

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018-AB56

Endangered and Threatened Wildlife and Plants; Six Plants and Myrtle's Silverspot Butterfly From Coastal Dunes in Northern and Central California Determined To Be Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines endangered status pursuant to the Endangered Species Act of 1973, as amended (Act), for six plants and one butterfly: *Chorizanthe howellii* (Howell's spineflower), *Chorizanthe valida* (Sonoma spineflower), *Erysimum menziesii* (Menzies' wallflower), *Gilia tenuiflora* ssp. *arenaria* (Monterey gilia), *Layia carnosa* (beach layia), *Lupinus tidestromii* (clover lupine), and Myrtle's silverspot butterfly (*Speyeria zerene myrtilae*). These species are restricted to northern and central California within the foredunes and dune scrub communities and associated habitats occupied by coastal scrub or coastal terrace prairie. The six plant taxa are threatened by one or more of the following: Commercial and residential development, competition from alien plants, off-road vehicle use, equestrian use, trampling by hikers and possibly livestock, sand mining, disposal of dredged material, and perhaps stochastic (i.e., random) extinction by virtue of the small isolated nature of the remaining populations. The butterfly is threatened by the following actions: Commercial and residential development, off-road vehicle use, loss of the larval foodplant and adult nectar resources due to replacement of the native plants by alien plants and inappropriate levels of grazing, and perhaps stochastic extinction of the remaining isolated populations. This rule implements the Federal protection and recovery provisions afforded by the Act for plants and butterfly.

EFFECTIVE DATE: June 22, 1992.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Sacramento Field Office, 2800 Cottage Way, room E-1823, Sacramento, California 95825.

FOR FURTHER INFORMATION CONTACT: Mr. Chris Nagano, at the above address (916/978-4866).

SUPPLEMENTARY INFORMATION:**Background**

Chorizanthe howellii, *Chorizanthe valida*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, and *Lupinus tidestromii* are endemic to the coastal dunes of northern and central California. Within these dune systems, the six plants are restricted to the coastal foredunes and coastal dune scrub communities and associated habitats occupied by coastal scrub or coastal terrace prairie. The butterfly is found on coastal dunes, coastal terrace prairie, northern coastal scrub, and associated non-native grassland habitat. The foredunes (also referred to as littoral dunes (Barbour and Johnson 1977) or coastal strand (Cooper 1919, Munz and Keck 1950)) are situated immediately above the lower, non-vegetated portion of the beach or littoral strip.

In the dune systems north of Monterey Bay, sand-stabilizing rhizomatous grasses, *Ammophila arenaria* and *Elymus mollis*, generally dominate the vegetation of the foredunes (Barbour and Johnson 1977). *Ammophila arenaria*, European beachgrass or marram grass, is an alien species that has largely replaced the native *Elymus*-dominated foredune community. According to Sauer (1988), European beachgrass "has become a powerful geomorphic agent (along the California coast) by building fairly continuous wall-like foredunes, which were not previously characteristic of this region." Although the *Elymus*-dominated foredune community exists around Monterey Bay, these foredunes typically consist of low hillocks and mounds that are sparsely populated with generally succulent, tap-rooted, perennial herbs (e.g., *Abronia latifolia*, *Ambrosia chamissonis*, *Calystegia solandella*, *Camissonia* spp., *Carpobrotus aequilaterus*, *C. edulis*, *Fragaria chiloensis*) (Barbour and Johnson 1977). Many plant associations and topographic features, which have been created by the wind, water table, and vegetation, occur behind the foredunes and its associated plant community. The numerous names (e.g., deflation area, stabilized ridge, vernal pool hollow, open dune pioneer community, dune-mat community, *Poa-Lathyrus* phase, scrub zone, dune chaparral, climax dune forest) used by plant ecologists (Cooper 1919, Johnson 1963, Parker 1974, McBride and Stone 1976, Barbour and Johnson 1977, Woodhouse 1982, Renner *et al.* 1986, Pickart 1987) to describe these

"backdune" habitats have complicated the literature. Aside from supplanting the native *Elymus*-dominated community in the foredunes, the stabilization of the dunes by *A. arenaria* has permitted the colonization of formerly active backdune areas with a mixture of native and alien plants (Sauer 1988). The generally stabilized backdune areas occupied by the species proposed herein can be characterized as a soft, woody, dense plant community of short shrubs and subshrubs (<2 meters (m) [6.6 feet (ft)] tall), and herbaceous plants. Often referred to as coastal dune scrub (cf. Holland 1986), several plants (e.g., *Artemisia pycnocephala*, *Baccharis pilularis*, *Ericameria ericoides*, *Lupinus arboreus*, *L. chamissonis*, *Scrophularia californica*) are commonly associated with this community.

Aside from the beachgrass, many other alien plants have invaded these plant communities. Introduced taxa that are now established include sea-rocket (*Cakile* spp.), ice plant or sea-fig (*Carpobrotus* spp.), and several annual grasses and forbs generally restricted to wetland habitats within the dunes (Barbour and Johnson 1977, Sauer 1988). In addition to the beachgrass, which has been used in dune stabilization projects along the Pacific Coast since 1869 (Cooper 1967), bush lupine (*Lupinus arboreus*), a shrub native to the dunes of central and southern California, has been sown into the dune systems north of San Francisco Bay since 1900 (Miller 1987). In some cases, these aliens have outcompeted and largely supplanted the native dune vegetation, including the six plants proposed herein and the foodplants of Myrtle's silverspot butterfly.

Aside from the impact of exotic vegetation, many of the areas harboring populations of the six plants and butterfly are threatened by proposed commercial and residential development. The historical use of some dune systems by the military has resulted in "heavy damage" (Cooper 1967). Off-road vehicle use has damaged the fragile plant communities in these dune systems and remains a significant threat to the six plants and butterfly on both public and private lands. Trampling of the native flora by equestrians, hikers (Brown 1987), and perhaps livestock (Clark and Fellers 1986) threatens the plants. Other factors adversely affecting coastal dunes and the seven species proposed herein include sand mining, disposal of dredged material from adjacent bays and waterways, and perhaps stochastic extinction by virtue

of the small isolated nature of the remaining populations.

Discussion of the Seven Species Proposed Herein for Listing Follows:

Chorizanthe howellii (Howell's spineflower) was first collected by Mathews in 1914 from the sand dunes north of Fort Bragg in Mendocino County. Based on a collection made by John Thomas Howell in 1929, Goodman (1934) described and named the species in Howell's honor in 1934. *Chorizanthe howellii*, a member of the buckwheat family (Polygonaceae), is a shaggy-haired, short (3 to 10 centimeters (cm) (1.2 to 3.9 inches (in))), annual herb with spatula-shaped, 1 to 3 cm (.4 to 1.2 in) long, basal leaves, and spreading to decumbent stems that branch from the base. Flowers, which appear May through July and are white to rose in color, generally range from 3.5 to 4.5 millimeters (mm) (.14 to .18 in) in length (Reveal and Hardham 1989).

Characteristics of the species' flowers, habit, tepals (petal-like sepals) involucre (whorl of bracts subtending the flowers), and involucre teeth and awns separate *Chorizanthe howellii* from other annual species in the genus. Restricted to coastal foredunes and adjacent sandy habitats occupied by coastal prairie, the species is discontinuously distributed within the southern portion of the dunes south of Tenmile River. This dune system, referred to as the "Tenmile River" dunes by Cooper (1967), stretches continuously for about 8 kilometers (km) (5 miles) from the mouth of Tenmile River to Laguna Point, with isolated dunes as far south as Pudding Creek on the north edge of the community of Fort Bragg.

Chorizanthe valida (Sonoma spineflower) was originally collected by Ilya Vosnesensky in 1841 (Reveal and Hardham 1989). Given the ambiguity of his collection label, the collection location is not clear. Watson (1877), who described the species from Vosnesensky's material in 1877, referred to "Russian Colony" as the type locality. Though Reveal and Hardham (1989) listed the type locality as "near Fort Ross" in Sonoma County, Davis and Sherman (1990) speculated that Vosnesensky may have collected the type of specimen from the Point Reyes Peninsula in Marin County.

Chorizanthe valida, a member of the buckwheat family (Polygonaceae), is an erect to spreading, 1 to 3 decimeters (dm) (3.9 to 11.8 in) tall, shaggy-haired, annual herb with 1 to 5 cm (.4 to 2.0 in) long, basal leaves that are typically wider near the tip. Flowers, which appear June through August and are white to lavender to rose in color, are 5

to 6 mm (.20 to .24 in) long (Reveal and Hardham 1989) and occur in dense, ball-shaped, pinkish clusters with green bracts below. As with *C. howellii*, characteristics of the species' flowers, habit, tepals, and involucre, and involucre teeth and awns separate *C. valida* from other taxa. Today the species is restricted to sandy places within coastal prairie near the south end of Abbots Lagoon, which is immediately adjacent to the "Point Reyes" dune system. According to Cooper (1967), this dune system ranges for about 19 km (12 miles) from south of Tomales Point to Point Reyes within Point Reyes National Seashore in Marin County. Thought to be extinct, the plant was rediscovered by a group of amateur botanists in 1980 at Abbots Lagoon (Davis and Sherman 1990). Although the Park Service has enclosed this population within a 360-acre pasture to protect plants from grazing cattle, only about 2,500 plants grew in the enclosure in 1988. The species was more widespread and historically grew south of the Abbots Lagoon population near the old Point Reyes post office (Reveal and Hardham 1989). According to the California Natural Diversity Data Base (CNDDB), however, a putative collection of *C. valida* from Rodeo Lagoon in Marin County actually came from Abbots Lagoon. Additional historical collections of this spineflower were made near Petaluma and Sebastopol in the interior portion of Sonoma County (Reveal and Hardham 1989). Given the extensive urbanization in this area, these localities are considered extinct (Reveal and Hardham 1989).

Erysimum menziesii (Menzies' wallflower) was first collected from the Monterey area by Archibald Menzies during the Vancouver expedition in 1792 to 1794. Hooker (1830), citing Menzies' collection as the type, described the plant as *Hesperis menziesii* in 1830. Though Bentham and Hooker (1862) subsequently placed the species within the genus *Chieranthus*, von Wettstein (1889) appropriately transferred the plant to the genus *Erysimum*. Subsequent taxonomic treatments of North American wallflowers by Rossbach (1940, 1958) and Price (1987) have maintained *E. menziesii* as a distinct species. Although Price recognizes three subspecies of the plant, he has yet to formally describe these new subspecies.

Erysimum menziesii, a member of the mustard family (Brassicaceae), is a low (<3 dm (11.8 in) tall), succulent, rosette-forming, biennial to short-lived perennial herb. Throughout most of its range, the species produces dense clusters of bright yellow flowers in the

winter and early spring (i.e., January to April). However, the populations near Marina in Monterey County flower in early summer (i.e., May to June). The characteristic fleshy, spoon-shaped, rosette leaves of *E. menziesii* and *E. concinnum* are used to distinguish these coastal species from other native wallflowers. The divergent fruits or siliques, and smaller (<10 mm (.4 in)), consistently yellow petals of *E. menziesii* separate the species from *E. concinnum*. *Erysimum menziesii* is discontinuously distributed within the coastal foredune community of four dune systems. The northernmost dune system, referred to as "Humboldt Bay" by Cooper (1967), stretches from the mouth of the Little River to Centerville Beach south of the Eel River in Humboldt County. Within these dunes, the species is restricted to a 19-km (12-mile) stretch between the mouths of the Mad River and Humboldt Bay (i.e., Samoa Peninsula). *Erysimum menziesii* also occurs within the Tenmile River dune system in Mendocino County and the "Monterey Bay" dune system, which according to Cooper (1967), ranges from La Selva (north of the mouth of the Pajaro River) to the City of Monterey in Monterey County. Within the Monterey Bay dune system, the species does not occur north of the mouth of the Salinas River. Several small discontinuous populations occur within this 21-km (13-mile) reach. The southernmost populations of *E. menziesii* exist in the "Monterey Peninsula" dune system, as defined by Cooper (1967). The Monterey Peninsula dunes, which are localized and limited in size, occur in two general areas: Point Pinos to Point Joe and north of Point Cypress. The species occurs in both areas. Putative collections of *E. menziesii* from north of Mendocino in Mendocino County and from north of Lake Talawa in Del Norte County are *E. concinnum* (Price 1987).

Gilia tenuiflora ssp. *arenaria* (Monterey gilia) was first collected by David Douglas in the early 1800's. Bentham (1833) described the plant as a species in 1833, based on Douglas' collection. In 1943, Jepson reduced the gilia to a variety of *G. tenuiflora*, a widespread species restricted to sandy habitats on Santa Rosa Island and within the central coastal portion of California (Jepson 1943). Subsequently, Grant and Grant (1956) elevated the plant to subspecific rank.

Gilia tenuiflora ssp. *arenaria*, a member of the phlox family (Polemoniaceae), is an erect, short (<1.7 dm (6.7 in) tall), rosette-forming, annual herb. The narrow (2 to 4 mm (.08 to .16 in)) petals and narrow purple throat of

the funnel-shaped flower, open inflorescence, short fruits or capsules (3.5 to 5 mm (.14 to .20 in)), and slightly exerted stamens separate ssp. *arenaria* from the other three subspecies of *C. tenuiflora*. The plant is restricted to isolated occurrences within wind-sheltered, sparsely vegetated portions of the Monterey Bay and Monterey Peninsula dune systems in Monterey County. The subspecies typically grows within coastal dune scrub or Flandrian dune habitat (Pavlik *et al.* 1987). The Monterey Peninsula populations range from Point Pinos to Point Joe.

Layia carnosa (beach layia) was originally collected by Thomas Nuttall reportedly from "St. Diego, Upper California" in 1835. Citing his collection as the type, Nuttall (1841) described the species as *Madaroglossa carnosa* in 1841. Two years later, Torrey and Gray (1843) transferred the plant and the other species of *Madaroglossa* into the genus *Layia*. Although Greene (1892) placed *L. carnosa* into the monotypic genus *Blepharipappus*, authors of subsequent floras (Munz 1959, Ferris 1960) concurred with Torrey and Gray.

Layia carnosa, a member of the sunflower family (Asteraceae), is a low (<15 cm (5.9 in)), glandular, succulent, winter annual. Highly branched individuals often spread more than 4 dm (15.7 in) in diameter. The sticky fleshy leaves, short (2 to 4 mm (.08 to .16 in)) white-colored ray flowers, and bristles about the summit of the achene (one-seeded fruit) differentiate *L. carnosa* from other species in California. Historically, *L. carnosa* was restricted to widely scattered, isolated occurrences within the coastal foredunes of eight dune systems. The northernmost occurrences of *L. carnosa* are from the Humboldt Bay dune system in Humboldt County. These populations ranged from near the mouth of the Little River and along the Samoa Peninsula. Exotic vegetation and highway construction reportedly eliminated *L. carnosa* and the rest of the native plant community from the Little River area. *Layia carnosa* occurs in two isolated dune systems not discussed by Cooper (1967): Near the mouth of McNutt Gulch and south of the mouth of the Mattole River in Humboldt County. The species has been collected from near Kehoe Beach and Abbotts Lagoon in the Point Reyes dune system. Though collected from the San Francisco Peninsula in San Francisco County in 1904, the development of Golden Gate Park and growth of San Francisco eliminated this population and dune system (Cooper 1967). Within the Monterey Peninsula dune system, two of the four known occurrences have been

eliminated. Although suitable habitat remains, the southernmost location of *L. carnosa* from near Surf in Santa Barbara County has not been seen since 1929. This site occurs within the "Santa Ynez River" dune system, as defined by Cooper (1967).

Lupinus tidestromii (clover lupine) was first collected from Pacific Grove on the Monterey Peninsula by Ivar Tidestrom in 1893. Greene (1895) described the species based on the Tidestrom collection in 1895. After Eastwood (1986) described a similar lupine (*L. layneae*) from Point Reyes, Munz (1958) recognized these northern California plants as a variety of *L. tidestromii*. The presence of blackish spots on the seeds, longer inflorescence stems (4 to 8 cm (1.57 to 3.15 in)), and shorter hairs on the leaves and stems separate *L. tidestromii* var. *tidestromii* (Monterey Peninsula) from *L. tidestromii* var. *layneae* (Point Reyes Peninsula).

Lupinus tidestromii, a member of the pea family (Fabaceae), is a low (1 to 3 dm (3.94 to 11.81 in)), silky, creeping, sand-binding perennial herb. The species produces whorls of blue to lavender-colored flowers from May to June. The generally prostrate habit, bright yellow roots, small leaflets (1.3 to 2 cm (.51 to .79 in) long), and densely pubescent foliage distinguish *L. tidestromii* from other lupines. Restricted to coastal foredunes, the species is discontinuously distributed in three dune systems. The northernmost locality is an isolated population along the south bank of the Russian River near its mouth in Sonoma County. Further south within the Point Reyes dune system, Clark and Fellers (1986) noted the occurrence of three isolated stands of *L. tidestromii* from Abbotts Lagoon to Point Reyes Test Station. However, based on field work in 1988 (Vignia Norris, local amateur botanist, *in litt.*, May and June 1988), the species likely is more abundant within the Point Reyes dune system. The Monterey Peninsula populations range from Point Pinos to Pebble Beach. A putative collection of *L. tidestromii* from Bodega Head in Sonoma County in 1925 may be misidentified because of the limited dune habitat from this general area and the vegetative condition of the specimen.

Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*) is a member of the brush-foots family (Nymphalidae). Using specimens collected by W.F. Breeze from San Mateo, San Mateo County, California, in July and August of 1919, dos Passos and Grey (1945) described the butterfly in 1945. This subspecies is a medium-sized butterfly with a

wingspan of approximately 55 mm (2.17 in). The upper surfaces of the wings are golden brown with numerous black spots and lines. The undersides are brown, orange-brown, and tan with black lines and distinctive silver and black spots. The basal areas of the wings and body are densely pubescent (hairy). The females lay their eggs in the debris and dried stems of the larval foodplant *Viola* sp. (McCorkle and Hammond 1988). Upon hatching, the caterpillars wander a short distance and spin a silk pad upon which they pass the winter. The larvae are dark-colored with many sharp branching spines on their backs. The caterpillars immediately seek out the foodplant upon termination of their diapause in the spring. This portion of the life history of the butterfly may last about 7 to 10 weeks. The larvae then form their pupa within a chamber of leaves that they have drawn together with silk. Based on studies of a related subspecies, the adults may emerge in about 2 weeks and could live for approximately 3 weeks (McCorkle 1980). Depending upon environmental conditions, the flight period of this single brooded butterfly ranges from late June to early September (Sterling Mattoon, entomologist from Chico, California, *in litt.*, August 4, 1989).

The historical range of Myrtle's silverspot butterfly extends from San Mateo County north to the mouth of the Russian River in Sonoma County (Mattoon, *in litt.*, August 4, 1989). No butterflies have been observed recently at the known population sites near Pacifica and San Mateo in San Mateo County. Four populations are known to inhabit coastal terrace prairie, coastal bluff scrub, and associated non-native grassland habitats in western Marin and southwestern Sonoma Counties. Two populations are located within the Sonoma State Beaches in Sonoma County; near Portuguese Beach and on the peninsula west of Bodega Harbor. No individuals were observed in the vicinity of Bodega Bay in 1991 (Murphy and Launer 1991). A population occurs on coastal dunes in Point Reyes National Seashore in Marin County (Mattoon, *in litt.*, August 4, 1989). A single female specimen was recorded from Valley Ford in Sonoma County, which is approximately 13 km (8 miles) inland from the community of Bodega Bay. This lone butterfly may have been from a local colony or a dispersing individual.

Federal government actions on these six plants began as a result of section 12 of the Endangered Species Act of 1973, which directed the Secretary of the Smithsonian Institution to prepare a

report on those plants considered to be endangered, threatened, or extinct. This report, designated as House Document No. 94-51, was presented to Congress on January 9, 1975. In the report, *Chorizanthe valida* was thought to be possibly extinct, both varieties of *Lupinus tirstromii* (vars. *tirstromii* and *layneae*) were listed as endangered species, and *Chorizanthe howellii* and *Erysimum menziesii* were listed as threatened species. On July 1, 1975, the Service published a notice in the **Federal Register** (40 FR 27823) of its acceptance of the report as a petition within the context of section 4(c)(2) (now section 4(b)(3)(A)) of the Act, and of the Service's intention thereby to review the status of the plant taxa named within. On June 16, 1976, the Service published a proposed rule in the **Federal Register** (41 FR 24523) to determine approximately 1,700 vascular plant species to be endangered species pursuant to section 4 of the Act. The list of 1,700 plant taxa was assembled on the basis of comments and data received by the Smithsonian Institution and the Service in response to House Document No. 94-51 and the July 1, 1975, **Federal Register** publication. *Chorizanthe valida*, and both varieties of *Lupinus tirstromii* were included in the proposed rule, though the Service requested additional information on *C. valida*. General comments received in relation to the 1976 proposal were summarized in an April 26, 1978, **Federal Register** publication (43 FR 17909), which also determined 13 plant species to be endangered or threatened.

The Endangered Species Act Amendments of 1978 required that all proposals over 2 years old be withdrawn. A 1-year grace period was given to proposals over 2 years old. In the December 10, 1979, **Federal Register** (44 FR 70796), the Service published a notice of withdrawal of that portion of the June 16, 1976, proposal, along with four other proposals that had expired. On December 15, 1980, the Service published a revised notice of review of native plants in the **Federal Register** (45 FR 82480); *Chorizanthe valida*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Lupinus tirstromii* var. *layneae*, and *L. tirstromii* var. *tirstromii* were included as category-1 species (species for which the Service has sufficient data in its possession to support a listing proposal as endangered or threatened), while *Chorizanthe howellii* was included as a category-2 species (species for which data in the Service's possession indicate listing is possibly appropriate, but for which additional biological information is

needed to support a proposed rule). On November 28, 1983, the Service published in the **Federal Register** (48 FR 53640) a supplement to the 1980 notice of review. This supplement treated *Chorizanthe valida* and *Lupinus tirstromii* var. *layneae* as category-2 species. *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, and *Lupinus tirstromii* var. *tirstromii* were included in category 1, and *Chorizanthe howellii*, *C. valida*, and *Lupinus tirstromii* var. *layneae* were included in category 2 in the September 27, 1985, revised notice of review for plants (50 FR 39526). Subsequently, precise survey information by Teresa Sholars (Department of Botany, University of California, Berkeley) delineated the threats facing *Chorizanthe howellii* and field work by Clark and Fellers (1986) and other National Park Service researchers provided the necessary information regarding the status of *Chorizanthe valida* and the Point Reyes populations of *L. tirstromii* (i.e., *L. tirstromii* var. *layneae*). In addition, the California Native Plant Society and the Nature Conservancy recently compiled distribution and threat data delineating the status of *Layia carnosa*. As a result, the February 21, 1990, Plant Notice of Review included all six plant species as category 1 candidates. The portion of this rule to list *Chorizanthe howellii*, *C. valida*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, and *Lupinus tirstromii* as endangered is largely based on population data from numerous botanists that have been collated by the CNDDDB, and various reports and studies discussed in this rule (see "References Cited" below).

Section 4(b)(3)(B) of the Endangered Species Act, as amended in 1982, requires the Secretary to make findings on certain pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires that all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. This was the case for *Chorizanthe howellii*, *C. valida*, *Erysimum menziesii*, and the two varieties of *Lupinus tirstromii* because the 1975 Smithsonian report was accepted as a petition. In October 1983, 1984, 1985, 1986, 1987, 1988, 1989 and 1990 the Service found that the petitioned listing of *Chorizanthe howellii*, *C. valida*, *Erysimum menziesii*, *Lupinus tirstromii* var. *layneae*, and *L. tirstromii* var. *tirstromii* was warranted, but that the listing of these species was precluded due to other higher priority listing actions.

On March 20, 1975, Myrtle's silverspot butterfly was listed as one of 42 insects whose status was being reviewed for listing as either endangered or threatened by the Service in the **Federal Register** (40 FR 12691). This insect was included as a category 2 species in the January 6, 1989, **Federal Register** Animal Notice of Review (54 FR 573). Dr. Dennis Murphy of the Center for Conservation Biology, Stanford University, Stanford, California, petitioned the Service to list Myrtle's silverspot butterfly as an endangered species in a letter dated June 28, 1989, that was received on June 29, 1989. The Service made a 90-day finding on October 2, 1990, that the petition contained substantial information indicating that the action requested may be warranted. This finding was announced in the November 1, 1990, **Federal Register** (55 FR 46080). On November 21, 1991, the Service published a revised Animal Notice of Review (56 FR 58804) and included the Myrtle's silverspot butterfly as a category 1 candidate. The portion of this rule to list Myrtle's silverspot butterfly is largely based on scientific and commercial information on the species, various scientific papers and unpublished reports (Hammond 1980, McCorkle 1980, McCorkle and Hammond 1988), and information gathered from several entomologists, including Mr. Sterling Mattoon and Mr. John Steiner.

On March 22, 1991, the Service published a proposed rule in the **Federal Register** (56 FR 12318) to list the six plants and Myrtle's silverspot butterfly as endangered.

Myrtle's silverspot butterfly has a limited distribution (i.e., seven sites) and specific habitat requirements. The subspecies faces threats from commercial and residential development, off-road vehicle use, loss of the larval foodplant and adult nectar resources due to replacement of the native plants by alien plants and inappropriate levels of grazing, and perhaps stochastic extinction of the remaining isolated populations. This species faces an immediate threat from a proposal to construct a golf course on the site of one of the largest remaining populations (Arnold 1990; Marin Coast Associates undated). The project, as proposed, would result in the loss of a significant amount of habitat utilized by Myrtle's silverspot butterfly with a concomitant loss of individuals on the 1254-acre site located north of Dillion Beach in Marin County. With only seven known populations remaining, the loss or reduction in size of this colony, one of the two largest colonies remaining,

would be significant and could be potentially devastating to the subspecies. Because of the immediate threat posed by this project proposal, the Service finds that good cause exists for this rule to take effect immediately upon publication in accordance with 5 U.S.C. 553(d)(3).

Summary of Comments and Recommendations

In the March 22, 1991, proposed rule (56 FR 12318), and associated notifications, all interested parties were requested to submit factual reports or information relevant to a final decision on the listing proposal. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Notice of the proposal and public hearing (see below) were published in the Eureka Times Standard, Ukiah Daily Journal, Fort Bragg Advocate-News, Santa Rosa Press Democrat, Marin Independent Journal, Point Reyes Light, San Francisco Chronicle, San Mateo Times, Santa Cruz Sentinel, Salinas Californian, Monterey Herald, San Luis Obispo Telegram-Tribune, Santa Maria Times, and the Santa Barbara News-Press.

Two parties requested a public hearing. As a result, the Service conducted a hearing on July 10, 1991, at the Marin County Civic Center in San Rafael, California. Testimony was taken from 7 p.m. to 9 p.m. One person presented testimony. On June 21, 1991, the Service published a notice in the *Federal Register* (56 FR 28522) announcing the public hearing and reopening the comment period until July 22, 1991. The comment period was reopened from November 22, 1991, to December 6, 1991 (56 FR 58869) to accept additional information of which the Service had become aware.

During the comment periods, the Service received 13 written and oral testimony comments. The California Department of Fish and Game and the California Department of Parks and Recreation were among the six commenters expressing support for the listing proposal, while three commenters opposed or asked for a delay in the listing proposal. Four commenters were neutral, although some of these individuals provided locality or miscellaneous data on the species. Written comments and oral statements obtained during the public hearing and comment period are combined in the following discussion. Opposing comments and other comments questioning the rule have been organized into specific issues. These

issues and the Service's response to each are summarized as follows:

Issue 1: One commenter felt that the combination of habitat descriptions for all of the proposed species resulted in a vague description of the habitat utilized by Myrtle's silverspot butterfly.

Service Response: The information presented in the "Background" and "Summary of Factors Affecting the Species" in the proposed rule and the final rule, as well as in the supporting material supplied to the commenter provide a comprehensive description of the habitat of the six plants and the butterfly species. However, to insure clarity, the Service has included additional clarification on the habitats utilized by the butterfly in this final rule.

Issue 2: One commenter expressed concern that the population of Myrtle's silverspot butterfly at the site of the proposed golf course in Marin County is found in areas of blufftop grass and scrub at elevations up to 182 m (600 ft) above a rocky cliff-faced shoreline and not in the habitat described in the proposed rule.

Service Response: The proposed rule stated that Myrtle's silverspot butterfly is found in coastal dunes, coastal terrace prairie, and associated habitats. Coastal terrace prairie is composed of dense, tall grassland that is up to 1 m (3.3 ft) tall, dominated by both sod and tussock-forming perennial grasses (Holland 1986). The distribution of this habitat is discontinuous along the coastline from Santa Cruz County north to the Oregon border. Myrtle's silverspot butterfly also was found in coastal bluff scrub and associated non-native grassland at the site of the proposed golf course in western Marin County. Coastal bluff scrub is composed of low continuous or more scattered plant species that are often prostrate and range from 5 to 50 cm (2.5 to 19.7 in) high. Dwarf shrubs, herbaceous perennials, and annual plants are represented. Most growth and flowering occurs in late spring and early summer, but may occur almost year round (Holland 1986). Holland (1986) describes non-native grassland as habitat with dense to sparse cover of annual grasses with flowering culms that are 0.2 to 0.5 m (7.9 to 19.7 in) tall. It is often associated with numerous species of showy-flowering native annual forbs, especially in years of favorable rainfall. This habitat intergrades with coastal prairie along the central coast (Holland 1986). The Service has clarified the habitats utilized by Myrtle's silverspot butterfly in the final rule.

Issue 3: One commenter contended that it was inappropriate to draw

conclusions about the life history of Myrtle's silverspot butterfly using a study of the life history of the threatened Oregon silverspot butterfly (*Speyeria zerene hippolyta*) in the proposed rule.

Service Response: The paper cited in the proposed rule (McCorkle and Hammond 1988) was a comprehensive study of the life history of the threatened Oregon silverspot butterfly. Both this butterfly and Myrtle's silverspot butterfly are coastal subspecies of the same species. The paper also presented some comparative life history data on these two animals. The Service concludes that the use of the study by McCorkle and Hammond (1988) is valid because the biology and ecology of the members of the genus *Speyeria* are very similar and the Oregon silverspot butterfly and Myrtle's silverspot butterfly are closely related to each other.

Issue 4: One commenter felt that the threat of overcollecting of Myrtle's silverspot butterfly was overstated and contended that this was incorrectly used as justification for not designating critical habitat in the proposed rule. Another commenter requested that critical habitat be designated for *Erysimum menziesii*. She noted that the locations of the populations were locally known and relatively accessible.

Service Response: the Service is not aware of any studies on the impact to the subspecies of the removal of individuals of the Myrtle's silverspot butterfly by insect collectors. However, based on investigations of another endangered nymphalid butterfly (Gall 1984), it is likely that the Myrtle's silverspot butterfly could be adversely affected due to its isolated, possibly small populations. The impact of collecting on a butterfly population is not clear, and likely varies from species to species and site-to-site (Thomas 1984). Collecting from small colonies or repeated handling and marking (particularly of females and/or in years of low abundance) could seriously damage the populations through loss of individuals and genetic variability. Collection of females dispersing from a colony also can reduce the probability that new colonies will be founded. Collectors may pose a threat because they may be unable to recognize when they are depleting butterfly colonies below the threshold of recovery, especially when the area is visited for a short period of time or the studies are conducted by poorly trained biologists (Collins and Morris 1985).

Under section 4(a)(3)(A) of the Act, the Secretary must designate critical

habitat to the maximum extent prudent and determinable at the time a species is determined to be endangered or threatened. As discussed under the "Critical Habitat" section below, the Service continues to find that designation of critical habitat is not prudent for Myrtle's silverspot butterfly, *Erysimum menziesii*, as well as the other five species at this time because such designation likely would increase the threat from vandalism, collecting, and other human activities.

Issue 5: Two commenters requested that the Service postpone a final decision regarding the Myrtle's silverspot butterfly until a field study at the proposed golf course in Marin County was completed and reviewed by the Service.

Service Response: The Service reopened the comment period from November 22, 1991, to December 6, 1991, (56 FR 58869) to accept the study of Myrtle's silverspot butterfly from the commenters (Murphy and Launer 1991). The study provides additional data on the ecology of the species, as well as information on the potential impacts of the proposed golf course on this population. The study also presents data on the location of other populations of the butterfly. The Service has carefully reviewed the study (Murphy and Launer 1991) and has incorporated the results into the findings of the final rule.

Issue 6: A commenter felt that insufficient data was available on *Gilia tenuiflora* ssp. *arenaria* to make a determination whether or not listing of this species is warranted. He stated that any decision should be deferred until additional information was obtained on the distribution and ecology.

Service Response: Aside from the previously cited study on *Gilia tenuiflora* ssp. *arenaria* (Pavlik et al. 1987) in the proposed rule, the Service did not receive any comments that provided additional data on its precise location or ecology. Although future surveys may reveal additional small and isolated populations of the species, any newly discovered population sites likely would be imperiled by the same activities affecting other known populations. The Service believes that sufficient information is available on *Gilia tenuiflora* ssp. *arenaria* to warrant making a decision on its status. The Service maintains that the decision in this final rule is based on the best scientific and commercial information available.

Issue 7: One commenter requested that no further action be undertaken with the listing process for *Gilia tenuiflora* ssp. *arenaria* until the Sand City and Marina Dunes Habitat

Conservation Plans are completed and reviewed by the Service and the California Department of Fish and Game.

Service Response: Although *Gilia tenuiflora* ssp. *arenaria* is included in the habitat conservation plans (HCPs) being prepared by the City of Marina and the City of Sand City, neither of these proposed section 10(a) incidental take permit applications have been submitted to the Service for review. Given the declining status of the plant as described in the "Summary of Factors Affecting the Species" section below, and the uncertainty as to the adequacy and approval of the HCPs, the Service concludes that listing of *Gilia tenuiflora* ssp. *arenaria* as an endangered species at this time is necessary to insure its survival and recovery.

Issue 8: One commenter stated that *Chorizanthe howellii*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, and *Lupinus tidestromii* exist at sites that have been or are currently being utilized by off-road vehicles (ORVs). He contended that listing of the plants was a means to deny usage of these areas by ORVs.

Service Response: The proposed rule documented the adverse impact of ORVs on populations of *Chorizanthe howellii*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, and *Lupinus tidestromii* in its discussion of the factors that threaten the species. The Service and other State and Federal agencies would be required to undertake a number of actions when these plants are listed as endangered species. Partial or complete closure of Federal or State lands to restrict certain activities may be required to protect these species. However, the Service will not undertake conservation activities, such as closure of areas to ORVs, where it would not benefit endangered species.

Issue 9: One commenter provided additional information on land use activities on lands owned by the California Department of Parks and Recreation. The population of *Gilia tenuiflora* ssp. *arenaria* at Asilomar State Beach is on a steep bluff face and is inaccessible to the public. Boardwalks at this site have been used to direct visitors away from sensitive dune areas and populations of *Lupinus tidestromii*.

Service Response: The comments have been noted and incorporated into the final rule.

Issue 10: One commenter stated that *Erysimum menziesii* and *Layia carnosa* are being addressed in the management plan for the North and South Spits of Humboldt Bay in Humboldt County.

Service Response: This comment has been noted and incorporated into the final rule.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined *Chorizanthe howellii* Goodman (Howell's spineflower); *Chorizanthe valida* Watson (Sonoma spineflower); *Erysimum menziesii* (Hooker) Wettstein (Menzies' wallflower); *Gilia tenuiflora* Bentham ssp. *arenaria* (Bentham) A. & V. Grant (Monterey gilia); *Layia carnosa* (Nuttall) Torrey & A. Gray (beach layia); *Lupinus tidestromii* Greene (clover lupine); and Myrtle's silverspot butterfly (*Speyeria zerene myrtleae* dos Passos & Grey) should be classified an endangered species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531) et seq. and regulations (50 CFR part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the factors described in section 4(a)(1). These factors and their application to *Chorizanthe howellii* Goodman (Howell's spineflower); *Chorizanthe valida* Watson (Sonoma spineflower); *Erysimum menziesii* (Hooker) Wettstein (Menzies' wallflower); *Gilia tenuiflora* Bentham ssp. *arenaria* (Bentham) A. & V. Grant (Monterey gilia); *Layia carnosa* (Nuttall) Torrey & A. Gray (beach layia); *Lupinus tidestromii* Greene (clover lupine); and Myrtle's silverspot butterfly (*Speyeria zerene myrtleae* dos Passos & Grey) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Their Habitat or Range

All seven species included in this final rule (*Chorizanthe howellii*, *Chorizanthe valida*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, *Lupinus tidestromii* and Myrtle's silverspot butterfly) are restricted to the coastal foredunes, coastal dune scrub communities, and/or adjacent sandy habitats occupied by coastal scrub or coastal prairie of the coastal dunes of northern and central California. The imminent threat facing these species and their associated habitats is the ongoing and threatened destruction and adverse modification of these dune systems by commercial and residential development, off-road vehicle use, trampling by hikers and equestrians, sand mining, and disposal of dredged

material from adjacent bays and waterways.

Chorizanthe howellii is endemic to the Tenmile River dune system, which is immediately north of the community of Fort Bragg (see "Background" section for locality data). All known sites for this species occur within MacKerricher State Park. Because of a lack of any preservation or management strategy for *C. howellii* on park land, the species has been variously affected or is threatened, to some degree, by off-road vehicle use and trampling by hikers and equestrians (CNDDDB, *in litt.*, November 25, 1985).

Chorizanthe valida is restricted to one population within the Point Reyes National Seashore (see "Background" section for locality data). Other historical populations within the national seashore have been lost, while development probably eliminated *C. valida* from the Sebastopol/Petaluma area. Because cattle ranching at Point Reyes is considered part of the cultural heritage of western Marin County, the lone population still occurs within an active cattle ranch (Davis and Sherman 1990). Though the National Park Service has fenced most of the remaining population, the fenced portion remains vulnerable to accidental incursion. The preliminary results of a National Park Service monitoring study suggest that the species is not sought after by cattle for forage. However, the plants within the enclosure grew taller than their counterparts outside the enclosure. Thus, the overall effect of grazing is unknown (Davis and Sherman 1990).

Erysimum menziesii is discontinuously distributed in the coastal foredune community of four dune systems (see "Background" section for locality data). All known populations have been variously affected, to some degree, by commercial and residential development, off-road vehicle use, trampling by hikers and equestrians, sand mining, and/or disposal of dredged material from adjacent bays and waterways. Although three of the four dune systems harboring *E. menziesii* are owned, in part, by the State of California or the Federal government, this public ownership amounts to less than 10 percent of the species' habitat. Moreover, State and Federal lands remain subject to heavy recreational use by off-road vehicle and hang-glider enthusiasts, hikers, and/or equestrians. With the exception of the Lanphere-Christensen Dunes Preserve owned by The Nature Conservancy, the privately owned stands of *E. menziesii*, including the approximately 642 acres of dunes and former dunes on the Samoa Peninsula owned by the City of Eureka,

are typically adjacent to expanding urban centers (e.g., Eureka, Monterey Peninsula) and subject to potential or proposed coastal development (e.g., \$25 million port expansion on the Samoa Peninsula, residential and commercial development within the Marina Dunes in Monterey County). *Erysimum menziesii* and *Layia carnosa* are being addressed in the management plan for the North and South Spits of Humboldt Bay in Humboldt County; however, this comprises only a portion of the ranges of these species.

Gilia tenuiflora ssp. *arenaria* is restricted to isolated sites within coastal dune scrub in two dunes systems in Monterey County (see "Background" section for locality data). The construction of a golf course in 1987 near Spanish Bay on the Monterey Peninsula eliminated a portion of a population of *G. tenuiflora* ssp. *arenaria*. The developer attempted to mitigate for the project via the transplantation of this subspecies, *E. menziesii*, and *L. tidestromii* on an artificial dune. However, the effort "has not been successful" (Vernal Yadon, Pacific Grove Natural History Museum, pers. comm., April 14, 1989). Though a portion of perhaps the largest population of *G. tenuiflora* ssp. *arenaria* occurs on State land (i.e., Salinas River State Beach), the area remains subject to off-road vehicle use, and trampling by hikers and equestrians. The population at Asilomar State Beach is on a steep bluff face and is inaccessible to the public. Commercial and residential development near Marina, Seaside, Sand City, and on the Monterey Peninsula threatens the remaining populations.

Layia carnosa was discontinuously distributed within the coastal foredunes of seven dune systems (see "Background" section for locality data). According to the CNDDDB, the Little River migrated north and eroded away the dune habitat near the river mouth. As a result, the northernmost occurrence of *L. carnosa*, which is part of the Humboldt Bay dune system, has been extirpated. In addition, urbanization destroyed the dunes in San Francisco while the southernmost locality of the species, which is on Vandenberg Air Force Base, has not been seen since 1929. Recreational, commercial, and residential development likely caused the elimination of the northernmost sites of *L. carnosa* on the Monterey Peninsula. Although portions of the six dune systems harboring the species occur on Federal land (i.e., Bureau of Land Management, Point Reyes National Seashore), these populations, which are often associated with *Erysimum*

menziesii (see discussion above), are threatened by off-road vehicle use, trampling by hikers and equestrians, sand mining, disposal of dredged material from adjacent bays and waterways, and/or perhaps trampling by livestock. Except for the population on the Lanphere-Christensen Dunes Preserve, the privately-owned sites and the lands owned by the City of Eureka are subject to future commercial and residential development and many of the threats facing publicly-owned dunes.

Lupinus tidestromii, a coastal foredunes species occasionally associated with *Erysimum menziesii* and *Layia carnosa*, occurs near the mouth of the Russian River and is discontinuously distributed on the Point Reyes and Monterey Peninsulas (see "Background" section for locality data). Golf course construction eliminated two known sites from the Monterey Peninsula. Though *L. tidestromii* occurs, in part, on Federal land (i.e., U.S. Coast Guard, Point Reyes National Seashore), trampling by hikers and perhaps livestock threatens these populations. Boardwalks at Asilomar State Beach have been used to direct visitors away from sensitive areas and populations of this species. The privately-owned sites, which are all from the Monterey Peninsula, are zoned for residential use and are therefore subject to future residential or recreational development.

Myrtle's silverspot butterfly has been extirpated from a significant portion of its range. The last known collections of the butterfly from the San Francisco Peninsula were made in 1919. Reportedly the Pacifica colony was extirpated in the 1950's. Urban development likely eliminated both populations. The species is now only known from coastal dunes and coastal terrace prairie in western Marin and Sonoma Counties. No individuals were observed in the vicinity of Bodega Bay in 1991 (Murphy and Launer 1991). Before this portion of the coast was developed for residential and recreational purposes, it contained a significant colony of the animal. The size of the population at Point Reyes National Seashore has been reduced in comparison to previous years, although the cause is unknown (Mattoon, pers. comm, August 4, 1989). Uncontrolled human foot traffic may pose a threat to the colonies in Sonoma County. This activity could harass, injure, or kill individuals of Myrtle's silverspot butterfly by trampling the early life stages, larval foodplants, or adult nectar sources. Significant portions of the area inhabited by a large colony of the species would be eliminated by a

proposed 1254-acre golf course north of Dillion Beach in Marin County (Marin Coast Associates undated, Harding Lawson Associates 1990, Murphy and Launer 1991).

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Although butterflies are a popular group with insect collectors, capture and permanent removal of individuals generally does not threaten most species (Pyle *et al.* 1981). However, based on studies of another endangered nymphalid butterfly (Gall 1984), overcollecting could place the small isolated populations of the Myrtle's silverspot butterfly at risk. The majority of museum specimens were collected at Point Reyes National Seashore. Overutilization is not presently applicable to the six plants, although unrestricted collecting for scientific or horticultural purposes or excessive visits by individuals interested in seeing rare plants could result from increased publicity, and could seriously impact these plants.

C. Disease or Predation

With the possible exception of *Chorizanthe valida*, no data exist to substantiate whether predation by grazing livestock threatens any of the plants. No data exist on the effects of disease or predation for Myrtle's silverspot butterfly.

D. The Inadequacy of Existing Regulatory Mechanisms

Under the Native Plant Protection Act (Chapter 1.5 § 1990 *et seq.* of the Fish and Game Code) and California Endangered Species Act (Chapter 1.5 § 2050 *et seq.*), the California Fish and Game Commission has listed *Chorizanthe valida*, *Erysimum menziesii*, *Layia carnosa*, and a variety of *Lupinus tidestromii* (var. *tidestromii*) as endangered; and *Chorizanthe howellii* and *Gilia tenuiflora* ssp. *arenaria* as threatened (14 California Code of Regulations § 670.2). Though both statutes prohibit the "take" of State-listed plants (Chapter 1.5 § 1908 and § 2080), State law appears to exempt the taking of such plants via habitat modification or land use change by the landowner. After the California Department of Fish and Game notifies a landowner that a State-listed plant grows on his or her property, State law evidently requires only that the landowner notify the agency "at least 10 days in advance of changing the land use to allow salvage of such plant." (Chapter 1.5 § 1913). Myrtle's silverspot

butterfly is not specifically protected under State or local law.

E. Other Natural or Manmade Factors Affecting Their Continued Existence

The introduction and invasion of California's ecosystems by alien plants has adversely affected native flora, including the six plants and the food plant of the butterfly addressed herein. As discussed in the "Background" section, numerous aliens or exotics (e.g., *Ammophila arenaria*, *Cakile* spp., *Carpobrotus* spp.) have invaded these native plant communities (Barbour and Johnson 1977, Sauer 1988). Moreover, a California native plant, bush lupine (*Lupinus arboreus*) was introduced into the dune systems north of San Francisco Bay (Miller 1967). Often these introduced and alien plants outcompete and largely supplant the native vegetation. For example, European beachgrass and bush lupine dominate much of the dune habitat near Humboldt Bay, while sea-fig carpets extensive portions of the dune habitat north of Fort Bragg and from Marina to Monterey. Absent control and eradication programs, the introduced and alien taxa will continue to invade and eliminate the remaining native plant communities, including the six plants proposed herein and the host plants of Myrtle's silverspot butterfly.

Typically, annuals and other monocarpic plants (individuals that die after flowering and fruiting), including five of the six plants addressed herein, are vulnerable to random fluctuations or variation (stochasticity) in annual weather patterns and other environmental factors (Huenneke *et al.* 1986). Most of the populations of the six plants are isolated from other conspecific populations and consist of a few thousand plants distributed in patches of 1 acre to 100 acres or more. Such populations, including the entire species in the case of *Chorizanthe valida*, are vulnerable to stochastic extinction.

As briefly mentioned above under Factor "A", trampling by livestock may contribute to the endangerment of *Layia carnosa* and *Lupinus tidestromii*. In addition, *Chorizanthe valida* and *Erysimum menziesii* grow in areas grazed by livestock. The effect of trampling needs further study. Myrtle's silverspot butterfly occurs in disjunct populations whose long-term persistence may depend upon intercolony movement. The loss of suitable habitat containing larval food plants and adult nectar sources may make such movement more difficult by increasing the distance the insects must travel to successfully reach other

colonies. Inappropriate levels of grazing by livestock may pose a threat to the extant populations. Intensive grazing could cause the loss of larval foodplants and adult nectar sources. The elimination of grazing and the complete suppression of fires could allow other plants to outcompete the species required by Myrtle's silverspot butterfly. Alien plants, such as iceplant and European beach grass, may eliminate colonies of the animal by outcompeting the larval foodplant and the adult nectar resources. Sufficient densities of *Viola* are especially critical for the long term survival of populations of Myrtle's silverspot butterfly (Mattoon, *in litt.*, August 4, 1989). A summary of the effect of adverse environmental factors on the genus *Speyeria* is summarized in Hammond and McCorkle (1983).

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in determining to issue this final rule. Based on this evaluation, the preferred action is to list *Chorizanthe howellii*, *Chorizanthe valida*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, *Lupinus tidestromii*, and Myrtle's silverspot butterfly as endangered. Although biologists have confirmed only a relatively few extirpations in recent times (Myrtle's silverspot butterfly has been lost from two sites while CNDDB records indicate nine extirpations of known "occurrences" of the six plants), *Chorizanthe howellii*, *Chorizanthe valida*, *Erysimum menziesii*, *Gilia tenuiflora* ssp. *arenaria*, *Layia carnosa*, *Lupinus tidestromii*, and Myrtle's silverspot butterfly have limited historical distributions and likely have been eliminated from all but a small fraction of their historical dune or associated habitats. Today these species generally persist as small, isolated populations or "islands" surrounded by urban areas, roads, trails, agricultural lands, competing alien plants, and other lands made unsuitable for these seven taxa by sand mining, the placement of dredged spoils, or foot traffic. Although many of the remaining populations are owned and managed, at least in part, by local, State, or Federal government agencies, the areas owned by local governments remain subject to development, while the other publicly-owned areas are affected generally by exotic vegetation encroachment and subject to trampling by off-road vehicles, hang-glider enthusiasts, hikers, equestrians, and occasionally livestock. In addition, stochastic events, which commonly adversely affect small

isolated populations, may result in the extirpation of some populations of these species. Because these six plants and butterfly are in danger of extinction throughout all or a significant portion of their ranges, they fit the definition of endangered as defined in the Act.

Critical Habitat

Section 4(a)(3), of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for these species at this time. Because the six plants and Myrtle's silverspot butterfly face numerous anthropogenic threats (see Factor A in "Summary of Factors Affecting the Species"), the publication of precise maps and descriptions of critical habitat in the **Federal Register** would make these species more vulnerable to incidents of vandalism and, therefore, could contribute to the decline of these species. The listing of these species as endangered also publicizes their rarity and, thus, could make them attractive to researchers or collectors of rare plants and butterflies. The proper agencies have been notified of the locations and management needs of these plants. As discussed under "Summary of Factors Affecting the Species," Myrtle's silverspot butterfly and its habitat are vulnerable to several activities, some of which, such as the removal of specimens for scientific or personal collections, could be carried out by an individual or few people. This activity can be difficult to regulate and control because it can be done in a fairly discrete manner. The precise pinpointing of localities that would result from publication of critical habitat descriptions and maps in the **Federal Register** would increase enforcement problems because this species would be more vulnerable to collecting as well as vandalism to its habitat. The National Park Service, which manages the largest known population of the butterfly, is already aware of the insect's presence. Landowners will be notified of the general location and importance of protecting habitat of these species. Protection of these species' habitats will be addressed through the recovery process and the section 7 consultation process. Therefore, the Service finds that designation of critical habitat for the six plants and butterfly is not prudent at this time, because such designation likely would increase the degree of threat from vandalism, collecting, or other human activities.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain activities. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required of Federal agencies and the prohibitions against certain activities involving listed plants are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(2) of the Act requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service.

Federal activities potentially impacting one or more of the six plants and Myrtle's silverspot butterfly likely will involve navigation and port-related activities, recreation-related projects (e.g., off-road vehicle parks), and perhaps grazing practices on Federal land. Populations of four of the six plant species and butterfly occur, at least in part, on Federal land. A 130-acre portion of the dunes on the Samoa Peninsula, which harbors *Erysimum menziesii* and *Layia carnosa*, is managed by the Bureau of Land Management (BLM). The latter species also occurs within the dunes near the mouth of Mattole River on land managed by the BLM. *Chorizanthe valida*, *Layia carnosa*, *Lupinus tidestromii*, and Myrtle's silverspot butterfly are discontinuously distributed within the dunes or in adjacent sandy habitats along the western shore of Point Reyes National Seashore. *Erysimum menziesii* occurs within the dunes near the Point Pinos lighthouse on the Monterey Peninsula on land controlled by the U.S. Coast Guard. A historical site of *Layia carnosa* is

administered by the Department of Defense at Vandenberg Air Force Base. Activities relating to the maintenance of harbors and waterways, and other actions regulated by the U.S. Army Corps of Engineers (Corps) under the River and Harbor Act of 1899 (33 U.S.C. 401 *et seq.*) and section 404 of the Federal Water Pollution Control Act Amendments of 1972 may affect the six plants and butterfly. Such Federal activities, including recreation-related projects and perhaps grazing practices on Federal land, may be subject to section 7 review.

Listing of these six plants and butterfly as endangered will provide for the development of a recovery plan (or plans) for them. Such a plan(s) will bring together both State and Federal efforts for their conservation. The plan(s) will establish a framework for agencies to coordinate activities and cooperate with each other in conservation efforts. The plan(s) will set recovery priorities and estimate costs of various tasks necessary to accomplish them. It also will describe site-specific management actions necessary to achieve conservation and survival of the six plants and butterfly.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 for endangered species set forth a series of general prohibitions and exceptions that apply to all endangered plants. With respect to the six plants proposed herein, all trade prohibitions of section 9(a)(2) of the Act, implemented by 50 CFR 17.61, apply. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export; transport in interstate or foreign commerce in the course of a commercial activity; sell or offer for sale in interstate or foreign commerce; or to remove and reduce to possession these species from areas under Federal jurisdiction; maliciously damage or destroy any listed plant on any area under Federal jurisdiction; or remove, cut, dig up, or damage or destroy listed plants on any other area in knowing violation of any State law or regulation, or in the course of any violation of a State criminal trespass law. Certain exceptions apply to agents of the Service and State conservation agencies.

The Act and implementing regulations found at 50 CFR 17.21 set forth a series of general prohibitions and exceptions that apply to all endangered wildlife. With respect to Myrtle's silverspot butterfly, these prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to

take (including harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect; or attempt any such conduct), import or export, transport in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any listed wildlife species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. Certain exceptions apply to agents of the Service and State conservation agencies.

The Act and 50 CFR 17.62 and 17.63 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered plants under certain circumstances. Permits also may be issued to carry out otherwise prohibited activities involving endangered wildlife species under certain circumstances. Regulations governing permits for endangered wildlife are at 50 CFR 17.22 and 17.23. Such permits are available for scientific purposes, to enhance the propagation or survival of the species, to alleviate economic hardship in certain circumstances, and/or for incidental take in connection with otherwise lawful activities. The Service anticipates few trade permits would ever be sought or issued for any of the six plants or the butterfly. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Office of Management Authority, U.S. Fish and Wildlife Service, room 432, 4401 N. Fairfax Drive, Arlington, Virginia 22203-3507 (703/358-2104).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined by the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination was published in the *Federal Register* on October 25, 1983 (48 FR 49244).

References Cited

- Arnold, R. 1990. Letter to Harding Lawson Associates regarding candidate insect surveys at the Marin Coast Golf Ranch site. 6 pgs. In: Marin Coast Associates. Undated. Marin Coast Golf Ranch. Report to the Marin County Planning Department, San Rafael, California.
- Barbour, M.G., and A.F. Johnson. 1977. Beach and dune. Pages 223-261. In: M.G. Barbour, and J. Major, eds. Terrestrial vegetation of California. John Wiley and Sons, New York.
- Bentham, G. 1833. Bot. Reg. 19: under *pl.* 1622.
- Bentham, G., and W.J. Hooker. 1862. Gen. Pl. 1:68.
- Brown, D.R. 1987. The effect of human trampling on dune-mat vegetation of the Lanphere-Christensen Dunes Preserve. I. Unpubl. prelim. rpt., The Nature Conservancy, Calif. Field Off., San Francisco.
- Clark, R.A., and G.M. Fellers. 1986. Rare plants of Point Reyes National Seashore. Cooperative Natl. Park Resources Studies Unit, Tech. Rpt. No. 22. Univ. Calif., Davis.
- Collins, N.M. and M.G. Morris. 1985. Threatened swallowtail butterflies of the world. The IUCN Red Data Book. Gland, Switzerland. 401 pp.
- Cooper, W.S. 1919. Ecology of the strand vegetation of the Pacific coast of North America. Carnegie Inst. Wash. Yearbook 18:96-99.
- Cooper, W.S. 1967. Coastal dunes of California. Geol. Soc. Amer. Mem. 104:1-125.
- Davis, L., and R.J. Sherman. 1990. The rediscovered Sonoma spineflower at Point Reyes National Seashore. *Fremontia* 18(1):17-18.
- dos Passos, C.F., and L.P. Grey. 1945. A new species and some new subspecies of *Speyeria* (Lepidoptera, Nymphalidae). *Amer. Mus. Nov.* 1297.
- Eastwood, A. 1938. The perennial lupines of California—I. Leaflet. *W. Bot.* 2:86.
- Ferris, R.S. 1960. Illustrated flora of the Pacific states. Vol. IV. Stanford Univ. Press.
- Gall, L.F. 1984. Population structure and recommendations for conservation of the narrowly endemic alpine butterfly, *Boloria acrocneuma* (Lepidoptera: Nymphalidae). *Biol. Cons.* 28:111-138.
- Goodman, G.J. 1934. A revision of the North American species of the genus *Chorizanthe*. *Ann. Mo. Bot. Gard.* 21:1-102.
- Grant, A., and V. Grant. 1956. Genetic and taxonomic studies in *Gilia* VIII: The cobwebby gilias. *Aliso* 3:203-287.
- Greene, E.L. 1892. Studies in the Compositae. *Pittonia* 2:244-248.
- Greene, E.L. 1895. *Novitates occidentales—X. Erythea* 3:17.
- Hammond, P. 1980. Appendix I. Taxonomy of *Speyeria zerene hippolyta*. Pages 84-91. In: D.V. McCorkle. Ecological investigation report: Oregon silverspot butterfly (*Speyeria zerene hippolyta*). U.S. Forest Service, Siuslaw National Forest, Corvallis, Oregon.
- Hammond, P.C., and D.V. McCorkle. 1983. The decline and extinction of *Speyeria* populations resulting from human environmental disturbances (Nymphalidae: Argynninae). *J. Res. Lep.* 22:217-224.
- Harding Lawson Associates. 1990. Preliminary biological assessment and conceptual management plan Marin Golf Ranch, Dillion Beach, California. In: Marin Coast Associates. Undated. Marin Coast Golf Ranch. Report to the Marin County Planning Department, San Rafael, California.
- Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpubl. rpt., Calif. Dept. Fish and Game, Sacramento, Calif.
- Hooker, W.J. 1830. *Fl. Bor. Amer.* 1:60.
- Huenneke, L.F., K. Holsinger, and M.E. Palmer. 1986. Plant population biology and the management of viable plant populations. Pages 169-183. In: B.A. Wilcox, P.E. Brussard, B.G. Marcot, eds. The management of viable populations: Theory, applications, and case studies. Center for Conservation Biology, Stanford University, Stanford, California.
- Jepson, W.L. 1943. A flora of California. Vol. III. Jepson Herbarium and Library, Univ. Calif., Berkeley.
- Johnson, J.W. 1963. Ecological study of dune flora, Humboldt Bay. M.S. thesis, Humboldt State Coll., Arcata, Calif.
- Marin Coast Associates. Undated. Marin Coast Golf Ranch. Report to the Marin County Planning Department, San Rafael, California.
- McBride, J.R., and E.C. Stone. 1976. Plant succession on the sand dunes of the Monterey Peninsula, California. *Amer. Midl. Natur.* 96:118-132.
- McCorkle, D.V. 1980. Ecological investigation report: Oregon silverspot butterfly (*Speyeria zerene hippolyta*). U.S. Forest Service, Siuslaw National Forest, Corvallis, Oregon.
- McCorkle, D.V., and P.C. Hammond. 1988. Biology of *Speyeria zerene hippolyta* (Nymphalidae) in a marine-modified environment. *J. Lep. Soc.* 42(3):184-195.
- Miller, L. 1987. The introduction of yellow bush lupine (*Lupinus arboreus* Sims.) on the North Spit of Humboldt Bay, California. Unpubl. rpt., The Nature Conservancy, Calif. Field Off., San Francisco.
- Munz, P.A. 1958. California miscellany IV. *Aliso* 4:92.
- Munz, P.A. 1959. A California flora. Univ. Calif. Press, Berkeley.
- Munz, P.A., and D.D. Keck. 1950. California plant communities-supplement. *Aliso* 2:199-202.
- Murphy, D.D. and A.E. Launer. 1991. Report on the status of Myrtle's silverspot butterfly, *Speyeria zerene myrtleae*, at the proposed Marin Coast Golf Ranch site and in surrounding areas. Center for Conservation Biology, Stanford University, Stanford, California. 11pp. + 7figs.
- Nuttall, T. 1841. Descriptions of new species and genera of plants in the natural order of the Compositae. *Amer. Phil. Soc. Trans.* II 7:283-453.
- Parker, J. 1974. Coastal dune systems between Mad River and Little River, Humboldt County, California. M.A. thesis, Humboldt State Coll., Arcata, Calif.
- Pavlik, B., A. Zoger, and V. Harris. 1987. Rare plant survey. Pages IV-1-IV-19. In: Thomas Reid Associates and The Planning Collaborative. Draft Marina Dunes Plan Supporting Technical Studies. Unpubl. rpt. prep. for Marina Coastal Zone Planning Task Force.

Pickart, A. 1987. A classification of northern foredune and its relationship to Menzies' wallflower on the North Spit of Humboldt Bay, California. Unpubl. rpt., The Nature Conservancy, Calif. Field Off., San Francisco.

Price, R.A. 1987. Systematics of the *Erysimum capitatum* alliance (Brassicaceae) in North America. Ph.D. dissertation, University of Calif., Berkeley.

Pyle, R.M., M. Bentzien, and P. Opler. 1981. Insect conservation. Ann. Rev. Ent. 26:233-258.

Renner, M.A., K. Berg, K.L. Clark, T. Duebendorfer, and G.A. Newton. 1986. Draft Menzies' wallflower dunes mitigation bank, enhancement plan, monitoring plan, implementation schedule. Unpubl. rpt., County of Humboldt, Dept of Public Works, Eureka, Calif.

Reveal, J.L., and C.B. Hardham. 1989. Revision of annual *Chorizanthe* (Polygonaceae). Phytologia 66:98-198.

Rossbach, G.B. 1940. *Erysimum* in North America. Ph.D. dissertation. Stanford Univ., Stanford, Calif.

Rossbach, G.B. 1958. The genus *Erysimum* in North America north of Mexico—a key to the species and varieties. Madroño 14:261-267.

Saver, J.D. 1968. Plant migration, the dynamics of geographic patterning in seed plant species. Univ. Calif. Press.

Thomas, J.A. 1984. The conservation of butterflies in temperate countries: Past effects and lessons for the future. Pages 333-353. In: R.I. Vane-Wright and P.R. Ackery, eds. The biology of butterflies. Proc. Roy. Ent. Soc. London Num. 11. Academic Press. London, U.K.

Torrey, J., and A. Gray. 1843. Fl. N. Amer. 2:394.

von Wettstein, R. 1889. Die Gattungen *Erysimum* und *Chieranthus*. Österr. Bot. Z. 39:243-247, 281-284, 327-330.

Watson, S. 1877. Descriptions of new species of plants, with revisions of certain genera. Proc. Amer. Acad. Arts 12:271.

Woodhouse, W.W. 1982. Coastal sand dunes of the U.S. Pages 1-44. In: R.R. Lewis, III, ed. Creation and restoration of coastal dune plant communities. Pp. 1-44. CRC Press, Boca Raton, Florida.

Authors

The primary authors of this final rule are Jim A. Bartel and Christopher D. Nagano, Sacramento Field Office, U.S. Fish and Wildlife Service, 2800 Cottage Way, Room E-1823, Sacramento, California 95825 (916/978-4866).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Export, Import, Reporting and recordkeeping requirements, and Transportation.

Regulations Promulgation

PART 17—[AMENDED]

Accordingly, part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, is amended, as set forth below:

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by adding the following, in alphabetical order under "INSECTS", to the List of Endangered and Threatened Wildlife:

§ 17.11 Endangered and threatened wildlife.

* * * * *
(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
INSECTS							
Butterfly, Myrtle's silverspot	<i>Speyeria zerene myrtilae</i>	U.S.A. (CA)	NA	E	472	NA	NA

3. Amend § 17.12(h) by adding the following, in alphabetical order under the families indicated, to the List of Endangered and Threatened Plants:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Asteraceae—Aster family:						
<i>Layia carnosa</i>	Beach layia	U.S.A. (CA)	E	472	NA	NA
Brassicaceae—Mustard family:						
<i>Erysimum menziesii</i>	Menzies' wallflower	U.S.A. (CA)	E	472	NA	NA
Fabaceae—Pea family:						
<i>Lupinus tidestromii</i>	Clover lupine	U.S.A. (CA)	E	472	NA	NA
Polemoniaceae—Phlox family:						
<i>Gilia tenuiflora</i> ssp. <i>arenaria</i>	Monterey gilia	U.S.A. (CA)	E	472	NA	NA
Polygonaceae—Buckwheat family:						
<i>Chorizanthe howellii</i>	Howell's spineflower	U.S.A. (CA)	E	472	NA	NA
<i>Chorizanthe valida</i>	Sonoma spineflower	U.S.A. (CA)	E	472	NA	NA

Dated: June 2, 1992.

Bruce Blanchard,
Acting Director, U.S. Fish and Wildlife
Service.

[FR Doc. 92-14227 Filed 6-19-92; 8:45 am]
BILLING CODE 4310-55-M

DEPARTMENT OF THE INTERIOR

50 CFR Part 17

RIN 1018-AB36

Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for *Wilkesia hobbdi* (Dwarf Iliau), a Hawaiian Plant

AGENCY: Fish and Wildlife Service,
Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service (Service) determines a Hawaiian plant, *Wilkesia hobbdi* (dwarf iliou), to be endangered under the authority of the Endangered Species Act of 1973, as amended (Act). This species is known from three small populations with a total of about 400 individuals. Three additional, unconfirmed observations, which may be of this species, have been reported. The known populations and the unconfirmed sightings are all from the nearly vertical rock outcrops on the Na Pali Coast of western Kauai, Hawaiian Islands. The greatest immediate threats to the survival of this species are browsing and habitat disturbance by feral goats. Goat predation and the concomitant habitat disturbance accelerates erosion of the habitat and facilitates the encroachment of competing species of naturalized plants. This rule implements the protection provided by the Act for this plant.

EFFECTIVE DATE: July 22, 1992.

ADDRESSES: The complete file for this rule is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Pacific Islands Office, 300 Ala Moana Boulevard, room 6307, P.O. Box 50167, Honolulu, Hawaii 96850.

FOR FURTHER INFORMATION CONTACT:
Derral R. Herbst, at the above address
(808/541-2749 or FTS 551-2749; FAX
808/541-2756).

SUPPLEMENTARY INFORMATION:

Background

Wilkesia hobbdi was discovered by Robert W. Hobdy on Polihale Ridge, Kauai, in 1968. He sent a specimen of the plant to the late Dr. Harold St. John, a botanist who was affiliated with the Bishop Museum herbarium. St. John described the plant as a new species and named it in Hobdy's honor (St. John 1971). This population is believed to comprise between 250 and 300 plants (Hawaiian Heritage Program (HHP) 1991a). In 1982, a population of about 100 individuals of the species was discovered on the adjacent Kaaweiki ridge (HHP 1991b). A third population, estimated to be between 10 to 50 individuals, was discovered on a cliff face in Waiahuakua Valley in 1988 (HHP 1991d). Today, only these three populations, estimated to comprise between 360 to 450 individuals, are known. All populations occur on State-owned land, on the island and county of Kauai, Hawaii. Two of the populations are in the Puu Ka Pele Forest Reserve, growing on the north-facing, nearly vertical rock outcrops near the summits of the adjacent Polihale and Kaaweiki ridges. The third population grows on a cliff face in Waiahuakua Valley, on the boundary between the Hono O Na Pali Natural Area Reserve and the Na Pali Coast State Park, approximately ten miles (16 kilometers) northeast of the other two populations. Three additional, unconfirmed observations, which may be of this species, have been reported. The observations were made from a distance with binoculars. The first observation was made by the State botanist during a survey of the Na Pali Coast in 1979, and was in the Nualolo-Aina Valley (HHP 1991e). The population comprised about ten plants (Carolyn Corn, State Botanist, pers. comm., 1990). The plants were not seen during a follow-up survey of the area five years later, and the observer stated that the species may be a good indicator plant for the presence of grazing animals (C. Corn, pers. comm. 1992). The second observation was that of a single plant on a cliff wall in Milolii Valley (HHP 1991c; C. Corn, pers. comm. 1990). The sighting was made during a botanical survey of the Na Pali Coast in 1980, and the plant was not seen during a subsequent survey in 1989 (C. Corn, pers. comm. 1990). The third observation, made on March 6, 1991, was of an estimated 30 to

40 plants seen by binoculars on Haelele Ridge, the ridge south of Polihale Ridge (Joel Lau, HHP, pers. comm., 1991). The known populations and the unconfirmed sightings are all from the nearly vertical rock outcrops on the Na Pali Coast of western Kauai, Hawaiian Islands. There are at least two other species of plants in this area that from a distance superficially resemble *Wilkesia hobbdi*. It is not known how it was determined that the observations were of *W. hobbdi*.

Wilkesia hobbdi, a member of the sunflower family (Asteraceae), is a shrub about 2 feet (60 centimeters (cm)) tall, which branches from the base. The tip of each branch bears a tuft of narrow leaves which are about 1/2 inch (in) (1.3 cm) wide and about 3 to 6 in (7.5 to 15 cm) long. The leaves, which are in whorls, are joined together into a short sheathing section at their bases. The flower heads are in clusters of about 10 to 18 in (25 to 45 cm) long. Each head is cream colored and about 3/4 in (2 cm) in diameter (Carr 1982, 1990; St. John 1971).

The greatest immediate threats to the survival of this species are habitat disturbance and browsing by feral goats. The goats browse on the plant and their activity in the area accelerates erosion and facilitates the encroachment of competing, naturalized plants. Although the low number of individuals and their restricted habitat could be considered a potential threat to the survival of the species, the plant appears to have vigorous reproduction and should survive indefinitely if goats were eliminated from its habitat. A cooperative effort between Federal and State agencies is needed to protect the remaining plants and to provide for the species' recovery.

Federal action on this plant began as a result of section 12 of the Act, which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct in the United States. This report, designated as House Document No. 94-51, was presented to Congress on January 9, 1975. *Wilkesia hobbdi* was listed as "endangered" in that document. On July 1, 1975, the Service published a notice in the Federal Register (40 FR 27823) of its acceptance of the Smithsonian report as a petition within the context of section 4(c)(2) (now section 4(b)(3)) of the Act,