–1575 ft, 18 May 1991, *Ross, Mistretta, & Hammitt 5184* (RSA), det. J. D. Morefield. Clay flats W of the west fork of China Canyon, 83°E, 410 m distant from 1448-foot BM, localized on drying margin of mud pond, elev. ca. 1315 ft, 11 April 1992, *Ross & Kellogg 6118* (RSA), verif. by J. D. Morefield.

These apparently represent the first formal reports of this taxon from the island, making it the second *Psilocarphus* species known to occur here. This species appears to be largely restricted to the margins of vernal pools, although *P. tenellus* var. *tenellus* may also occur in this habitat as well as more widely on vernally moist adobe flats.

QUERCUS CHRYSOLEPIS Liebm. (FAGACEAE). East rim at canyon head, San Clemente Island, rare, 25 November 1939, *Dunkle 7361* (RSA, *ex* LAM). Lower half of China Canyon, S end of island, W side, 7 April 1990, *Boyd, Ross, & Arnseth 4284* (RSA).

This taxon had originally been reported for the island by Dunkle (1950). In his discussion of plant ecology on the Channel Islands, he twice mentioned the taxon in regard to woodland and savanna communities as follows: "A few trees of *Q. chrysolepis* and *Photinia* [*Heteromeles*] *arbutifolia macrocarpa* are to be found in protected canyon heads on San Clemente. . ." (p. 287); and, "On San Clemente Island *Quercus tomentella, Q. chrysolepis,* and *Photinia arbutifolia* form very small areas of savanna. These savannas are usually on terraces or on rolling hills about wide upland watercourses. The trees most frequently occupy slopes or swales where they receive some protection from the wind" (p. 297). Twelve years after Dunkle's report, Raven collected oaks throughout the island and had

his collections examined by Cornelius Muller. All were identified as *Q. tomentella.* As Raven was apparently unable to locate any vouchers for this taxon in herbaria, he concluded that "records of *Q. chrysolepis* Liebm. from the island are evidently erroneous" (Raven 1963) and necessarily omitted it from the flora. Subsequently, Wallace (1985) listed the species as occurring on San Clemente Island and cited *Dunkle 7361* (LAM). Many botanists, however, apparently regarded this report as an error and dismissed it. This voucher is indeed extant and has been cited above with the Boyd et al. collection as substantiation. As with much of the island's native flora, this species is now only relictual. Certainly the savanna formations are gone and the canyon woodlands are only a shadow of what they once must have been. Boyd indicated on his collection label "large tree, infrequent in canyon bottom." In fact, there may have been no more than one to three individuals encountered during our trek down China Canyon. This species is in need of careful conservation and replenishment efforts on the island.

*Rumex conglomeratus Murray (Polygonaceae). E side of island, at mouth of canyon at Mosquito Cove, rare in canyon bottom, elev. ca. 20 ft, 18 May 1996, *Junak SCl-488a* (RSA, SBBG).

Currently known only from the Mosquito Cove area on San Clemente Island; presumably a fairly recent introduction.

Salix gooddingii C.Ball (Salicaceae). Lemon Tank, at NW end of reservoir, large tree at water's edge, elev. ca. 1160 ft, 3 June 1996, *Junak SCl-621* (RSA, SBBG).

Currently known from a single location on San Clemente Island, where it was first seen in 1985 (R.M. Beauchamp per. comm., May 1985).

*Schinus molle L. (Anacardiaceae). N end of island, two wind-pruned trees at E end of airfield runways, 31 May 1996, *Philbrick & Kershaw s.n.* (SBBG).

Currently known from a single collection on San Clemente Island.

*Schismus arabicus Nees (Poaceae). N end of island, at S edge of airfield parking lot, common in disturbed area with sandy soil, elev. ca. 200 ft, 24 April 1991, *Junak SCl-147* (SBBG). N end of island, ca. 1 mi S of airfield, locally common along sandy roadside, elev. ca. 380 ft, 26 April 1991, *Junak SCl-241* (SBBG). USGS San Clemente Island North quadrangle; north head of island, south side of landing field at airport baggage claim area, growing out of cracks in the concrete, elev. ca. 200 ft, 12 June 1992, *Kellogg s.n.* (RSA), det. Ross. Wilson Cove settlement, on SE side of Galley (Bldg 60103), USGS San Clemente Island North 7.5′ Quad., near 33°00′10″N-118°33′12″W, elev. ca. 160 ft, locally scarce annual growing in sidewalk crack and in adjacent gravel, 19 May 1995, *Ross & Elvin 8577* (RSA).

This pernicious annual weed apparently represents a recent introduction to San Clemente. In recent decades it has spread rapidly on the southern California mainland; it is also known from Santa Cruz, Santa Barbara, and Santa Catalina islands. Every effort should be made to extirpate this weed before it spreads more widely.

Sesuvium verrucosum Raf. (Aizoaceae). NE end of island, along E side of Skunk Alley Road ca. 1 mi N of intersection with San Clemente Ridge Road, locally abundant in swale N of Peak 597, elev. ca. 460 ft, 12 April 1996, *Junak SCl-295* (RSA, SBBG).

Currently known from a single location on San Clemente Island; first report of this taxon from the California Channel Islands.

*Silybum marianum L. (Asteraceae). W side of island, single plant along edge of road to Triangulation Point "Pole," ca. 0.2 mi from REWS facility, elev. ca. 1550 ft, 2 June 1996, *Junak SCl-600* (SBBG).

Currently known from a single collection on San Clemente Island; the only plant seen, which was apparently introduced with road gravel, was removed. This invasive taxon has apparently been eradicated from Santa Barbara and San Nicolas islands.

*Sisymbrium orientale L. (Brassicaceae). SW side of island, lower half of China Canyon, 7 April 1990, *Boyd, Ross, & Arnseth 4243A* (RSA). N head of island, on small sandy terrace off E end of airfield runway [ca. 140 ft elev.], 13 April 1992, *Ross & Kellogg 6139* (RSA). S end of island, main branch of Horse Beach Canyon, ca. 0.2 mi inland from beach, rare in dry gravel creekbed, elev. ca. 80 ft, 15 April 1996, *Junak SCl-345* (SBBG). N end of island, locally common on disturbed flats behind beach at West Cove, elev. ca. 20 ft, 31 May 1996, *Junak SCl-562* (RSA, SBBG).

This invasive taxon is now spreading on San Clemente Island and should be eradicated as soon as possible.

Stylocline gnaphaloides Nutt. (Asteraceae). SE end of island, xeric sparsely vegetated slope of S and SW exposure, 396 m NNW of Guds [888 ft] marker, elev. 790–880 ft, 18 May 1991, *Ross, Mistretta, & Hammitt 5194* (RSA). SE end of island in the vicinity of Knob, 5100 ft NW of Guds, locally uncommon on southeasterly clay slope about 250 ft SSE of Knob, approaching Knob Canyon, elev. ca. 925 ft, 18 May 1991, *Ross, Mistretta, & Hammitt 5223* (RSA). Westerly fork of "Near-death Canyon," draining to Mosquito Cove, 1800 ft SE of "Malo Knoll" [1396 ft], localized and uncommon on rocky southerly slope at beginning of drainage, elev. ca. 1275 ft, 19 May 1991, *Ross, Mistretta, & Hammitt 5245* (RSA), all verif. by J. D. Morefield. Terrace near the head of "Snail Canyon," just on the E side of "the snail's raised neck," 1650 ft N of Slope triangulation point (781-ft) and 6250 ft SSE of Rest tri. pt. (1336-ft), USGS San Clemente Island South 7.5′ Quad., near 32°50′07″N-118°24′18″W, elev. ca. 810 ft, highly localized at S base of rockpile on the terrace, 21 May 1995, *Ross 8610* (RSA).

This is an inconspicuous native annual that is often overlooked in the field. Based on these collections and field observations, the taxon appears to be restricted to the southern third of the island.

Suaeda taxifolia (Standl.) Standl., *glabrous form* (Chenopodiaceae). Spray [Point], W side of island about 5300 ft N of Eel Point, coastal terrace at about 18 ft elev., 22 May 1991, *Ross 5441* (RSA).

Until recently, the common *Suaeda* species of southern California coastal areas was known as *Suaeda californica* S.Watson. Within this taxonomic framework, two infraspecific taxa were recognized: var. *californica,* a glabrous form; and var. *pubescens* Jeps., with pubescent herbage. Raven (1963) had indicated that "all material from San Clemente Island is pubescent and would thus be referable to var. *pubescens* Jeps., if that variety were recognized." While the glabrous and pubescent forms of the species are not always recognized by taxonomists, the pubescence (or lack thereof) may result in rather different physiognomies. Recently, Wayne Ferren (UCSB) has determined that the name *S. californica* S.Watson has been misapplied and is applicable only to populations in the vicinity of San Francisco Bay (now apparently extirpated) and Morro Bay (San Luis Obispo County), and that the correct name for the *S. californica auct., non* S.Watson, in southern California is *S. taxifolia.* Under this species name, infraspecific epithets are not available to distinguish between the pubescent and glabrous forms of the taxon. Despite the lack of a taxonomic designation for this entity, the presence of the glabrous form on San Clemente Island is noted here should the character be deemed of taxonomic significance in the future.

*TAMARIX RAMOSISSIMA Ledeb. (TAMARICACEAE). Pond W of old firing range, E of main dune area, 17 August 1976, *Beauchamp 4008* (×STO), det. by Junak. E shore of island, at mouth of third small canyon N of Thirst Canyon, single isolated tree on gravel floodplain, elev. ca. 30 ft, 20 May 1996, *Junak SCl-510* (RSA, SBBG). NW end of island, at Pot Tank, three large clumps in gully bottom, elev. ca. 260 ft, 27 September 1996, *Junak SCl-667* (RSA, SBBG).

Currently known from two locations on the island. The taxon is native to southern Russia, but is very similar to (if not conspecific with) *T. chinensis* Lour. of China and shares its weedy tendencies. We would strongly recommend that this taxon be removed from the island.

*TRAGOPOGON PORRIFOLIUS L. (ASTERACEAE). N portion of island, large population of several hundred individuals in disturbed areas near Building #60244, elev. ca. 660 ft, 6 January 1995, *Junak & Stone SCl-245* (SBBG). Central portion of island, locally abundant (more than 100 individuals seen) at SW end of paved area at old airfield, elev. ca. 900 ft, 14 May 1996, *Junak SCl-450* (RSA, SBBG). E side of island, localized colony of ca. 10 individuals along E Shore Road ca. 0.1 mi S of intersection with road to Nots Pier, elev. ca. 325 ft, 4 June 1996, *Junak SCl-624* (SBBG).

Currently known from the N and central portions of San Clemente Island, this weedy taxon is already spreading rapidly and should be eradicated as soon as possible. It is also known from Santa Cruz, San Nicolas, and Santa Catalina islands; it has spread rapidly on San Nicolas (Junak and Vanderwier 1990; G. Smith, pers. comm., 1996).

*TRIFOLIUM HIRTUM All. (FABACEAE). S end of island, along China Point Road ca. 1 mi S of intersection with San Clemente Ridge Road, rare along disturbed roadside, elev. ca. 1100 ft, 29 May 1996, *Junak SCl-548* (SBBG).

This taxon appears to have been introduced to San Clemente Island with road gravel; it has also been found recently on Santa Catalina Island.

*TROPAEOLUM MAJUS L. (TROPAEOLACEAE). Wilson Cove, around buildings at pier, 24 April 1967, *Boutin 1721* (SBBG). Lower Wilson Cove Canyon, just W of the dock activities, elev. ca. 40 ft, 22 May 1991, *Ross 5434* (RSA).

The common "garden nasturtium" of cultivation has been known to establish itself along coastal bluffs in southern California. The second collection cited here represents a small colony naturalized on an eroding embankment, but with no escapes from the general vicinity noted.

*ULMUS PARVIFLORA Jacq. (ULMACEAE). E side of island, escaped seedlings at Wilson Cove, 24 April 1967, *Boutin 1717* (RSA, SBBG).

Known from a single collection on San Clemente Island; first report for the California Channel Islands.

VERBENA BRACTEATA Lag. & Rodr. (VERBENACEAE). Ponds between Tower and Woody, N of Wilson Cove, [ca. 350–400 ft elev.,] 10 August 1980, *Ferguson 107* (×STO), det. Ross 1992. USGS San Clemente Island North Quad., SE of the airport, 29° and 1500 ft NNE of the 408-foot knoll, ca. 400 ft elev., 28 June 1992, *Kellogg s.n.* (RSA), det. Ross 1992. Lemon Tank, locally common on SE-facing slope at W end of dam, elev. ca. 1160 ft, 17 May 1996, *Junak SCl-488* (RSA, SBBG).

Currently known from only two locations on San Clemente Island.

Excluded Taxa

A few taxa mentioned by workers *post*-Raven appear to be erroneous reports and are here excluded. The widely dispersed European weed, *Euphorbia peplus* L., was reported from the island by Wallace (1985, p. 15) based on *Dunkle 7216,* "Pyramid Cove, E [side], lower slope, locally common" (RSA, *ex* LAM). This specimen consists of a 3.5 cm stem tip with one cyathium and one parasitized capsule. Re-examination of this material indicates that it is a "top-snatch" of *Euphorbia misera* Benth. Consequently, *Euphorbia peplus* appears to be undocumented on the island and should be deleted from the flora.

Wallace also included *Phacelia cicutaria* Greene ssp. *hispida* (A.Gray) Thorne in his listing for the island (1985, p. 19), but cited no vouchers. We have not encountered this taxon in our fieldwork on the island, are not aware of any herbarium specimens to document its presence there, and have therefore excluded the report as a clerical error.

Gilia angelensis V.E.Grant was reported for San Clemente by Wallace (1985, pp. 23, 74) on the basis of an unspecified specimen at SBBG. The only possible voucher found at SBBG was *Piehl 62-318,* which was determined as *G. angelensis* by Alva Day in August 1963; this same specimen was redetermined as *G. nevinii* by Alva Day in April 1990. Without further evidence, *G. angelensis* should be excluded.

Navarretia atractyloides (Benth.) Hook. & Arn. was included in the flora by Wallace (1985, p. 24) based on *House & Grumbles s.n.,* August 5–13, 1930, (RSA, *ex* USC). This collection, however, represents robust material of *N. hamata* Greene ssp. *leptantha* (Greene) H.Mason (annotated by A. G. Day 1993). Additional *Navarretia* material was reported (*loc. cit.*) as *N. hamata* var. *hamata.* Examination of the other extant *Navarretia* collections housed at RSA-POM indicates that they are all representative of *N. hamata* ssp. *leptantha.* This taxon, to date, appears to be the only *Navarretia* documented on the island.

A report of *Delphinium parryi* A.Gray, cited by Wallace (1985, p. 25), is based on *Raven 17820* housed at RSA. Examination of that specimen, however, indicates that it was collected on Santa Catalina Island. The species is not otherwise known from San Clemente Island, and is therefore excluded.

Sanicula crassicaulis DC. is mentioned casually in text by Beauchamp (1987*a,* p. 576) in discussing pig-rooting damage at the type locality of *Delphinium kinkiense* ("canyon north of Nanny," now known as Larkspur Canyon). However, *S. arguta* J.M.Coult. & Rose is the only sanicle known to occur on the island and is still reasonably common at the site mentioned above. No specimens of *S. crassicaulis* have been seen by us at the site mentioned, or in herbaria, and the

taxon has not otherwise been reported from the island. Its mention is therefore assumed to be an inadvertent error.

Cneoridium dumosum (Nutt.) Baill., was reported from the island by Roderick (1967) and thence by Munz (1974). This report has been perpetuated most recently in The Jepson Manual (Shevock 1993). However, Thorne (1969) already pointed out that the report was based on misidentified material of *Lycium californicum.* We are aware of no collections that would substantiate the presence of this monotypic genus on San Clemente Island, and once again recommend deletion of the taxon from the flora.

The delicate annual grass *Muhlenbergia microsperma* (DC.) Trin. has been reported for the island by Dunkle (1950), Raven (1963), and Wallace (1985). Reexamination of the *Muhlenbergia* collections from San Clemente Island indicates, however, that all the material collected thus far represents the very similar *Muhlenbergia appressa* C.O.Goodd. This species is apparently restricted to the southern half of San Clemente Island and is disjunct in California to the eastern Mojave Desert, thence SE to southern Arizona and Baja California, Mexico. Hence, reports of *M. microsperma* on the island should be supplanted with *M. appressa.*

Finally, *Polygonum aviculare* L. was included in the island flora by Wallace (1985) citing only "RSA-POM." Examination of RSA-POM holdings in 1992 revealed two collections, *Raven 17343* and *Raven 17996,* which had been identified by Raven as *P. arenastrum* Boreau, but each of which bore a penciled annotation by R. F. Thorne stating simply "probably *P. aviculare* L." According to James C. Hickman (1993), true *P. aviculare* has not been documented in California, the name being generally misapplied to *P. arenastrum.* Here we accept the original determinations for these two collections and delete *P. aviculare* from the known flora of San Clemente Island.

Need for Continued Fieldwork

It is important to note that several of the species listed above (*Allophyllum glutinosum, Brickellia californica, Coreopsis gigantea, Pellaea mucronata, Quercus chrysolepis*) were originally reported by Dunkle in 1950, apparently based on his San Clemente Island fieldwork of 1939, but were excluded from the flora by Raven because voucher specimens could not be located. While Dunkle's work is not error-free, these affirmations of his reports lead us to speculate on some of the other taxa that he cited for the island but for which there appear to be no extant voucher specimens. Among the additional taxa reported by Dunkle, but not yet re-encountered on the island, are *Stellaria nitens, Lupinus albifrons* (also reported by Eastwood 1941), *Salvia mellifera* (also Eastwood 1941), *Platystemon californicus* (also reported by Brandegee 1890), and *Solanum wallacei.* These additional reports may represent taxa that have been extirpated on the island since that time, or they may yet persist on a remote ridgetop or canyon slope awaiting rediscovery.

Several native taxa reported in this paper had apparently never been reported for the island by previous workers (e.g., *Draba cuneifolia, Stylocline gnaphaloides, Verbena bracteata, Nama stenocarpum*). This underscores the fact that the island has not yet been thoroughly explored botanically, and that continued exploration by knowledgeable field botanists should reveal the presence of other rare native taxa. Admittedly, some of these may now be restricted to precipitous slopes or life-threatening canyons on the eastern escarpment, but the *Verbena* and *Nama* provide examples of two vernal pool species that have persisted on a readily accessible clay terrace, but which apparently eluded earlier workers due to their restricted distributions.

Conservation Concerns

The efforts to document the floristic diversity on San Clemente Island will be of little ultimate consequence unless they go hand-in-hand with well-planned and competently executed conservation activities. The documentation of newly introduced aggressive weeds, for example, should be followed with a quick effort toward extirpation before they spread from their points of introduction. Fortunately, the U.S. Navy has shown an interest in weed abatement, and several weed control projects have been undertaken on the island in recent years.

Control of invasive exotics is only one portion of the equation, however. Many of the native taxa on San Clemente Island have been driven to the brink of extinction by decades of relentless activity by feral goats and pigs. Removal of these pernicious herbivores was finally completed in about 1992, and a few species of vascular plants already appear to be recovering. For many other taxa, however, recovery may not be possible unless there is concerted intervention. As an example, the shrub *Crossosoma californicum* Nuttall is endemic to Guadalupe Island, Mexico, San Clemente and Santa Catalina islands, and the Palos Verdes Peninsula on the California mainland (where there are only three or four shrubs known). This plant is still reasonably widespread and common on Santa Catalina Island, but on San Clemente the species is now reduced to a handful of solitary, isolated plants in several remote canyons. The plants appear to be capable of self-pollination, but seed-set also appears to be poor among the individuals (Ross, pers. observ. 1995). In

such a case, it should be worthwhile to give each plant an identification number, root cuttings or germinate seeds from each of these individuals, and the following winter transplant the progeny to the vicinity of the persisting individuals in such a manner as to eventually promote cross-pollination between genetically divergent individuals (presumably increasing the seed-set of the individuals and promoting greater adaptability among the seedlings). Several of the woody species now reduced to dangerously low numbers (such as *Adenostoma fasciculatum, Quercus chrysolepis, Rhamnus pirifolia, Ceanothus megacarpus, Ribes malvaceum, Malosma laurina, Lonicera hispidula* var. *vacillans, Sambucus mexicana vel aff.,* and *Malacothamnus clementinus*) may benefit from this type of replenishment effort. Material used in such a program should originate on San Clemente Island, and under no conditions should it be supplemented or replaced with genetic material imported from the mainland or one of the other islands. This would be critical to maintaining the genetic integrity of the plants long isolated on San Clemente Island.

Floristic Summary for San Clemente Island

Although a complete itemization of the vascular plants on San Clemente Island has not been presented in this paper, we offer figures that we believe most accurately reflect the known flora. These are in line with substantiated reports since Raven's flora, deletions of erroneous reports and synonyms, and taxonomic innovations accepted by the authors. The summary presented in Table 1 should serve to illustrate the continued need for floristic documentation on the island.

Currently, the number of vascular plant taxa known to be endemic to San Clemente Island stands at 15; they are: *Stephanomeria blairii* (*Munzothamnus b.,* Asteraceae), *Dudleya virens* ssp. *virens* (Crassul.), *Astragalus nevinii* (Fab.), *Lotus argophyllus* var. *adsurgens* (Fab.), *L. dendroideus* var. *traskiae, Malacothamnus clementinus* (Malv.), *Camissonia guadalupensis* ssp. *clementina* (Onagr.), *Eriogonum giganteum* var. *formosum* (Polygon.), *Delphinium variegatum* ssp. *kinkiense* (Ranuncul.), *D. variegatum* ssp. *thornei, Galium catalinense* ssp. *acrispum* (Rubi.), *Lithophragma maximum* (Saxifrag.), *Castilleja grisea* (Scrophulari.), *Brodiaea kinkiensis* (Themid.), and *Triteleia clementina* (Themid.). The endemic status of *Dudleya virens* ssp. *virens* was recently clarified by Moran (1995).

Several native taxa are thought to have been extirpated on the island over the last few decades, largely as an effect of feral herbivores, but also as a result of more direct human disturbances. Among them are *Lomatium insulare* (Apiaceae), *Malacothrix incana* (Aster.), *Senecio flaccidus* var. *douglasii* (Aster.), *Batis maritima* (Bat.), *Trifolium fucatum* (Fab.), *Dissanthelium californicum* (Po.), *Dendromecon rigida* ssp. *rhamnoides* (Rhamn.), *Anemopsis californica* (Saurur.), and *Lycium brevipes* var. *hassei* (Solan.). Comprehensive fieldwork will be required to verify the status of these and other taxa that have not been seen or documented in recent decades.

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