DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2013–0078; 4500030113]

RIN 1018–AY27

Endangered and Threatened Wildlife and Plants; Endangered Status for Vandenberg Monkeyflower

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service, propose to list Vandenberg monkeyflower as an endangered species under the Endangered Species Act. If we finalize this rule as proposed, it would extend the Endangered Species Act's protections

to this plant. The effect of this regulation will be to add Vandenberg monkeyflower to the List of Endangered and Threatened Plants under the Endangered Species Act.

DATES: We will accept all comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES** section below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in **FOR FURTHER INFORMATION CONTACT** by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically*: Go to the Federal eRulemaking Portal: *http://www.regulations.gov* and search for FWS–R8–ES–2013–0078, which is the docket number for this rulemaking. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on "Comment Now!"

(2) *By hard copy*: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R8–ES–2013–0078; Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042–PDM; Arlington, VA 22203.

We request that you send comments only by the methods described above. We

will post all information received on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see the **Information Requested** section below for more information).

FOR FURTHER INFORMATION CONTACT: Stephen P. Henry, Acting Field Supervisor, U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, 2493 Portola Road, Suite B, Ventura, CA 93003; telephone 805–644–1766; facsimile 805–644–3958. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531, et seq.) (Act), if a species is determined to be an endangered or threatened species throughout all or a significant portion of its range, we are required to promptly publish a proposal in the **Federal Register** and make a determination on our proposal within 1 year. Critical habitat shall be designated, to the maximum extent prudent and determinable, for any species determined to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designations and revisions of critical habitat can only be completed by issuing a rule.

This rule consists of a proposed rule to list Vandenberg monkeyflower (previously identified as a candidate for listing by the name *Mimulus fremontii* var. *vandenbergensis*, currently known as *Diplacus vandenbergensis*, and hereafter referred to as Vandenberg monkeyflower, with the exception of the *Description and Taxonomy* section below) as an endangered species. This plant occurs in nine locations exclusively on Burton Mesa, a distinct geographic region in Santa Barbara County, California.

The basis for our action. Under the Act, we can determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

We have determined Vandenberg monkeyflower faces threats under Factors A, D, and E. The greatest threat to Vandenberg monkeyflower is the presence and expansion of invasive, nonnative plants that are abundant on Burton Mesa, particularly occurring within or adjacent to all known occurrences of Vandenberg monkeyflower. Vandenberg monkeyflower habitat includes sandy openings (canopy gaps) within the dominant vegetation. Ground-disturbing activities (including wildfires) create additional open areas that are invaded by nonnative plants, which precludes establishment of Vandenberg monkeyflower. Furthermore, the availability of habitat for Vandenberg monkeyflower and its small overall population size may be affected by a suite of threats

(including stochastic events such as wildfire and a changing climate) acting synergistically on the species. Based on the best available scientific and commercial information, we find that the species has a restricted range, faces ongoing and future threats across its range, and is in danger of extinction throughout all of its range.

We will seek peer review. We are seeking comments from knowledgeable individuals with scientific expertise to review our analysis of the best available science and application of that science and to provide any additional scientific information to improve this proposed rule. Because we will consider all comments and information received during the comment period, our final determination may differ from this proposal.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from the public, other concerned governmental agencies, Native American tribes, the scientific community, industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

(1) The species' biology, range, and population trends, including:

(a) Habitat requirements for establishment, growth, and reproduction;

(b) Genetics and taxonomy;

(c) Historical and current range including distribution patterns;

(d) Historical and current population levels, and current and projected trends; and

(e) Past and ongoing conservation measures for the species, its habitat, or both.

(2) The factors that are the basis for making a listing determination for a species under section 4(a) of the Act (16 U.S.C. 1533(a)), which are:

(a) The present or threatened destruction, modification, or curtailment of its habitat or range;

(b) Overutilization for commercial, recreational, scientific, or educational purposes;

(c) Disease or predation;

(d) The inadequacy of existing regulatory mechanisms; or

(e) Other natural or manmade factors affecting its continued existence.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to Vandenberg monkeyflower and regulations that may be addressing those threats.

(4) Additional information concerning the historical and current status, range, distribution, and population size of Vandenberg monkeyflower, including the locations of any additional occurrences of this species.

(5) Current or planned activities in the areas occupied by Vandenberg monkeyflower and possible impacts of these activities on this species and its habitat.

(6) Information on the projected and reasonably likely impacts of climate change on Vandenberg monkeyflower and its habitat.

(7) Information related to our interpretation and analysis of the best scientific and commercial data and our proposed status determination for the species.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include.

Please note that submissions merely stating support for or opposition to the action under consideration without providing supporting information may not meet the standard of information required by section 4(b)(1)(A) of the Act, which requires that determinations as to whether any species is an endangered or threatened species must be made "solely on the basis of the best scientific and commercial data available."

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments only by the methods described in **ADDRESSES**.

If you submit information via *http://www.regulations.gov*, your entire submission—including any personal identifying information—will be posted on the website. If your submission is made via a hardcopy that includes personal identifying information, you may request at the top of your document that we withhold this information from public review. However, we cannot guarantee that we will be able to do so. We will post all hardcopy submissions on http://www.regulations.gov. Please include sufficient information with your comments to allow us to verify any scientific or commercial information you include.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection at *http://www.regulations.gov*, or by appointment during normal business hours at the U.S. Fish and Wildlife Service, Ventura Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Previous Federal Actions

We first identified Vandenberg monkeyflower as a candidate species in a notice of review published in the **Federal Register** on November 10, 2010 (75 FR 69222). Vandenberg monkeyflower was given a listing priority number of 3, which denotes a subspecies [or variety] facing an imminent threat of high magnitude. Notices of review reconfirming its candidate status were also published in the **Federal Register** on October 26, 2011 (76 FR 66370), and November 21, 2012 (77 FR 69994). Candidate taxa are

plants and animals for which the Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Act, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. We may identify a taxon as a candidate for listing after we conduct an evaluation of its status on our own initiative, or after we make a positive finding on a petition to list a species. No petitions seeking the listing of Vandenberg monkeyflower have been submitted nor have other Federal reviews been conducted for Vandenberg monkeyflower.

On May 10, 2011, we filed a multiyear work plan as part of a proposed settlement agreement with Wild Earth Guardians and others in a consolidated case in the U.S. District Court for the District of Columbia. On September 9, 2011, the court accepted our agreement with plaintiffs in *Endangered Species Act Section 4 Deadline Litig.*, Misc. Action No. 10–377 (EGS), MDL Docket No. 2165 (D. DC) (known as the "MDL case") on a schedule to publish proposed rules or not-warranted findings for the 251 species designated as candidates in 2010 no later than September 30, 2016. We are submitting this proposed rule in compliance with the MDL settlement agreement.

Elsewhere in today's **Federal Register**, we propose to designate critical habitat for Vandenberg monkeyflower under the Act.

Status Assessment for Vandenberg Monkeyflower

Background

It is our intent to discuss below only those topics directly relevant to the listing of Vandenberg monkeyflower as endangered in this section of the proposed rule.

Description and Taxonomy

Vandenberg monkeyflower is a small, annual herbaceous plant that grows from 0.5 to 10 inches (in) (1.2 to 25.4 centimeters (cm)) tall. The stems are glandular and usually green with purplish tinting. Leaves are obovate (narrowly elliptic) and reach 1.2 in (3 cm) in length. Plants produce a single flower or plants are branched producing multiple flowers. The tubular yellow flowers are bilaterally symmetrical, with the distal ends of the petals forming a unique structure that is likened to a face; hence the common name monkeyflower. Seed capsules are ovoid and reach 0.5 in (1.3 cm) in length. The capsule splits open longitudinally from the tip to release approximately 20 to 100 seeds.

Vandenberg monkeyflower was first described as *Mimulus fremontii* (Benth.) A. Gray var. *vandenbergensis* D.M. Thompson (Thompson 2005, p. 134) as a member of the Scrophulariaceae (figwort family). This is the name and family placement we have previously followed. Molecular systematics studies examining members of the Scrophulariaceae, including *Mimulus*, determined that this genus and a few others constituted a separate monophyletic group warranting recognition at the family rank as Phrymaceae (Beardsley and Olmstead 2002, pp. 1193–1101; Olmstead 2002, p. 18).

Placement of *Mimulus* in the family Phrymaceae is recognized by species experts, is used in the recent flora of California (Thompson 2012, pp. 988–998), and will be treated as such in the upcoming volume of the *Flora of North America*.

In 2012, Barker *et al.* (2012) recognized a redefined genus *Diplacus* that includes 46 taxa previously segregated as *Mimulus,* including Vandenberg monkeyflower as *Diplacus vandenbergensis* (D.M. Thompson) Nesom (Barker *et al.* 2012, p. 29). The citation in Barker *et al*. (2012, p. 29) attributes the nomenclatural combination at the species rank to Nesom in Phytoneuron 2012-47: 2, which was published electronically on the same day as Barker *et al*. (2012). The current citation for Vandenberg monkeyflower is at the species rank as *Diplacus vandenbergensis* (D.M. Thompson) G.L. Nesom. This combination is accepted by species and genus experts and will be used in the upcoming treatment in the *Flora of North America.* Accordingly, we will use the correct name (*Diplacus vandenbergensis*) and family attribution (Phrymaceae) throughout this and subsequent documents.

Life History

The life history of Vandenberg monkeyflower has not been thoroughly studied, but certain characteristics appear similar to other small annual herbs. Vandenberg monkeyflower is shallow-rooted (Thompson 2005, p.131; Consortium of California Herbaria (Consortium 2010)) and has seeds that germinate during winter rains, typically between November and February (Thompson 2005, p. 23), which is similar to other small

annual species that grow in sandy openings in chaparral and are adapted to the Mediterranean climate zone of California. For instance, *Lessingia glandulifera* (lessingia) is an annual herb that grows in sandy openings in chaparral, is shallow-rooted, and is commonly associated with Vandenberg monkeyflower (Davis and Mooney 1985, p. 528). Rooting depth is positively related to above-ground size, with annuals having the smallest above-ground size and rooting depth in the soil (Schenk and Jackson 2002, pp. 484–485).

Vandenberg monkeyflower is sensitive to annual levels of rainfall (Thompson 2005, p. 23), and, therefore, germination of resident seed banks may be low or nonexistent in unfavorable years, with little or no visible aboveground expression of the species. Many annual monkeyflower species, including Vandenberg monkeyflower, need early rainfall along with continued rains in late winter or early spring for a substantial number of seeds to germinate, and do not respond well when only later rainfall is available (Thompson 2005, p. 23; Fraga *in litt.* 2012). Vandenberg monkeyflower flowers mostly from late March through June with fruits maturing from late April through July (Thompson 2005, p. 130).

Seed banks develop when a plant produces more viable seeds than germinate in any given year. Seed banks contribute to the long-term persistence of a species by sustaining them through periods when conditions are not conducive to adequately germinate, reproduce, and replenish the seed bank (such as when there is not sufficient rainfall for plants to germinate, grow, and produce enough seeds to maintain the

population at the same size from year to year) (Rees and Long 1992, entire; Adams *et al*. 2005, pp. 432–434; Satterthwaite *et al.* 2007, entire). The annual differences in the numbers and location of aboveground plants indicate the presence of a seed bank.

The reproductive biology of Vandenberg monkeyflower has not been specifically studied; however, it is likely similar to closely related *Diplacus* species that occur in similar habitats. In general, annual species of *Diplacus* are self-compatible (able to be fertilized by its own pollen) but are also visited by a wide array of pollinators, which results in a mixed mating system that utilizes both self-fertilization and cross-fertilization (Sutherland and Vickery 1988, p. 334; Leclerc-Potvin and Ritland 1994, pp. 201–204; Fraga *in litt.* 2012). The large size of the flower relative to the size of the plant suggests that Vandenberg monkeyflower is allocating significant resources into attracting pollinators; therefore, this species is thought to typically breed through outcrossing, and is dependent on pollinators to achieve seed production (Fraga *in litt.* 2012).

Species of *Diplacus* are predominantly bee-pollinated, although the genus also includes species that are pollinated by hummingbirds, hawk moths (Sphingidae), beeflies (Bombyliidae), and other flies (order Diptera) (Wu *et al.* 2008, p. 224). Species of bees that have been observed to visit flowers of Vandenberg monkeyflower include sweat bees (*Dufourea versatilis rubriventris*), miner bees (*Perdita nitens, Caliopsis* [*Nomadopsis*] *fracta* and *C. Nomadopsis trifolii*), mason bees (*Hoplitis product bernardina*), and leaf-cutter bees (*Anthidium collectum, Chelostoma cockerelli, C. minutum, C. phaceliae, Chelostomopsis rubifloris,* and *Ashmeadiella timberlakei timberlakei*) (Krombein *et al.*

1979, pp. 1863–2030; Bugguide 2012; The Xerces Society 2012). Additionally, Inouye (*in litt.* 2012) observed that small solitary bees were the most common pollinators on three other species of small annual monkeyflower species from dry and mesic habitats (*D. androsaceus*, *D. angustatus*, and *D. douglasii*); and Fraga (*in litt* 2012) has observed halictid bees (Halictidae) on other small monkeyflower species.

Seeds of Vandenberg monkeyflower are small and light in weight, dispersing primarily by gravity and also by water and wind over relatively short distances (Thompson 2005, p. 130; Fraga *in litt.* 2012). The small size of the seed makes it likely that short-distance dispersal could also be facilitated by ants, as has been noted for other small-seeded plant taxa (Cain *et al.* 1998, pp. 328–330). Given that the Burton Mesa area is subject to occasional high winds (see discussion in *Climate* section below), long-distance dispersal likely occurs during these wind events. Wind dispersal results in a random dispersal of seeds, some of which fall into suitable habitat and some do not.

Geographic Setting

Vandenberg monkeyflower occurs only at low elevations and close to the coast in a distinct region in western Santa Barbara County known as Burton Mesa (Wilken and Wardlaw 2010, p. 2). Burton Mesa is a physiographic region situated between the Purisima Hills to the north and the Santa Ynez River to the south. The topography of Burton Mesa comprises a low, flat-topped series of hills averaging 400 feet (ft) (133 meters (m)) in elevation (Ferren *et al*. 1984, p. 3; Dibblee 1988). Level upland expanses

from 328 to 394 ft (100 to 120 m) above sea level are dissected by streams that have formed wide valleys with short steep slopes (Davis 1987, p. 318). Underlying this region is the Burton Mesa dune sheet, which extends from Shuman Canyon on Vandenberg Air Force Base (AFB) in the north, roughly southeast along the southern slopes of the Purisima Hills and eastward to a point approximately 22 mi (35 km) from the present shoreline in the Santa Ynez River Valley (Cooper 1967, pp. 89–91; Hunt 1993, pp. 8–9).

Climate

Burton Mesa experiences a Mediterranean climate, with mild, moist winters and moderately warm, rainless summers. The region is strongly influenced by the prevailing westerly transoceanic air currents. Late afternoon and early evening are often characterized by onshore breezes or winds during most of the year, but winds are strongest and persistent in late spring and early summer. A marine layer or fog characterizes this coastal region and is heaviest during late spring and early summer mornings. Frost is also a regular occurrence in winter, especially in low-lying areas (Gevirtz *et al*. 2007, p. 39).

Habitat

Burton Mesa supports a mosaic of several native vegetation types, including maritime chaparral, maritime chaparral mixed with coastal scrub, oak woodland, and small patches of native grasslands (Wilken and Wardlaw 2010, p. 2). The maritime

chaparral on Burton Mesa is referred to as Burton Mesa chaparral (Odion *et al*. 1992, pp. 5–6; Sawyer *et al.* 2009, p. 376), and is dominated by evergreen shrubs and scattered multi-trunked *Quercus agrifolia* (coast live oak) that form open stands to almost impenetrable thickets over large areas of Burton Mesa, with heights reaching up to 13 ft (4 m) (Gevirtz *et al*. 2007, pp. 95–96). The dominant endemic species of Burton Mesa chaparral include *Ceanothus* (*Ceanothus impressus* var. *impressus* (Santa Barbara ceanothus) and *C. cuneatus* var. *fascicularis* (Lompoc ceanothus)) and *Arctostaphylos* (*Arctostaphylos purissima* (Purisima manzanita) and *A. rudis* (shagbark manzanita)), along with the more widespread *Adenostoma fasciculatum* (chamise), *Heteromeles arbutifolia* (toyon), *Cercocarpus betuloides* (birchleaf mountain mahogany), *Salvia mellifera* (black sage), and *Rhamnus californica* (California coffeeberry).

Coast live oak is an important dominant in many places on Burton Mesa, attaining 40 to 70 percent crown cover in older undisturbed patches of habitat. *Ericameria ericoides* (mock heather), with its wind-dispersed seeds, is most often observed at trail edges in dense chaparral, but appears in greater numbers in large open areas and coastal scrub (Gevirtz *et al*. 2007, p. 96). Annual grassland and coastal sage scrub characterized by mock heather, *Artemisia californica* (California sagebrush), and *Baccharis pilularis* (coyote brush) occur on formerly cleared sites and on xeric (dry) slopes. Some poorly drained upland sites in the central and western portions of Burton Mesa form seasonal wetlands characterized by native perennial grasses such as *Elymus glaucus* (blue wildrye) and vernal pool species including *Eryngium armatum* (coastal button-celery) (Davis *et al*. 1988, p. 172). The vegetation transitions to coastal sage scrub habitat as it nears the

ocean and into other terrestrial habitats east of Purisima Canyon on the eastern side of La Purisima Mission State Historic Park (SHP) (Gevirtz *et al.* 2005, p. 86). The edaphic (soil) variable with the greatest effect on vegetation composition is the depth of soil overlying the bedrock or subsoil pan (Davis *et al.* 1988, p. 188). Soils on Burton Mesa become very shallow toward the north and west, and chaparral shrubs decrease in height and density with decreasing soil depth (Odion *et al.* 1992, p. 6).

Vandenberg monkeyflower does not grow beneath the canopy of shrubs or oaks, but rather in the sandy openings (canopy gaps) that occur in-between shrubs. Sandy openings have been noted for their high abundance and diversity of annual and perennial herbaceous species, compared to those found in the understory of the shrub canopy (Hickson 1987, Davis *et al.* 1989; Keeley *et al.* 1981; Horton and Kraebel 1955). Vandenberg monkeyflower is currently known to occur within sandy openings at nine extant locations; one additional location is potentially extirpated (see *Distribution of Vandenberg Monkeyflower* below). Because portions of Burton Mesa are inaccessible and difficult to survey, Vandenberg monkeyflower has the potential to occur in areas where it has not yet been observed within sandy openings. However, not all sandy openings within the shrub canopy appear to be currently suitable for Vandenberg monkeyflower because some of the sandy openings consist of sands that structurally seem more consolidated and currently do not support this species (Rutherford *in litt.* 2012). To date, all of the extant occurrences of Vandenberg monkeyflower are within sandy openings where the structure of the sands appears loose (Rutherford *in litt.* 2012).

The amount of Vandenberg monkeyflower suitable habitat currently available has changed over time. Prior to 1938, approximately 23,550 ac (9,350 ha) of maritime chaparral was present on Burton Mesa (Hickson 1987, p. 34). For the purposes of this analysis, we determined in 2012 that approximately 10,057 ac (4,070 ha) of maritime chaparral habitat remain on Burton Mesa, which represents a loss of 53 percent of the original upland habitat (Figure 1; Service 2012a, unpublished data). We then estimated the amount of Burton Mesa considered as sandy openings where Vandenberg monkeyflower could potentially occur. Based on inspection of color imagery (National Agriculture Imagery Program (NAIP) 2009) of areas within Burton Mesa where this species occurs, we used the range of image pixel values among 20 point locations to define bare ground while all other pixel values defined vegetated areas. We calculated the total area encompassed by bare ground and vegetation by multiplying the number of bare ground and vegetated pixels by 1 square meter (the ground resolution of a pixel in the NAIP data). Roads, buried pipeline rights-of-way, and building footprints were removed to estimate the percent of Burton Mesa that currently comprise sandy openings.

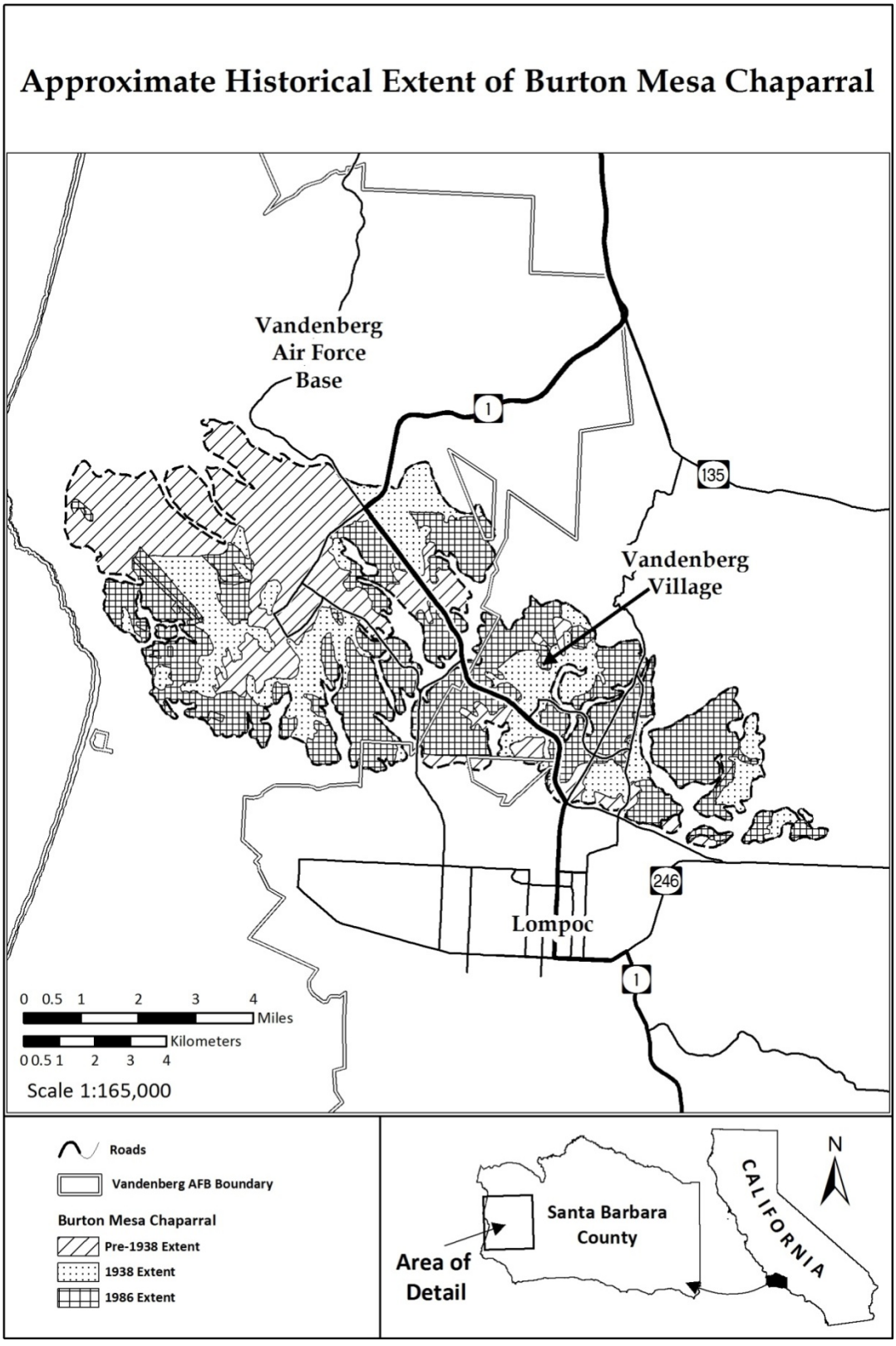


FIGURE 1. Approximate historical extent of Burton Mesa chaparral.

Results indicate up to approximately 20 percent of the total area of remaining Burton Mesa chaparral comprises sandy openings, which is a high estimate because this may include areas of bare ground that are not sandy openings suitable for Vandenberg monkeyflower, such as walking trails (Service 2012b, unpublished data). The percentage would likely change over time depending on whether chaparral stands continue to age and increase in canopy cover, or are burned to temporarily increase the amount of sandy openings. Additionally, the location of sandy openings on Burton Mesa would likely shift over time because individual shrubs continue to mature and increase in cover or die, creating temporary gaps in the shrub canopy.

The structure of Burton Mesa chaparral comprises a mosaic of vegetation patches interspersed with sandy openings that varies from place to place. Within a given substrate, the chaparral composition is a reflection of stand age or shrub canopy cover, disturbance history (whether the area was cleared in the past or nonnative species were planted), history of wildfire, and distance from the coast (Davis *et al.* 1988, p. 188; Gevirtz *et al.* 2007, p. 97). Although the sandy openings that Vandenberg monkeyflower occupies are only a small percent of the total amount of Burton Mesa chaparral habitat, because the sandy openings and vegetation form a mosaic vegetation community that structurally may vary over time, it is impossible to separate out the sandy openings from the rest of the Burton Mesa chaparral vegetation. Therefore, for the purposes of this rule, we consider suitable Vandenberg monkeyflower habitat to consist of Burton Mesa chaparral, which would include the sandy openings and the dominant vegetation that characterize this vegetation community.

Other low-growing native annual species that often co-occur with Vandenberg monkeyflower in sandy openings include: *Mucronea californica* (California spineflower); *Castillleja exserta* (purple owl's clover); *Logfia filaginoides* (California filago); *Lessingia glandulifera* (lessingia); *Layia glandulosa* (white tidy tips); *Chaenactis glabriuscula* (pincushion); and *Plantago erecta* (plantain). Frequently co-occurring herbaceous native perennial species include *Horkelia cuneata* (horkelia) and *Croton californicus* (croton) (Meyer *in litt.* 2010a). Nonnative annual and perennial species are also known to occur in Vandenberg monkeyflower habitat. Nonnative annual species include (but are not limited to) *Bromus diandrus* (ripgut brome) and *Hypochaeris glabra* (smooth cat's-ear) (Meyer *in litt.* 2010a). Nonnative perennial species include: *Ehrharta calycina* (South African perennial veldt grass (veldt grass)), *Carpobrotus edulis* (iceplant), *Brassica tournefortii* (Sahara mustard), and *Cortaderia* jubata (pampas grass).

Land Ownership

The western portion of Burton Mesa is Federal land within Vandenberg AFB (Davis *et al.* 1988, p. 170). Vandenberg AFB contains approximately 99,000 acres (ac) (40,064 hectares (ha)); approximately 8,114 ac (3,284 ha) is maritime chaparral mixed with coastal sage scrub, veldt grass, pampas grass, herbs, and coast live oak on Burton Mesa within Base boundaries (Air Force 2011c, Appendix A-Figure 5-3; Lum *in litt.* 2012d). Vandenberg AFB is managed by the U.S. Air Force.

To the east of Vandenberg AFB, the State of California received 5,078 ac (2,055 ha) from Union Oil Company in 1990 as part of a settlement of two antitrust lawsuits (Gevirtz *et al.* 2007, p. 2). The land acquired by the State formed the Burton Mesa Ecological Reserve (Reserve) and encompasses most of the maritime chaparral that occurs to the east of Vandenberg AFB (Odion *et al.* 1992, p. 6). The western boundary of the Reserve abuts the eastern boundary of Vandenberg AFB and is delineated by a 100-ft (30-m) wide fuel break (a gap in vegetation designed to act as a barrier to slow progress of a potential wildfire). Additional lands have since been added to the Reserve since 1990, bringing its total acreage to 5,186 ac (2,099 ha) (Gevirtz *et al.* 2007, p. 3). The Reserve contains five management units (Vandenberg, Santa Lucia, Purisima Hills, Encina, and La Purisima) and is situated on the eastern Burton Mesa and foothills of the Purisima Hills (Gevirtz *et al*. 2007, p. 7). The Reserve is managed by the California Department of Fish and Wildlife (CDFW). CDFW was formerly California Department of Fish and Game (CDFG), and because historic documents prior to 2013 use this old name, the abbreviations CDFG and CDFW will both be used interchangeably for references cited throughout the remainder of this document.

Residential communities such as Vandenberg Village, Clubhouse Estates, Mesa Oaks, and Mission Hills fragment (divide into small noncontiguous pieces) the Reserve and other non-Federal lands on Burton Mesa. The southern portion of the mesa and beyond the southern boundary of the Reserve comprises agricultural lands as well as land owned by the Department of Justice (which houses the U.S. Bureau of Prisons Federal Penitentiary Complex at Lompoc (Lompoc Penitentiary)). The jagged northern perimeter

of Burton Mesa is adjacent to an active oil field operated by Plains Exploration and Production Company (PXP).

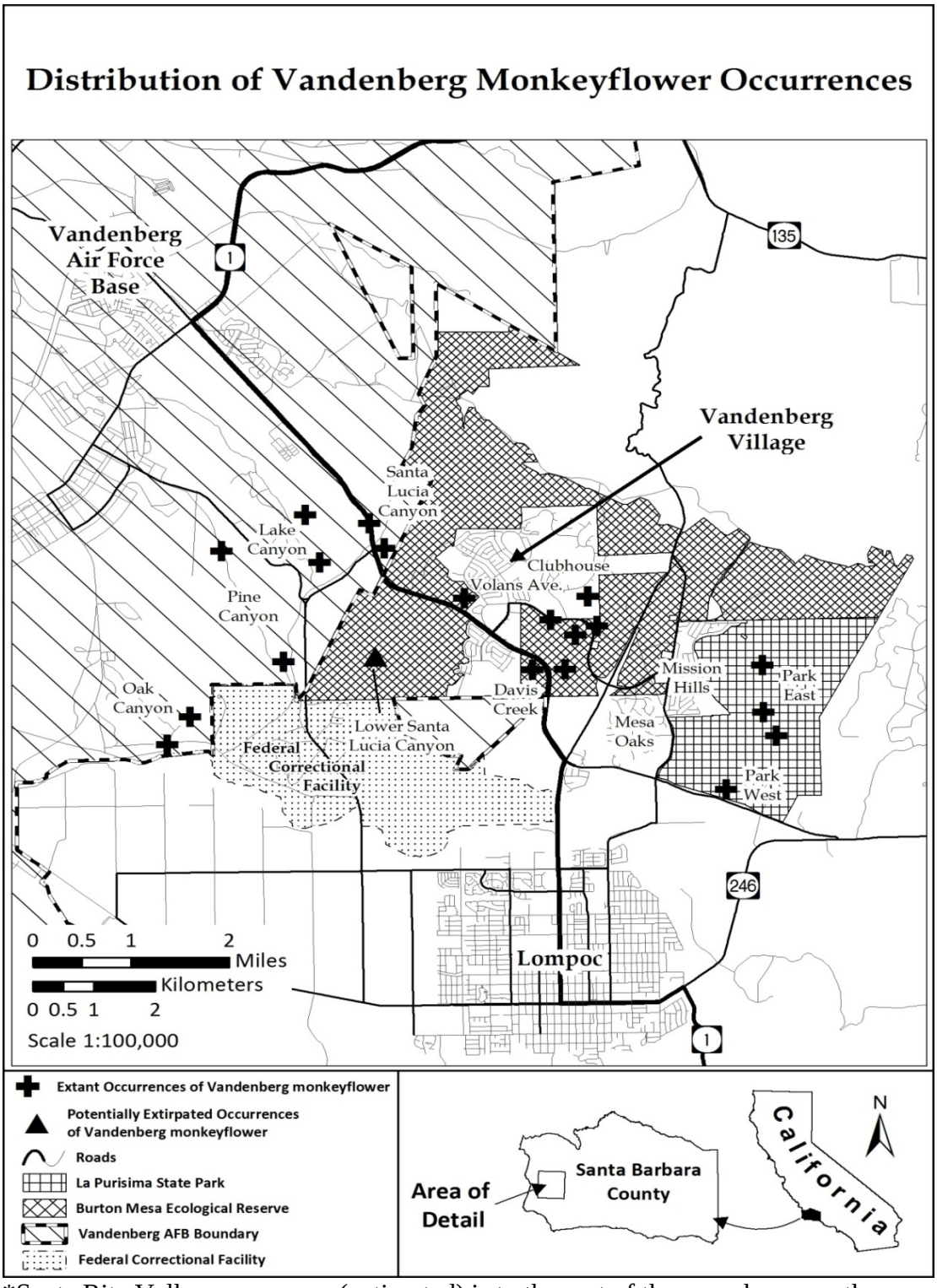
To the east of the Reserve, La Purisima Mission State Historic Park (SHP) contains 980 ac (397 ha) (California State Parks 1991, p. 9) and is separated from the Reserve by the residential communities of Mesa Oaks and Mission Hills. La Purisima Mission SHP also abuts the southern boundary of the La Purisima Management Unit of the Reserve. California State Parks manages La Purisima Mission SHP.

Distribution of Vandenberg Monkeyflower

For the purposes of this rule, we define the following terms to refer to individuals of Vandenberg monkeyflower and where they occur. We use the term "occurrence" (consistent with the definition for "element occurrence" used by the California Natural Diversity Data Base (CNDDB)) to be a grouping of plants (individuals) within 0.25 mi (0.4 km) proximity (CNDDB 2010). There may be one or more discrete groupings of plants (individuals) within a single occurrence. We use the term "location" to refer only to a particular site, area, or region, as in "at that location," with no relation to an assemblage of plants (e.g., polygon, occurrence, population).

We generally describe the area on Burton Mesa where Vandenberg monkeyflower currently occurs as a crescent-shaped area approximately 7 mi (10.7 km) long by 2 mi (3.0 km) wide. All extant individuals of Vandenberg monkeyflower are located within

this area (Consortium) 2010), almost exclusively occurring on thin layers of aeolian- (wind-) deposited sands between approximately 100 and 400 ft (30 to 122 m) in elevation (Wilken and Wardlaw 2010, p. 2). We based the description of suitable habitat on viewing U.S. Geological Survey maps and Google Earth©, and looking at how the occurrences of Vandenberg monkeyflower were spread across the landscape. We did not analyze biological factors such as vegetation or soil type when describing this general area where the species occurs. A discussion of where Vandenberg monkeyflower has been historically observed and where it is currently known to occur follows below. Additionally, Figure 2 includes the known distribution of Vandenberg monkeyflower across its range based on the most recent survey data; Table 1 lists the names of the occurrences, land ownership, and status of each known and historical occurrence.



*Santa Rita Valley occurrence (extirpated) is to the east of the area shown on the map.

FIGURE 2. Distribution of Vandenberg monkeyflower occurrences.

Historical Locations

We are aware of historical herbarium collections of Vandenberg monkeyflower from two locations; one of these (Santa Rita Valley) no longer supports habitat for this species (Consortium 2010), and we consider it to be extirpated. The second collection was made from Lower Pine Canyon; although plants have not been relocated at lower Pine Canyon, we consider this collection to be a part of the Pine Canyon occurrence, which is extant. In addition to these two collections, an historical occurrence of Vandenberg monkeyflower was observed, but not collected, from Lower Santa Lucia Canyon; we consider it to be potentially extirpated. Additional detail on the occurrence of Vandenberg monkeyflower at these three historical locations is provided below.

The first historical collection of Vandenberg monkeyflower was made in 1931 from the Santa Ynez Valley approximately 5 mi (8 km) west of Buellton along State Highway 246 and east of La Purisima (Consortium 2010; Santa Barbara Botanic Garden (SBBG) 2005). This site was surveyed multiple times in 2006 (Wilken and Wardlaw 2010, Appendix 2); however, no Vandenberg monkeyflower were seen. At some point prior to 1931, seed from Burton Mesa may have blown downwind to this location, but it appears that Vandenberg monkeyflower has been extirpated at this location because no suitable habitat remains due to agricultural conversion (including vineyards and berries (Elvin 2009, pers. obs.) and heavily grazed pastureland (Wilken and Wardlaw 2010, Appendix 2). Therefore, we consider the occurrence of Vandenberg monkeyflower to be extirpated from this location.

The second historical collection of Vandenberg monkeyflower was made in 1960 near lower Pine Canyon (part of the existing Pine Canyon occurrence) on the eastern edge of Vandenberg AFB (Jepson Herbarium 2006; Rancho Santa Ana Botanic Garden 2006). Vandenberg monkeyflower had not been documented since it was collected there in 1960; however, it was observed in 2010 and 2012 up-canyon from this historical location (Lum *in litt.* 2012a, Rutherford *in litt.* 2012) where suitable habitat remains. (See further discussion of Pine Canyon in *Current Locations* section below). The description of the location of this historical occurrence is not precise enough to determine that the location is distinct from, and not part of, the location where an extant occurrence was observed in 2010 and 2012 in upper Pine Canyon (See *Occurrences Located on Vandenberg AFB* section below). Therefore, we consider the historical occurrence of Vandenberg monkeyflower to be part of the extant Pine Canyon occurrence.

The third historical location of Vandenberg monkeyflower was observed, but not collected, in 1985 in the southwestern portion of the Vandenberg Management Unit on the Reserve (Hickson *in litt.* 2007). Although no collection was made, we have a high confidence in the accuracy of the observation (known as the Lower Santa Lucia Canyon occurrence; Figure 2) because it was made during the course of a vegetation study for a master's thesis (Hickson *in litt.* 2007). The location had not been searched for the species between 1985 and 2011; in 2012 (a low rainfall year), CDFW staff (Meyer) conducted a cursory survey and was unable to relocate the species (Meyer *in litt.* 2012c). Because it has been approximately 30 years (albeit with little survey effort between 1985 and 2011)

since it was last observed, and suitable habitat remains but is overcrowded with invasive, nonnative plants (see *Factor A—Invasive, Nonnative Plants*), we consider the occurrence of Vandenberg monkeyflower at this historical location to be potentially extirpated.

Current Status of Vandenberg Monkeyflower

Because we do not have a wealth of survey data over multiple years to analyze a trend in the long-term persistence of Vandenberg monkeyflower, we consider it most appropriate to use suitable habitat trends as a surrogate for the species' trend. Thus, an increase or decrease in the amount of suitable habitat likely results in a respective increase or decrease in the Vandenberg monkeyflower population.

Surveys for Vandenberg monkeyflower have occurred across this species' range on Burton Mesa during recent years, although the level of effort and precision of the surveys varied between the different biologists who conducted surveys. In 2006, the first year that a concerted effort was made to survey most of the known locations, approximately 2,700 individuals were observed during surveys throughout the known range of the species (Ballard 2006; Wilken and Wardlaw 2010, pp. 2–3, Appendices 1, 2). In 2010, the Air Force observed approximately 5,200 individuals during surveys conducted on 376 ac (152 ha) within Vandenberg AFB (Air Force 2012).

In other years, individuals and agencies (including Air Force, CDFW, and our biologists) have conducted opportunistic surveys of specific sites where this species

occurs, but rangewide surveys have not been conducted since 2006. Ballard (*in litt.* 2009) searched for Vandenberg monkeyflower in areas between extant occurrences and on the periphery of the plant's known distribution but found no plants. Additionally, the species has not been observed in some areas with sandy openings that appear to be suitable habitat (Ballard *in litt.* 2009). These areas: (1) Appear slightly degraded, even though many species commonly associated with Vandenberg monkeyflower were often abundant; (2) contain small pockets of sandy openings, but the sands did not appear to contain a loose enough structure to support Vandenberg monkeyflower; or (3) harbor a dominant amount of invasive, nonnative plants within sandy openings. The ability for Vandenberg monkeyflower to grow in sandy openings may depend upon the stand age and disturbance history of the location, as well as edaphic factors (Davis *et al.* 1988, p. 188), along with the amount of rainfall, size of the seed bank, and competition with invasive, nonnative plants.

The following sections provide a description of nine specific locations (which contain all extant occurrences identified in Figure 2) where Vandenberg monkeyflower is known to occur, hereby referred to as nine occurrences. All known occurrences are on the following lands: Vandenberg AFB (four occurrences), Burton Mesa Ecological Reserve (three occurrences), and La Purisima Mission SHP (two occurrences) (See Figure 2; Table 1).

Table 1. Vandenberg monkeyflower locations, land ownership, and current status.

Vandenberg Monkeyflower Locations	Land Ownership	Current Status

Current Locations		
1. Oak Canyon	Vandenberg AFB	Extant
2. Pine Canyon (includes historical location in lower Pine Canyon)	Vandenberg AFB	Extant
3. Lake Canyon	Vandenberg AFB	Extant
4. Santa Lucia Canyon	Vandenberg AFB	Extant
5. Volans Avenue	Burton Mesa Ecological Reserve	Extant
6. Clubhouse Estates	Burton Mesa Ecological Reserve and Private lands	Extant
7. Davis Creek	Burton Mesa Ecological Reserve	Extant
8. La Purisima West	La Purisima Mission State Historic Park	Extant
9. La Purisima East	La Purisima Mission State Historic Park	Extant
Historical Locations		
Santa Rita Valley	Private lands	Extirpated
Lower Santa Lucia Canyon	Burton Mesa Ecological Reserve	Potentially Extirpated

Occurrences Located on Vandenberg AFB

There are four locations on Vandenberg AFB that are known to support occurrences of Vandenberg monkeyflower. We refer to these four locations as the Oak, Pine, Lake, and Santa Lucia Canyons occurrences.

(1) *Oak Canyon*. Vandenberg monkeyflower was reported as common in the late 1980s or early 1990s (Odion *in litt.* 2006) at the mouth of Oak Canyon on the eastern

edge of the Base. Four individuals were found in 2006 (Ventura Fish and Wildlife Herbarium (VFWO) 2013). Although no plants were found in 2010 or 2012 (Air Force 2012, p. 1; Lum *in litt.* 2012b; Rutherford *in litt.* 2012), as discussed above in the *Background—Life History* section, we consider the species to be extant at this location because it has only been 7 years since individuals were last seen, and it is likely that a residual seed bank is still present.

(2) *Pine Canyon*. Approximately 365 individuals were present in multiple scattered occurrences in upper Pine Canyon in 2010 (Lum *in litt.* 2012b), and approximately 100 individuals were observed in 2012 (Rutherford *in litt.* 2012).

(3) *Lake Canyon*. This occurrence contains the greatest number of individuals throughout this species' range and accounts for most of the individuals on Vandenberg AFB. Approximately 1,500 individuals were observed in 2006 and 1,000 individuals in 2007 (Elvin *in litt.* 2009; VFWO 2013). The most recent surveys in Lake Canyon occurred in 2010 and documented approximately 4,817 individuals (Lum *in litt.* 2012b), although these surveys likely included a larger portion of the canyon than surveys conducted in 2006 and 2007. Even though surveys have not occurred at this location since 2010, plants were also observed at several sites in Lake Canyon in 2012. Therefore, we consider the species to be extant at this location (Rutherford *in litt.* 2012). A seed bank is likely present.

(4) *Santa Lucia Canyon*. This canyon is located on the eastern edge of

Vandenberg AFB at the junction of Santa Lucia and Lakes Canyons and abuts the Reserve that lies to the east. Approximately 25 individuals were observed in 2006 (Ballard 2006), and 1 individual was observed in 2010 (Lum *in litt*. 2012b). Although surveys have not occurred at this location since 2010, we consider the species to be extant at this location because it has only been 3 years since the species was last seen, and it is likely that a residual seed bank is still present.

Occurrences Located on Burton Mesa Ecological Reserve

Vandenberg monkeyflower occurs or partially occurs (i.e., part of the occurrence is on the Reserve and part of the occurrence is off the Reserve) at three locations within the Reserve. We refer to these locations as the Volans Avenue, Clubhouse Estates, and Davis Creek occurrences.

(5) *Volans Avenue*. Individuals of Vandenberg monkeyflower have been observed in the Santa Lucia Management Unit of the Reserve immediately west of Volans Avenue, between a portion of Vandenberg Village and California State Highway 1. The Santa Lucia Management Unit abuts the eastern boundary of Vandenberg AFB. Five plants were observed in 2003, and one plant was observed in 2007 (Meyer *in litt*. 2007). In the other years between 2004 and 2006, and in 2009, no plants were found (Meyer *in litt*. 2007; Ballard *in litt.* 2007; Meyer *in litt*. 2009a). Although no surveys have occurred since 2009, we consider the species to be extant at this location because it has only been 6 years since individuals were last seen, and it is likely that a residual seed

bank is still present.

(6) *Clubhouse Estates*. Vandenberg monkeyflower occurs east of Vandenberg Village on both the privately owned Clubhouse Estates residential development project site, which has ongoing but differing levels of development since 2006, and an adjacent portion of the Encina Management Unit of the Reserve. Prior to 2006, most of the plants occurred on private property at the Clubhouse Estates project site (Scientific Applications International Corporation (SAIC) 2005b, Figure 4.3-2). Approximately 100–285 individuals were observed in 2006 (Wilken and Wardlaw 2010, Appendices 1, 2), and approximately 350–400 individuals were observed in 2009 (McGowan *in litt.* 2009). Although no surveys have occurred since 2009, we consider the species to be extant at this location because it has only been 4 years since individuals were last seen, and it is likely that both plants and a residual seed bank are present.

(7) *Davis Creek*. Vandenberg monkeyflower is located along the western border of the Encina Management Unit of the Reserve and a right-of-way (ROW) for California State Highway 1 managed by the California Department of Transportation. Davis Creek is east of Vandenberg Village and less than 1 mi (1.6 km) south of the Vandenberg monkeyflower individuals at Clubhouse Estates.

The Davis Creek occurrence comprises four locations where Vandenberg monkeyflower has been observed. At "west of Highway 1," researchers reported 3 individuals in 2006 (Ballard 2006), approximately 100 in 2009 (Rutherford and Ballard

in litt. 2009), and 60 in 2010 (Meyer *in litt.* 2010a). At "north of Burton Mesa Boulevard," four individuals were observed in 2006 (Ballard 2006), and seven individuals were observed in 2010 (Meyer *in litt.* 2010a). Subsequently, 180 individuals were observed in 2010 at a third location east of the Vandenberg Village Community Services District Pump Station and between Highway 1 and Burton Mesa Boulevard (Meyer *in litt.* 2010a). Similarly, approximately 500 individuals were observed in 2010 at a fourth location northwest of the location where 180 individuals were observed in 2010, and to the west of the 7 individuals observed in 2010 that were located north of the Burton Mesa Boulevard. Individuals were also observed at several of these locations in 2012 and 2013. We consider the species to be extant at this location because individuals have been seen as recently as 2013 (Meyer *in litt*. 2013).

Occurrences Located on La Purisima Mission SHP

Vandenberg monkeyflower occurs at two separate locations within La Purisima Mission SHP. We refer to these locations of Vandenberg monkeyflower as the La Purisima West and La Purisima East occurrences.

(8) *La Purisima West*. Vandenberg monkeyflower that occur on the west side of the park are located in a discrete location. Approximately 300 individuals were observed in 2006 (Ballard 2006), and approximately 1,500 individuals were observed in 2009 (Rutherford and Ballard *in litt*. 2009). Subsequently, individuals were observed here in 2010 and 2011 but not counted (Rutherford *in litt*. 2012). Although no observations have

occurred since 2011, we consider the species to be extant at this location because it has been only 2 years since individuals were last observed (although not counted), and it is likely that both plants and a residual seed bank are present.

(9) *La Purisima East*. Vandenberg monkeyflower that occur on the east side of the park are made up of hundreds of scattered individuals. Approximately 850 individuals were observed in 2006 (Ballard 2006) and approximately 400 individuals were observed in 2009 (Rutherford and Ballard *in litt*. 2009). Although no surveys have occurred since 2009, we consider the species to be extant at this location because it has been only 4 years since individuals were last seen, and it is likely that both plants and a residual seed bank are present.

Summary—Distribution and Status of Vandenberg Monkeyflower

In summary, we identified one extirpated location where Vandenberg monkeyflower no longer exists, one location that is considered potentially extirpated, and nine locations where Vandenberg monkeyflower is currently considered extant on Burton Mesa. Most of these extant locations contain multiple scattered individuals, and thus we refer to these areas as nine occurrences, as defined above. We generally characterized the size of Vandenberg monkeyflower occurrences based on multiple observations over a period of years. Two of the nine occurrences (22 percent; Lake Canyon and La Purisima West) each contained over 1,000 individuals in multiple years and are the two largest known occurrences of this species. These largest occurrences include a high of

approximately 1,500 individuals at Lake Canyon in 2006 (Elvin *in litt.* 2009; VFWO 2013) and 1,500 individuals at La Purisima West in 2009 (Rutherford and Ballard *in litt.* 2009). Four occurrences (44 percent; Pine Canyon, Clubhouse Estates, Davis Creek, and La Purisima East) each contained hundreds of plants ranging between 100 and 850 individuals in multiple years. Finally, three occurrences (33 percent; Oak Canyon, Santa Lucia Canyon, and Volans Avenue) are the smallest, with a range of no individuals observed in most years surveyed (Volans Avenue) to a high of 25 individuals observed in 2006 (Santa Lucia Canyon). Although trend data are not available, these data indicate that the aboveground expression of Vandenberg monkeyflower for 7 of the 9 occurrences (78 percent) harbor 850 or fewer individuals.

Because we have only one rangewide survey for this species, and because based on our current data and the likelihood that Vandenberg monkeyflower forms a seed bank and expresses variable numbers of aboveground individuals from year to year (see *Background—Life History* section above), we are unable to determine a trend in the Vandenberg monkeyflower population. Therefore, we will use trends in the amount of suitable habitat as a surrogate for the species' trend.

Summary of Factors Affecting the Species

Section 4 of the Act (16 U.S.C. 1533), and its implementing regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, we

may list a species based on any of the following five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence. Listing actions may be warranted based on any of the above threat factors, singly or in combination. Each of these factors is discussed below.

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

Factor A threats to Vandenberg monkeyflower habitat include development (military, State lands, and residential), utility maintenance and miscellaneous activities, invasive, nonnative plants, anthropogenic (influenced by human-caused activity) fire, recreation, and climate change. These impact categories overlap or act in concert with each other to adversely affect Vandenberg monkeyflower habitat.

Development—Military

Development of Vandenberg AFB military facilities within the last century directly removed approximately 6,104 ac (2,470 ha) of Burton Mesa chaparral habitat. Approximately 40 percent of the chaparral that historically occurred on Vandenberg AFB remains, mostly south and east of the primary developed area on Vandenberg AFB

(Odion *et al.* 1992, p. 12). West of the developed area has been impacted by numerous trails, roads, and other ground disturbances. Much of the chaparral habitat that once existed to the north of the primary developed area was cultivated or type-converted (disturbance resulting in a new dominant plant community) to rangeland prior to military use. Areas that historically consisted of chaparral vegetation have regenerated to nonnative grassland, usually with shrubs, and are no longer considered suitable habitat for Vandenberg monkeyflower. This nonnative grassland is dominated by veldt grass and several species of nonnative annual grasses including *Bromus* spp. (bromes), *Avena* spp. (oatgrass), and *Vulpia* spp. (silvergrass) (Odion *et al.* 1992, p. 11).

The Air Force maintains multiple launch facilities at Vandenberg AFB to accomplish their mission (Air Force 2011c, p. 7). There are no launch facilities in suitable habitat for Vandenberg monkeyflower, and the Air Force is not likely to construct new launch facilities within suitable habitat because potential construction would likely occur near the coastline and away from more inland, human-populated areas (Air Force 2009a, p. 16). Additionally, the siting of future facilities is expected to capitalize on existing infrastructure; therefore, disturbance in undeveloped areas would be minimized (Air Force 2009a, p. 32).

Development—State Lands

Prior to the State Lands Commission acquisition of the Reserve lands in 1990, four land uses were identified in the Reserve area, including agricultural operations,

military operations, extractive industries, and urban development (Gevirtz *et al.* 2007, p. 54). The Reserve encompasses 5,186 ac (2,099 ha) and there has been no threat from new development. However, local governmental agencies and public utility companies maintain existing utilities and easements throughout the Reserve (see *Factor A—Utility Maintenance and Miscellaneous Activities* below).

La Purisima Mission SHP has operated as a State Park since 1937 (California State Parks 1991, p. 107). The current park boundaries encompass a total of 1,900 ac (769 ha). The park unit consists of the historical area, natural area with riding and hiking trails, agriculture, and the maintenance/service and residential area. The total amount of native vegetation is approximately 1,770 ac (716 ha) (Service 2013, unpublished data). There is no current or future threat of habitat destruction from development at La Purisima Mission SHP because the park was established to preserve cultural and natural features of the area.

Development—Private Lands

Three residential communities exist on Burton Mesa east of Vandenberg AFB's boundary including Vandenberg Village, Mission Hills, and Mesa Oaks. These communities harbor associated infrastructure (including major roads such as California State Highway 1, Harris Grade Road, Rucker Road, and Burton Mesa Boulevard), all of which fragment the Burton Mesa chaparral. Vandenberg Village and associated golf course comprise approximately 720 ac (291 ha). Thus, at least 2,000 ac (809 ha) of

Burton Mesa chaparral habitat were removed as a result of past development of these three residential communities and their associated infrastructure.

Presented below are three currently approved or proposed projects on private lands that harbor suitable Vandenberg monkeyflower habitat. Data are not available on the specific acreage of sandy openings expected to be lost as a result of these projects, but data are provided on the loss of Burton Mesa chaparral and the number of individuals of Vandenberg monkeyflower observed at, or adjacent to, these project sites.

(1) Clubhouse Estates is a private development located east of Vandenberg Village (LFR, Inc. 2006, p. 1). Santa Barbara County approved the Clubhouse Estates housing development in August 2005 (County of Santa Barbara Planning Commission 2005, p. 4). Approximately 33 ac (13 ha) were proposed to be developed into residential lots; the remaining 120 ac (49 ha) was proposed as open space (LFR, Inc. 2006, p. 1). Most of the Vandenberg monkeyflower individuals known to occur at this location were inside or within 10 ft (3 m) of the approved development footprint that was graded (SAIC 2005b, Figure 4.3-2). Additionally, the ground disturbance increased the extent of invasive, nonnative species at this location, particularly Sahara mustard and veldt grass (Meyer *in litt.* 2010b).

(2) The Burton Ranch Specific Plan site (Burton Ranch) is located south of the Encina Management Unit of the Reserve. The project was approved in 2006 (City of Lompoc 2012) and totals 149 ac (60 ha). Approximately 83 ac (34 ha) of Vandenberg

monkeyflower suitable habitat would be removed (SAIC 2005a, p. 175). Vandenberg monkeyflower has not been observed at this site, although the habitat contains many species commonly associated with Vandenberg monkeyflower (SAIC 2005a, p. 174), and veldt grass is present within the project site. Ground disturbance expected as a result of this approved project would remove native vegetation and may create open areas where veldt grass could invade (see *Factor A—Invasive Nonnnative Species* below*)*.

A 100-ft (30-m) buffer at the northern boundary of the project site and 8 ac (3 ha) of onsite open space were proposed as part of the Burton Ranch project (SAIC 2005a). Preserving chaparral may reduce the potential of nonnative plants to invade the intact Burton Mesa chaparral in the Reserve directly to the north of this project site. Additionally, the project proponent completed a conservation agreement with the Land Trust for Santa Barbara County (Land Trust) to mitigate for the removal of native vegetation (Feeney *in litt*. 2012). The conservation area is known as the Burton Ranch Chaparral Preserve and encompasses 95 ac (38 ha) of Burton Mesa chaparral near Vandenberg Village.

(3) Allan Hancock College proposed to develop a public safety complex adjacent to their existing facilities and south of the Davis Creek corridor (Allan Hancock College 2009, p. 28). The project site would remove approximately 59 ac (16 ha) of Burton Mesa chaparral (Allan Hancock College 2009, pp. 134–135). Vandenberg monkeyflower has not been observed within this project site, although a few individuals were observed in 2009 within the chaparral vegetation (Allan Hancock College 2009, p. 113). Therefore,

ground disturbance would remove suitable Burton Mesa chaparral and may create open areas for veldt grass to invade. As part of this project, Allan Hancock College proposed to preserve approximately 65 ac (26 ha) of Burton Mesa chaparral near the Davis Creek drainage that is contiguous with the northern portion of the project site (Allan Hancock College 2009, pp. 9, 135). Preserving chaparral in this area may reduce the potential of nonnative plants to invade the intact Burton Mesa chaparral in the Reserve to the north of this project site.

In summary, the majority of development on Vandenberg AFB and the residential communities of Vandenberg Village, Mission Hills, and Mesa Oaks, and the existing infrastructure at La Purisima Mission SHP have existed for decades. Most of Burton Mesa is either State or Federal land on which future development is unlikely; therefore, most of the remaining habitat for Vandenberg monkeyflower would not be directly impacted by future development. However, three recent private developments on the periphery of the State or Federal land either have resulted in or will result in the direct loss of Burton Mesa chaparral. Development within or adjacent to suitable chaparral habitat increases the likelihood of introducing invasive, nonnative species to spread, which is the most significant threat to Vandenberg monkeyflower (see *Factor A—Invasive, Nonnative Plants*). Available conservation measures to minimize the threat of development are discussed below, see *Factor A—Conservation Measures Undertaken*.

Utility and Pipeline Maintenance

Utility and pipeline structures occur within the Reserve on Burton Mesa. These existing facilities or structures at times require maintenance to ensure proper operation. As a result, vehicles and foot traffic could occur at or adjacent to these structures and potentially result in trampling of habitat and other soil surface disturbance, which in turn could result in ground disturbance that removes Burton Mesa chaparral and creates open areas in the vegetation that act as pathways for nonnative plants to expand or invade.

Plains Exploration and Production Company (PXP) owns an oil processing plant surrounded by the La Purisima Management Unit of the Reserve (see *Land Ownership* section above), and requires access to their operation across Reserve lands north of the La Purisima and Santa Lucia Management Units. Eighteen separate easements and 5 connector easements are used to maintain, repair, replace, and install roads and access power lines, utility lines, and pipelines (Gevirtz *et al.* 2007, p. 12). These easements are generally 50 ft (15 m) wide and vary in length. Additionally, PXP operates a triplet pipeline that is located within the 100-ft- (30-m-) wide fuel break between the Vandenberg AFB boundary and the western edge of the Reserve. Plains Exploration & Production routinely conducts maintenance of this pipeline that includes excavating trenches alongside the pipeline to perform the necessary inspections and repairs. The Oak Canyon occurrence of Vandenberg monkeyflower on Vandenberg AFB is partially located within the pipeline's footprint. No monkeyflower individuals have been observed in Oak Canyon recently, and veldt grass has filled almost every opening in the scrub in Oak Canyon (Rutherford *in litt.* 2012) (see *Factor A—Invasive, Nonnative Species*). The Santa Lucia Canyon occurrence is adjacent to, but not within the pipeline corridor.

Actions within PXP's pipeline footprint may result in ground disturbances that create openings for nonnative plants to invade and outcompete native vegetation. However, there is no indication that maintenance of PXP's pipeline in this area has affected Vandenberg monkeyflower or its habitat.

The Reserve contains a limited number of existing structures, most of which are remnants of previous land uses. Local land use agencies and public works agencies retain utilities and pipelines, and easements for access; routine maintenance of the utilities is conducted as needed. The Vandenberg Village Community Services District (VVCSD) has several structures (including water tanks, a water processing plant, wells, and water lines and sewer lines) located within the Reserve (Gevirtz *et al.* 2007, p. 63). The occurrence of Vandenberg monkeyflower at Volans Avenue is adjacent to a sewer line easement held by the VVCSD. A portion of the Vandenberg monkeyflower occurrence located at Davis Creek is within a water line easement, also held by the VVCSD. There is no indication that maintenance of VVCSD infrastructure has affected Vandenberg monkeyflower or its habitat at either of these locations.

The VVCSD filed a request with the State Lands Commission in May 2010 to acquire 27 ac (11 ha) of land within the Reserve east of their existing water tanks for the construction of a replacement water well (VVCSD 2010). The 27-ac (11-ha) site is within the Burton Mesa Ecological Reserve and is currently leased to the CDFW. Approximately 180 Vandenberg monkeyflower individuals (see the Davis Creek occurrence discussion under the *Occurrences Located on Burton Mesa Ecological*

Reserve section above) were observed in 2010 within the 27-ac (11-ha) parcel of land where the VVCSD proposes to construct wells in the future. Therefore, if development occurs at this parcel, habitat associated with approximately 25 percent of the known individuals of Vandenberg monkeyflower that were observed in 2010 within the Davis Creek occurrence could be impacted (Meyer *in litt.* 2010a) (see *Factor E—Utility and Pipeline Maintenance* section below). Additionally, removing vegetation would create open space for nonnative plants to invade this area.

In summary, there is no indication that ongoing maintenance activities of existing pipelines and utilities have directly impacted Vandenberg monkeyflower habitat. However, utility maintenance actions could result in ground disturbance that removes Burton Mesa chaparral, creating open areas in the vegetation that act as pathways for nonnative plants to invade.

Invasive, Nonnative Species

Invasive, nonnative plants occur throughout Burton Mesa and represent the greatest threat to the remaining individuals of, and suitable habitat for, Vandenberg monkeyflower. Invasive, nonnative plants occur across Vandenberg monkeyflower's range, including within and adjacent to occupied habitat at all nine extant locations, as well as at the potentially extirpated location (Lower Santa Lucia Canyon). The presence of invasive, nonnative plants can alter all components of an ecosystem, from directly altering habitat and displacing individuals (the latter of which is described under Factor

E), to negatively affecting the abundance and diversity of small mammals and insects that disperse seeds or pollinate the native vegetation.

Disturbance is one of the primary factors that promote invasion of nonnative species (Rejmanek 1996; D'Antonio and Vitousek 1992; Hobbs and Huenneke 1992; Brooks *et al.* 2004; Keeley *et al.* 2005). Broad disturbances such as urban development, and disturbances along corridors, such as roadsides and trails, provide opportunities for nonnative plants to invade and gain a foothold in Burton Mesa (Keil and Holland 1998, p. 23). The primary fragmenting (disturbance) event can be the construction of a road, with or without associated housing development; later the habitat remnants are subdivided by additional development, or trails and smaller disturbances that occur within the habitat remnants (Soule *et al.* 1992, p. 43). It is well known that roadside edges tend to be highly invaded habitats (Gelbard and Belnap 2003, p. 422). Paved roads tend to have larger verges and more adjacent invasive plants present than unpaved roads because of the ongoing maintenance and improvements of paved roads (Gelbard and Belnap 2003, pp. 422–430). Additionally, wheeled vehicles effectively disperse seed and seed-bearing plant parts along travel routes and trails, helping to spread invasive, nonnative plants (Gelbard and Belnap 2003; Gevirtz *et al.* 2005, p. 225). Several native mammals also disperse seeds of nonnative plants (D'Antonio 1990, pp. 697–698), including deer (*Odocoileus* spp.) and rabbits (*Sylvilagus* spp.), which effectively disperse the seeds in feces (Odion *et al.* 1992, pp. 1, 27). Furthermore, the prevailing onshore winds contribute to the rapid spread of nonnative plants across Burton Mesa.

The expansion of nonnative plants represents a substantial problem as it displaces native vegetation on Burton Mesa. Keil and Holland (1998, p. 27) documented 220 nonnative plant species on Vandenberg AFB, the majority of which are native to the Mediterranean region and a smaller number native to Eurasia, South America, Australia, South Africa, or other regions. A total of 124 nonnative plant species were observed on the Reserve, 17 of which are recognized as high concern because of their severe ecological impacts on native ecosystems (Gevirtz *et al.* 2007, p. 181). Ferren *et al.* (1984, p. 75) documented 90 species of nonnative plants in La Purisima Mission SHP, comprising approximately 25 percent of the total flora at the park. The list of species observed by Ferren *et al.* (1984) is not comprehensive but includes nearly all species occurring on unplowed uplands of Burton Mesa where Vandenberg monkeyflower habitat occurs (Hickson 1987, p. 21).

Several invasive plant species that are present within Vandenberg monkeyflower habitat and of particular concern with regard to altering habitat of Vandenberg monkeyflower on Burton Mesa include veldt grass, pampas grass, bromes, Sahara mustard, *Centaurea solstitialis* (star thistle), iceplant, *Carduus pycnocephalus* (Italian thistle), and *Cirsium vulgare* (bull thistle). The first five of these species have a ranking of "A" by the California Invasive Plants Council (Cal-IPC), denoting the highest level of impact on native habitats; iceplant, Italian thistle, and bull thistle have a ranking of "B", denoting a moderate level of impact on native habitats (Cal-IPC 2012).

The following paragraphs include a brief discussion of four prolific invasive,

nonnative plants (veldt grass, iceplant, Sahara mustard, and pampas grass) that are having the greatest impact to Vandenberg monkeyflower occupied and suitable habitat across its range. We describe general biological impacts these four invasive plants have on native vegetation, including known impacts to Burton Mesa chaparral, and thus, suitable habitat for Vandenberg monkeyflower. We then discuss the specific presence and known impacts of these invasive plants on Burton Mesa chaparral at each of the nine extant Vandenberg monkeyflower locations and one potentially extirpated location. We describe the biological impacts using the best available information, which includes personal observations of many scientists who are local experts concerning Burton Mesa or Vandenberg monkeyflower and its habitat. Available conservation measures to minimize the threat of invasive, nonnative plants are discussed below under *Factor A—Conservation Measures Undertaken*.

(1) *Veldt Grass*. Veldt grass may be the most pervasive of the nonnative species in Vandenberg monkeyflower habitat because it can produce an abundance of seeds year-round, and grows under a wide variety of light, temperature, moisture, and substrate conditions (Keil and Holland 1998, p. 23; The Nature Conservancy (TNC) 2005, pp. 6–7). Additionally, it is extremely difficult to eradicate once established. Note that, while several species of veldt grass occur in this region, the most prevalent, and the one we are focusing on in this rule, is South African perennial veldt grass. As a sprawling perennial, veldt grass substantially changes the plant community composition in invaded habitats, altering fire potential by buildup of dense thatch during the summer months (see *Factor A—Anthropogenic Fire*), and increasing the rate of organic matter accumulation (TNC

2005, p. 6; Cal-IPC 2012). Veldt grass tends to crowd out native species and prevents the reestablishment of native herbs and shrubs; larger shrubs are not replaced after they die (Keil and Holland 1998, p. 23; Bossard *et al.* 2000 pp. 164–170; Earth Tech *et al.* 1996, p. 314). Veldt grass also readily spreads into roadsides and from there into openings between shrubs (Bossard *et al.* 2000, p. 168). In the absence of veldt grass, open areas that occur in native vegetative communities on the mesa tend to be occupied by a variety of native annual herbs and short-lived perennials (Earth Tech *et al.* 1996, p. 314). These open areas may provide habitat for Vandenberg monkeyflower.

Veldt grass is spreading rapidly across Vandenberg AFB and the Burton Mesa and represents a significant problem (Gevirtz *et at.* 2007, p. 181). It was established on Vandenberg AFB in the late 1950s to stabilize sand dunes in the Purisima Point area approximately 5 mi (8 km) south of San Antonio Terrace (Peters and Sciandrone 1964, pp. 98, 101); the San Antonio Terrace dune sheet overlies the western edges of Burton Mesa and is upwind of Burton Mesa (Hunt 1993, p. 8). In a study of the vegetation of San Antonio Terrace, photos from 1979 and the early 1990s were compared, noting that veldt grass had expanded from a few localized areas (generally around existing roads and buildings) to become a dominant component of the vegetation and had expanded to new areas (Earth Tech *et al.* 1996). Veldt grass initially invades roadway corridors or other disturbed areas, and then spreads into the more open herbaceous or unvegetated areas between shrubs (Earth Tech *et al.* 1996, p. 314). Grasses like veldt grass that are prolific seeders can build up a large seed bank in the soil, increasing their capacity to respond to disturbances; however, D'Antonio and Vitousek (1992, p. 66) noted that veldt grass is

also a threat in the absence of habitat disturbance because it can invade undisturbed coastal habitats in California. Sandy habitats appear to be particularly susceptible to invasion in California (TNC 2005, p. 6). Human (1990, p. 34) identified veldt grass as the most devastating of the nonnative invaders on San Antonio Terrace (which is upwind of Burton Mesa and thus Vandenberg monkeyflower habitat) because it forms solid stands and excludes native plant species.

Currently, veldt grass occurs in more areas on Vandenberg AFB than where it was initially introduced. On Vandenberg AFB, veldt grass occurs both within and adjacent to occupied Vandenberg monkeyflower habitat and is expanding at Santa Lucia, Lake, and Pine Canyons, and has become the dominant vegetation cover in portions of lower Oak Canyon. Additionally, veldt grass is present and expanding at certain locations on the Reserve, including at the Volans Avenue, Clubhouse Estates, and Davis Creek occurrences. Veldt grass is also present at La Purisima Mission SHP. See section below entitled *Review of Invasive, Nonnative Species Present by Occurrence* regarding the presence and known impacts of veldt grass at each of the Vandenberg monkeyflower occurrences.

(2) *Iceplant*. Iceplant is a succulent, mat-forming perennial (D'Antonio 1990, p. 694). A single iceplant individual can form dense, circular mats up to 33 ft (10 m) in diameter and approximately 20 in (40 cm) thick (D'Antonio and Mahall 1991, p. 886). It overcrowds native plants and has an exceptional ability to spread to sandy soils along the coast (Jacks *et al* 1984, p. 12; Zedler and Scheid 1988, p. 196).

The reproductive potential of iceplant is very high (Schmalzer and Hinkle 1987, p. 18). It propagates by seed and vegetatively; even small stem fragments can regenerate into a new plant (Cal-IPC 2012). Iceplant is a successful invader because seeds are dispersed before or during the time of year when they are most likely to germinate, which allows little time for post-dispersal predation to occur; and the seeds are dispersed by a diversity of mammals (D'Antonio 1990, p. 700). Additionally, Vivrette and Muller (1977, pp. 315–317) showed that the salt leached from iceplant individuals was the limiting factor in the growth and establishment of native grassland species. Salt retained in aerial parts of dried iceplant individuals is transported into the soil through leaching by fog in the summer and rain in the fall (Vivrette and Muller 1977, pp. 311, 316; Kloot 1983, pp. 304–305). On sandy soils, salt deposited in the summer is washed through the soil and replaced by the remaining lower levels of salt leaching out of the plant with the first rains in the fall (Vivrette and Muller 1977, p. 316).

Iceplant is an invasive species of great concern on Vandenberg AFB (Keil and Holland 1998, p. 22). It was originally planted on Base along roads and about buildings to prevent wind erosion (Human 1990, pp. 32, 42). By the mid-1990s, iceplant occupied hundreds of acres on the San Antonio Terrace, having spread into adjacent habitats from plantings along roadsides, the Southern Pacific Railroad tracks, and around missile testing facilities (Earth Tech 1996, p. 264). It is especially prevalent west of the main developed area on Vandenberg AFB because there is extensive iceplant in the adjacent dune habitat and former chaparral habitat, and because of extensive past mechanical

disturbance (i.e., land disturbed by mechanical equipment) within the chaparral west of the primary developed area (Odion *et al.* 1992, p. 13).

Iceplant recruits abundantly within openings in the chaparral canopy such as those created by burning or mechanical disturbance (Odion *et al.* 1992, p. 1), and there is no area of Burton Mesa chaparral on Base where iceplant will not invade (Odion *et al.* 1992, p. 13). In one instance after a prescribed burn, iceplant was discovered in the burned plot after the fire, which was unexpected because succulent plants (such as iceplant) are not known to have the capacity to recover rapidly from fire (Jacks *et al.* 1984, pp. 11–12). Iceplant was not known to occur in the burn plot prior to fire; however, within 3 years of the prescribed burn, iceplant was the second most prevalent post-fire perennial plant observed (Zedler and Schied 1988, p. 198). Because iceplant distribution is extensive on Vandenberg AFB (Air Force 2011a) and is common within most chaparral on the Base (Odion *et al.* 1992, p. 13), little effort has been made to map individuals of iceplant that are mixed within many habitats on the Base, including Burton Mesa chaparral.

Iceplant has also been observed in the Reserve (Junak 2011; Meyer 2012, pers. comm.) and at La Purisima Mission SHP (Gevirtz *et al*. 2005, Appendix 5), although it is not as common as it is on Vandenberg AFB. Please see the *Review of Invasive, Nonnative Species Present by Occurrence* section below regarding the presence and known impacts of iceplant at each of the Vandenberg monkeyflower occurrences.

(3) *Sahara Mustard.* Dense stands of Sahara mustard have the potential to

dominate native ecosystems, especially in dry sandy soils (County of Santa Barbara Agricultural Commissioner's Office (Santa Barbara Ag. Comm.) 2012). Sahara mustard is especially common in areas with wind-blown sand deposits and in disturbed sites, such as roadsides. Additionally, it is invading nonnative annual grassland and coastal sage scrub on the coastal slope of southern California and is well-established in all counties of southern California (Cal-IPC 2012). In coastal southern California, it locally dominates nonnative grasslands in dry, open sites, especially disturbed areas, and can expand over larger areas replacing other nonnative annuals during drought conditions (Cal-IPC 2012). Its early-season growth and large size allow it to monopolize early-season moisture, expand its canopy, and set seed before other plants have emerged (Cal-IPC 2012; Santa Barbara Ag. Comm. 2012; Barrows *et al.* 2009).

Barrows *et al.* (2009, pp. 677–683) conducted a study in the Coachella Valley (Imperial County, California) from 2002 to 2008, to determine whether native annual plants were negatively affected by the presence of Sahara mustard by comparing plots with Sahara mustard to plots where Sahara mustard had been manually removed. Sahara mustard formed a canopy 1 to 3 ft (0.3 to 1.0 m) from the ground and native annuals under the canopy were often weakened by loss of sunlight, resulting in natives that grew taller; however, the increased plant height was at the expense of producing branches, flowers, and fruits (Barrows *et al.* 2009, p. 683). Flower and seed production of annuals growing under the Sahara mustard canopy decreased 80 to 90 percent compared to annuals free from mustard competition (Barrows *et al.* 2009, p. 683). Additionally, species richness, density, and total percent cover of natives were higher in the plots where

Sahara mustard was removed (Barrows *et al.* 2009, p. 679). The strongest effect was on the percent cover of natives, with nearly double the native annual plant cover on plots where Sahara mustard had been manually removed.

Sahara mustard was collected at three locations on Vandenberg AFB in the late 1990s and is likely to be more common (Keil *in litt.* 2013). One of these collections was from Lake Canyon (which is the location for one of the nine extant Vandenberg monkeyflower occurrences). A second collection of Sahara mustard was located on North Base, upwind of Burton Mesa and thus Vandenberg monkeyflower habitat. The third collection was from near Point Arguello on South Base and not near or upwind of Burton Mesa.

More recently, Sahara mustard has been observed on Department of Justice lands at the Lompoc Penitentiary that is near the southern terminus of Santa Lucia Canyon Road and Oak Canyon, and borders the southwestern corner of the Vandenberg Management Unit of the Reserve (Meyer *in litt.* 2012a; Lum *in litt.* 2012c). It is spreading rapidly across the Reserve, notably in the La Purisima, Santa Lucia, Vandenberg, and Encina Management Units (Gevirtz *et al.* 2007, p. 241, Junak 2011; Meyer *in litt.* 2012a). Specifically, Sahara mustard is known to occur adjacent to the Clubhouse Estates occurrence of Vandenberg monkeyflower (Meyer *in litt.* 2012a). Additionally, a small-scale infestation occurs by the eastern edge of La Purisima Mission SHP (California State Parks 2011, p. 4; Santa Barbara Ag. Comm. 2012). See the section below titled *Review of Invasive, Nonnative Species Present by Occurrence* regarding the

presence and known impacts of Sahara mustard at each of the Vandenberg monkeyflower occurrences.

(4) *Pampas Grass*. The invasion of pampas grass has altered the landscape of Burton Mesa because it has the ability to convert shrubland into nonnative perennial grassland and prevent native plants from reestablishing (Permberton 1985, p. 4; Lambrinos 2000, pp. 224–225). Once pampas grass is established, it is extremely difficult to eradicate (McClintock 1985, p. 5). Individual plants already present in the landscape may greatly accelerate the conversion of native vegetation into pampas grass-dominated grasslands (Lambrinos 2002, p. 527). Therefore, the ability of pampas grass to persist for long periods of time poses a serious threat to the native diversity of this ecosystem (Lambrinos 2000, p. 217). Large individuals can produce billions of seeds over the course of their reproductive lives (Lambrinos 2000, p. 225), and because the grass seeds are wind-dispersed (Keil and Holland 1998, p. 23), pampas grass is able to spread into adjacent vegetation, particularly chaparral, in which there are openings and bare soil (Schmalzer and Hinkle 1987, pp. 30–31). Additionally, it creates a fire hazard with excessive buildup of dry leaves, leaf bases, and flowering stalks (Cal-IPC 2012) (see *Factor A—Anthropogenic Fire*).

Lambrinos (2000, p. 225) studied the effects of pampas grass invasion at Vandenberg AFB. Plots with pampas grass were compared to adjacent plots of pristine maritime chaparral. The pampas grass-invaded portions of the plots were associated with adjacent, relatively small-scale disturbances, such as dirt roads, water runoff channels,

and a paved road. The only disturbance within the plots was narrow trails used by mule deer (*Odocoileus hemionus*) that crossed both invaded and noninvaded plots (Lambrinos 2000, pp. 219, 225). The cover of dead shrubs was significantly greater in invaded plots, indicating shrub cover was higher in the invaded plots at the time of invasion. Additionally, shrub recruitment into stands of pampas grass was low, and pampas grass individuals exhibited high recruitment rates in both invaded and pristine maritime chaparral stands (Lambrinos 2000, p. 225).

Populations of pampas grass have been well-established on Vandenberg AFB since 1975 (Coulombe and Cooper 1976, pp. 93–94). It was introduced along the railroad tracks (Odion *et al.* 1992, p. 14), and major populations occur around the airfield extending from the railroad tracks south along both sides of the runway and in adjacent areas (Schmalzer and Hinkle 1987, p. 30; Keil and Holland 1998, p. 23). Nearly all mechanically disturbed areas on Base downwind of established pampas grass are now invaded (Odion *et al*. 1992, p. 14). From the ruderal populations, pampas grass has also expanded into the surrounding, relatively undisturbed chaparral where there are openings and bare soil (Lambrinos 2000, p. 218; Schmalzer and Hinkle 1987, pp. 30–31). Therefore, over extended periods of time pampas grass can reduce native plant diversity, even in the absence of large-scale disturbances (Lambrinos 2000, p. 227). The most affected habitat is Burton Mesa chaparral because the natural integrity of the community was lost due to previous disturbances (Keil and Holland 1998, p. 23; Lambrinos 2002, p. 519). Thus, any activities that remove native vegetation and leave bare soil create an opportunity for pampas grass invasion (Schmalzer and Hinkle 1987, pp. 30–31).

Pampas grass has also been observed in the Reserve (Junak 2011) and at La Purisima Mission SHP (Gevirtz *et al*. 2005, Appendix 5), although it is not as widespread as it is on Vandenberg AFB. See the section below titled *Review of Invasive, Nonnative Species Present by Occurrence* regarding the presence and known impacts of pampas grass at each of the Vandenberg monkeyflower occurrences.

Review of Invasive, Nonnative Species Present by Occurrence

In the paragraphs below we discuss the presence of invasive plants that occur within or adjacent to Vandenberg monkeyflower and its habitat at each of the nine extant locations and one potentially extirpated location. The Pine, Lake, and Santa Lucia Canyon locations are grouped based on the information available.

(1) *Vandenberg AFB—Oak Canyon*. Oak Canyon is a location where Vandenberg monkeyflower was reported as common in the 1980s (see *Current Locations—Occurrences Located on Vandenberg AFB* section for additional site-specific information). In 2004, a 12-ac (4.86-ha) fire burned the northeast-facing slope of lower Oak Canyon (Lum *in litt* 2012e); a detailed description of the vegetation at this site prior to the fire is not available. Since then, however, veldt grass has filled almost every opening in the scrub in Oak Canyon and in 2012, it was the dominant species in this area (Rutherford *in litt.* 2012). Four individuals of Vandenberg monkeyflower were found in 2006 (VFWO 2013), and none were observed in 2010 or 2012 (Air Force 2012, p. 1;

Lum *in litt.* 2012b; Rutherford *in litt.* 2012).

(2), (3), and (4) *Vandenberg AFB—Pine, Lake, and Santa Lucia Canyons*. Veldt grass occurs within and near each of the occurrences of Vandenberg monkeyflower at Pine, Lake, and Santa Lucia Canyons, and the area occupied by veldt grass is expanding at each site (SAIC 2012, p. 5; Air Force 2012). Additionally, the Highway Incident wildfire in 2009 (see *Factor A—Anthropogenic Fire*) that burned in upper Lake Canyon fostered expansion of invasive, nonnative plants already present in the area, such as veldt grass, pampas grass, iceplant, and bull thistle (Air Force 2009b, Appendix E).

(5) *Burton Mesa Ecological Reserve—Volans Avenue*. Veldt grass and iceplant occur within Vandenberg monkeyflower suitable habitat and near the known occurrences at this location, and both species are likely directly affecting the availability of sandy openings at this location (Meyer *in litt.* 2013). The last time Vandenberg monkeyflower was observed at this location was in 2007 (Meyer *in litt.* 2007), although we still consider this occurrence extant.

(6) *Burton Mesa Ecological Reserve—Clubhouse Estates*. As of the most recent survey in 2009, the Clubhouse Estates occurrence supported 350–400 Vandenberg monkeyflower individuals (McGowen *in litt.* 2009). Since a portion of the vegetation was cleared from this project site in 2006 and later graded in 2007, veldt grass and Sahara mustard have expanded within Vandenberg monkeyflower suitable habitat and near individual plants (Meyer *in litt.* 2010b) (see also *Current Locations—Occurrences*

Located on Burton Mesa Ecological Reserve; and *Factor A—Development* sections above). In particular, veldt grass has moved into the Clubhouse Estates location and is expanding into undisturbed areas where veldt grass did not previously occur (Meyer *in litt.* 2010b). Prior to the 2006 ground disturbance, iceplant and pampas grass were present on the project site (SAIC 2005b, pp. 13–14). Iceplant typically occurred in scattered patches adjacent to areas disturbed by roadways and existing infrastructure (SAIC 2005b, pp. 13–14; LFR, Inc. 2006, p. 23), and pampas grass occurred throughout the project site, especially in moister places adjacent to wetlands, along both branches of Davis Creek that run through the site, and along roadways (SAIC 2005b, pp. 13–14; LFR, Inc. 2006, p. 23). Following the ground disturbance, veldt grass, pampas grass, and iceplant continue to expand in the undisturbed parcel that is designated as open space as part of the development project. It was previously controlled around 2008, but the required 3 years of weeding (LFR, Inc 2006, pp. 48–50, 75 (Table 10)) have not occurred (Meyer *in litt.* 2013).

(7) *Burton Mesa Ecological Reserve—Davis Creek*. Veldt grass and iceplant have been observed within sandy openings at the Davis Creek occurrence of Vandenberg monkeyflower. The CDFW observed veldt grass within the southern portion of the area occupied by Vandenberg monkeyflower in addition to the area approximately 100 ft (30 m) to the north of the plants (Meyer 2012, pers. comm.). Additionally, patches of iceplant were observed at the northern portion of the Davis Creek occurrence (Meyer 2012, pers. comm.).

Burton Mesa Ecological Reserve—Potentially Extirpated Occurrence at Lower Santa Lucia Canyon. An historical observation of Vandenberg monkeyflower was made in 1985 (Hickson *in litt.* 2007). However, this species has not been recently observed at this location and is considered potentially extirpated (see Figure 2 and Table 1) because it has been approximately 30 years since individuals were observed (with little survey effort between 1985 and 2011); suitable habitat remains but it is overcrowded with invasive, nonnative plants. Currently, veldt grass is dominant within the sandy openings in the Burton Mesa chaparral, and herbs commonly associated with Vandenberg monkeyflower are absent (Meyer *in litt.* 2012c). Sahara mustard is expanding into the Vandenberg Management Unit at the southwestern corner of the Reserve from the adjacent Lompoc Penitentiary (Meyer *in litt.* 2012a).

(8) and (9) *La Purisima Mission State Historic Park—La Purisima Mission SHP East and West*. Veldt grass occurs at both the western and eastern occurrences of Vandenberg monkeyflower in the park. Specifically, veldt grass is encroaching into intact Burton Mesa chaparral and into open sandy areas where Vandenberg monkeyflower grows (Ballard 2006; California State Parks 2011, p. 4).

Summary—Invasive, Nonnative Species

Invasive, nonnative plants occur and are expanding throughout the Burton Mesa. More specifically, at least one of the four most problematic invasive plants occurs within or adjacent to suitable habitat at each of the nine extant occurrences of Vandenberg

monkeyflower and at one potentially extirpated location. Invasive plants have demonstrated the ability to reduce the diversity of native vegetation and convert the native shrublands into nonnative-dominated vegetation. In some areas, particularly on Vandenberg AFB, veldt grass, iceplant, and pampas grass when first introduced were only minor components of the vegetation; today, these nonnatives are dominant components of the vegetation at the locations where they were introduced, and they have expanded to new areas. The expansion of invasive, nonnative plants is also prevalent on the Reserve and at La Purisima Mission SHP. Native shrub recruitment and growth of native annuals into open areas is substantially decreased where these invasive, nonnative plants become established. Thus, it is likely that invasive, nonnative plants will become more dominant where they already occur and will continue to expand to new areas due to the human activities on Burton Mesa, the competitive fitness of these invasive plants, the direction of the prevailing wind, and the potential for small- and large-scale disturbances (see *Factor A—Development and Anthropogenic Fire*), all of which could create open areas that promote invasive, nonnative species invasion and expansion.

With regard to site-specific impacts to Vandenberg monkeyflower habitat, veldt grass has been observed occurring within suitable habitat at each of the nine extant occurrences and at one potentially extirpated location. Recent observations of the habitat at all nine extant occurrences indicate that veldt grass is expanding and becoming dominant in the sandy openings where Vandenberg monkeyflower grows. Because veldt grass will outcompete native vegetation (including overcrowding the sandy openings where Vandenberg monkeyflower grows) and is very difficult to eradicate once it is

established, the presence and expansion of veldt grass within known occurrences of Vandenberg monkeyflower is a continuous threat because it reduces the amount and quality of this species' habitat. We also discussed above three other invasive, nonnative species (iceplant, Sahara mustard, and pampas grass) that have substantial impacts to Vandenberg monkeyflower and its habitat. These species, along with numerous other nonnative plant species, are present throughout Burton Mesa and at all extant occurrences of Vandenberg monkeyflower. Similar to veldt grass, the other invasive, nonnative plants reduce the amount and quality of habitat for Vandenberg monkeyflower by outcompeting Burton Mesa chaparral vegetation and decreasing the amount and availability of the sandy openings where Vandenberg monkeyflower grows. Nevertheless, no invasive plant is as prevalent and represents as much of a threat to Vandenberg monkeyflower habitat as veldt grass.

Anthropogenic Fire

The disturbance to maritime chaparral that anthropogenic fires cause may exceed the tolerance thresholds (ability to tolerate naturally occurring fire regimes and regenerate post-fire) of many shrub species, resulting in an open canopy, the demise of shrublands, and persistence of nonnative plants (Haidinger and Keeley 1993, pp. 143–147). The common pattern after chaparral fires is for native and nonnative annual herbs to dominate for the first year and then gradually decline as the cover of shrub and subshrubs increases (Zedler *et al.* 1983, p. 816). A high cover of annual and perennial herbs the first few years following the fire decreases as the shrub canopy closes, and there is little

herbaceous cover once the canopy closes, although senescence (aging) in some shrubs may allow the recruitment of opportunistic herb or shrub species into gaps in the chaparral (Hickson 1987, p. 5). Patterns of post-fire vegetation vary depending on chaparral habitat composition, fire timing and intensity, and the physical attributes and disturbance history of the site (Davis *et al.* 1988, p. 169).

At historical fire frequencies, chaparral species are generally resilient to fire because they are well known to regenerate from either resprouting of perennial root crowns or germination of seeds in the soil when heated or exposed to smoke (obligate and sprouter seeders) (Lambert *et al.* 2010, p. 31). However, increased fire frequencies in chaparral have led to the loss of native species that rely on seed regeneration because there is insufficient time between fires for shrub species to reach reproductive age and replenish the soil seed bank (Lambert *et al.* 2010, p. 31). Zedler *et al.* (1983, pp. 815–816) noted that high fire frequency has devastating impacts on shrub species that require a period of recovery before being resilient to further disturbance. On the other hand, long-term absence of fire may lead to a gradual transition from chaparral to oak woodland (Van Dyke *et al.* 2001, p. 2), although this transition is also dependent upon soil differences (Davis *et al.* 1988, pp.187–188). Given sufficient time without fire, successional changes in shrublands may result in a closed canopy that is capable of excluding most nonnative species (Keeley *et al.* 2005, p. 2110).

The long-term fire history for Santa Barbara County indicates that large fires (more than 49,400 ac (20,000 ha) and typically driven by Santa Ana wind conditions) are

part of the historical fire regime in this region. The average time between these large fires has remained relatively consistent over the last 500 years, regardless of changes in land use, from the Chumash who purposely set fires along the coast (1425–1770), to Spanish and American settlers (1770–1900) who practiced fire suppression but with little enforcement, to the more recent period (1900–1985) of active fire suppression (Mensing *et al.* 1999, pp. 301–304). The average interval between these large fires ranges between 20 and 30 years and is strongly controlled by precipitation patterns, with fires generally occurring at the end of wet phases and the beginning of droughts (Mensing *et al.* 1999, p. 304). The range between large fire events is 5 to 75 years (Mensing *et al.* 1999, p. 304).

The historical fire regime on Burton Mesa is unknown (Hickson 1987, p. 25), but it is likely that naturally occurring fires were less frequent as compared to inland areas because the mesa is at low elevation and the few lightning strikes recorded in the region have been in the distant mountains farther inland (Hickson 1988, p. 20). Additionally, because fog, cool temperatures, and cool winds blowing off the ocean are typical, the weather conditions conducive to naturally occurring fires are rare on Burton Mesa (Hickson 1988, p. 22; Gevirtz *et al.* 2007, p. 58). Therefore, the natural fire interval for Burton Mesa, similar to coastal chaparral environments north of the Transverse Ranges of southern California, may be on the order of 100 years (Greenlee and Langenheim 1990, pp. 242–250; Odion and Tyler 2002, p. 9; Moritz *et al.* 1997, p. 1258).

The present fire regime on Burton Mesa is likely anthropogenic (Davis *et al.* 1988, p. 185; Davis and Borchert 2006, p. 338), especially given the historical densities

of Native American and European settlers in coastal areas supporting maritime chaparral (Davis and Borchert 2006, p. 328; Mensing *et al.* 1999, p. 301) along with the related infrastructure that currently exists. Today, human-caused ignitions are more frequent in maritime chaparral, but wildfires are quickly suppressed or extinguished at roads and fuel breaks (Davis *et al.* 1988, p. 177; Davis and Borchert 2006, p. 338). Additionally, modern land use has fragmented the Burton Mesa chaparral into isolated patches (see *Habitat* section above), so that while fires may be more frequent now than in the past, fire size is probably reduced and the average time between fires on certain sites increased (Hickson 1987, p. 20).

Approximately 34 fires have occurred within or adjacent to Burton Mesa chaparral since 1940 on Vandenberg AFB, east of the main developed area, and from San Antonio Creek south to the Santa Ynez River (Lum *in litt.* 2012f). Odion *et al.* 1992 (pp. 12–14) stated that 44 fires have occurred within or adjacent to chaparral on Burton Mesa; however, this calculation also included fires that occurred west of the main developed area on Vandenberg AFB, and, therefore, a larger area than what the Air Force used. Some of the areas burned more than once because the perimeter of different fires overlapped (Odion *et al.* 1992, p. 12; Lum *in litt.* 2012f). A portion of the fires were prescribed burns (Lum *in litt.* 2012f; Odion *et al.* 1992, pp. 12–14). In total, at least 2,500 ac (1,012 ha) have burned on Vandenberg AFB since 1957 (Odion *et al.* 1992, p. 13). In recent years fires have accidentally ignited on Vandenberg AFB (see discussion of *Highway Incident* in paragraph below).

Twenty-eight wildfires occurred on the Reserve and adjacent La Purisima Mission SHP in the period 1950–2003; the most recent wildfire (Harris Grade Fire) occurred in 2000 and was caused by a power line that may have sparked in high winds (Gevirtz *et al.* 2007, p. 60). This fire consumed 11,000 ac (4,451 ha) and was the largest fire in the area since 1977 (Gevirtz *et al.* 2007, p. 60). All of the fires on the Reserve and at La Purisima Mission SHP since 1950 have been a result of human activity (Gevirtz *et al.* 2007, p. 60). Based on an analysis of the fire history, approximately 3,440 ac (1,392 ha) of the 5,186-ac (2,099-ha) Reserve has not burned since 1938 (Gevirtz *et al*. 2007, p. 60), indicating an absence of fire for at least 70 years on 66 percent of the Reserve's property. Similarly, the majority of vegetation at La Purisima Mission SHP has not been burned since before 1938, and most of the native habitat in the park is also more than 70 years old (Gevirtz *et al*. 2005, p. 77).

Although the fire interval in maritime chaparral is an important factor in determining species composition, on Burton Mesa, and for Vandenberg monkeyflower habitat specifically, the frequency of fire is secondary to the primary threat, which is the post-fire expansion of invasive, nonnative plants. California's chaparral habitats, like Burton Mesa, are most vulnerable to invasion by nonnative plants in the first few years after fire because fires open large areas of bare, nutrient-rich ground and remove toxins from the soil, chaparral recolonizes much more slowly because of limited seed dispersal, and some seedlings are poor competitors against nonnative annual species (Keeley *et al.* 2003, pp. 1362–1363; Alberts *et al.* 1993, p. 107; Davis and Mooney 1985, p. 528).

Because sites favorable for invasion by nonnative plants tend to be relatively open areas where existing plant cover is minimal (see *Factor A—Invasive, Nonnative Plants*), and wildfires occurring on Burton Mesa create such open areas, fires within Vandenberg monkeyflower habitat tend to increase the expansion of invasive plants that are already established. For example, an accidental wildfire (Highway Incident) occurred in September 2009 on Vandenberg AFB when sparks from a power line started a wildfire that burned approximately 617 ac (250 ha) (Air Force 2009b, p. 1) in upper Lake Canyon. The southern boundary of this wildfire burned to within 0.25 mi (0.4 km) of the known Vandenberg monkeyflower occurrence down-slope in Lake Canyon. The Burned Area Emergency Response (BAER) Plan noted that invasive, nonnative species already present in the area, including veldt grass, pampas grass, iceplant, and bull thistle, were confirmed or discovered in the burn area within 2 weeks of the fire (Air Force 2009b, Appendix E). Veldt grass initially colonizes disturbed areas, such as open areas created by wildfires, and can become a dominant component of the vegetation and expand to new areas (see *Factor A—Invasive, Nonnative Plants*). Another example in Vandenberg monkeyflower habitat includes a 12-ac (5-ha) fire that occurred in Oak Canyon on Vandenberg AFB in 2004; as a result, veldt grass is the dominant vegetation on a hillside sloping toward the canyon (Google Earth 2012).

In addition to displacing native vegetation, the presence of nonnative plants (in particular nonnative grasses) has increased the supply of readily ignitable fuel and increased the seasonal duration when fuels are susceptible to ignition, both because of their earlier seasonal drying compared to shrubs and their high surface-to-volume ratio

(Lambert *et al.* 2010, p. 31). Mediterranean grasses such as bromes and *Avena barbata* (slender wild oat) are particularly implicated since they act as wicks, spreading fast-moving fire into the canopies of larger shrub vegetation (Lambert *et al.* 2010, p. 31). Thus, the abundance of nonnative vegetation initiates a positive feedback cycle based on increased biomass, changes in the distribution of flammable biomass, and increased flammability (Lambert *et al.* 2010, p. 29). *Bromus rubens* (red brome) occurs on Burton Mesa and is known to rapidly colonize disturbed sites with open canopies and exposed bare ground (Brown and Minnich 1986, pp. 414, 418; Bossard *et al.* 2000, pp. 72–80). The prevalence of veldt grass and pampas grass also increases the fire potential on Burton Mesa (see *Factor A—Invasive, Nonnative Plants* section).

Fire Prevention and Suppression Activities

The Air Force, CDFW, and California State Parks have developed wildfire prevention and suppression practices not only to minimize the potential for wildfire, but also to minimize the impacts to the biological resources during suppression activities. As part of wildfire management practices, landowners and agencies may create fuel breaks (a permanent area of low volume fuel) to limit the spread of wildfire and to provide access for fire suppression activities (Gevirtz *et al.* 2007, p. 261). Merriam *et al.* (2006, pp. 525–526) observed that nonnative species represented an increasing proportion of total plant cover on fuel breaks with fuel-break age, suggesting that nonnative species can displace native species on fuel breaks, and become increasingly dominant over time (for example, bromes were four of the five most observed nonnative plants on fuel breaks

(Merriam *et al.* 2006, p. 519)). Additionally, wildland areas adjacent to fuel breaks were more likely to be invaded by nonnative species when these areas had been subject to recurrent fires (Merriam *et al.* 2006, p. 526).

Fire suppression activities that impact suitable Vandenberg monkeyflower habitat include bulldozed and hand-cut fire lines and the application of fire retardants. During the Highway Incident wildfire, the Air Force cut fire lines that resulted in a loss of Burton Mesa chaparral (Air Force 2009b, p. 28). Additionally, approximately 65,000 gallons (246,052 liters) of fire retardant (which is known to act as a fertilizer enhancing the growth of nonnative grasses (Avery 2001, pp. 17–18)) were spread over this site (Air Force 2009b, p. 28). Therefore, by burning the existing vegetation, fire creates open areas where invasive, nonnative plants can expand. Additionally, fire prevention and suppression activities (e.g., fire breaks and application of fire retardant) can exacerbate the resulting post-fire expansion of nonnative plants by creating open fire lines and if fire retardants add chemicals to the soil that stimulate growth of nonnative vegetation.

The Air Force, CDFW, and California State Parks are studying the feasibility of a prescribed burning program to restore fire to its natural role in the environment and help restore the native vegetation of Burton Mesa (California State Parks 1991, p. 110; Gevirtz *et al.* 2007, p. 258; California State Parks 2010, p. 3; Air Force 2012, p. 2). However, many local communities are concerned about the safety of conducting prescribed burns on wildlands when they occur within or near urban areas, thus complicating the ability of agencies to carry out such burns.

In summary, because of the human presence and infrastructure on the mesa, the frequency of human-caused wildfires is likely greater than the frequency of the historical fires in the past on Burton Mesa. An increased fire frequency in Burton Mesa chaparral would tend to favor the establishment of nonnative vegetation in open areas at the expense of native vegetation. However, the primary threat to Vandenberg monkeyflower and its habitat from fire is the post-fire expansion of invasive, nonnative plants, regardless of the fire frequency. Because an abundance of nonnative plants already occurs on the mesa and invasive plants rapidly invade open areas, any fire that occurs within or adjacent to Vandenberg monkeyflower habitat is likely to result in an increase of invasive, nonnative vegetation. Likewise, fire suppression activities that include clearing vegetation in fuel breaks or spreading retardant would increase the likelihood of nonnative species invading suitable Vandenberg monkeyflower habitat, as well as enhance the habitat conditions for invasive species expansion. Additionally, because the presence of invasive, nonnative plants creates a positive feedback mechanism, the greater the percent cover of nonnative vegetation, the more likely fires will occur on Burton Mesa. Based on the information presented in this section, the current threat from anthropogenic fire and associated fire suppression activities to Vandenberg monkeyflower habitat described above is expected to continue into the future. Available conservation measures to minimize the threat of anthropogenic wildfire are discussed below (see *Factor A—Conservation Measures Undertaken*).

Recreation and Other Human Activities

Recreational activities that occur throughout Burton Mesa include authorized uses such as hunting, hiking, biking, wildlife observation, and leashed-dog walking. Additionally, off-road vehicle (ORV) use is authorized on Vandenberg AFB (Air Force 2011b, p. 6), but it is not permitted on the Reserve (Gevirtz *et al.* 2007, p. 70) or La Purisima Mission SHP (California State Parks 1991, p. 109).

Vandenberg Air Force Base (AFB)

On the west end of Burton Mesa on Vandenberg AFB, recreational activities include OHV use and other casual-use activities, such as hunting, picnicking, and horseback riding. There is also an existing 237-ac (96-ha) golf course.

Prior to 1974, Vandenberg AFB was subject to uncontrolled use by ORVs. In April 1974, efforts to establish a program to control ORV use was prompted by dune damage and the complaints of recreational users, along with consideration of soil, water, air, noise, aesthetics, recreational users, wildlife, vegetation, suitability of other public lands, archaeological sites, threatened and endangered species, and the accessibility for users (Air Force 2011b, p. 6). Thus, Vandenberg AFB environmental staff and the Base's motorcycle club designated an ORV area (Air Force 2011b, p. 6). Currently, ORV use occurs within a 600-ac (243-ha) site that is west of the primary developed area on Base and an additional site referred to as Northstar that is located in the northeast portion of the Base (Air Force 2011b, p. 6), both of which are not within Vandenberg

monkeyflower habitat. The ORVs use existing trails and roads, and are managed to prevent damage to sensitive areas such as wetlands and highly erodible soils (Air Force 2011b, p. 6). Therefore, ORV use on Vandenberg AFB is not within the vicinity of Vandenberg monkeyflower occurrences on the Base and is not a direct threat to this species and its habitat.

The west end of Burton Mesa on Vandenberg AFB (west of the primary developed area) is heavily disturbed by existing trails and service roads, which may be used by recreationists. Although vehicles using these roads and trails (including wheeled vehicles for recreational activities) likely contribute to the spread of invasive, nonnative plant species on Burton Mesa (see *Invasive, Nonnative Species* section above), no information is available to assess the extent and degree to which this may be occurring on Vandenberg AFB. Moreover, the best available information does not indicate that these recreational activities on the west end of Burton Mesa on Base are a direct threat to Vandenberg monkeyflower and its habitat.

To the east of the developed area where higher-quality Burton Mesa chaparral still remains and where Vandenberg monkeyflower occurs on Base, recreational activities that may impact the habitat of this species include hunting and picnicking. Hunting occurs over much of the Base and is subject to restrictions at any time based on human safety and security concerns, as well as wildlife management goals (Air Force 2011b, p. 7). Lake Canyon Lakes picnic area is within a few hundred feet of Vandenberg monkeyflower plants that are located in lower Lake Canyon, but the picnic facilities are

located on concrete or asphalt and thus not in Vandenberg monkeyflower habitat. Overall, the best available information does not indicate that recreational activities on Base, including hunting and picnicking, are directly impacting Vandenberg monkeyflower or its habitat. However, these activities pose an indirect threat to the habitat quality because they contribute to the spread of nonnative plants within suitable habitat.

Burton Mesa Ecological Reserve

There are no formal recreational or public facilities currently within the Reserve, including no designated parking or restroom facilities (Gevirtz *et al.* 2007, p. 69). Authorized uses include hiking, wildlife observation, and leashed-dog walking. Wheeled recreational activities such as OHV use and bicycles are not allowed in the Reserve (Gevirtz *et al.* 2007, p. 70). The management plan for the Reserve identifies approximately 28 mi (45 km) of trails (Gevirtz *et al.* 2007, p. 71). The existing trails are a combination of oil and utility service roads and an informal network of pathways from the surrounding residential areas (Gevirtz *et al.* 2007, p. 69). Impacts to Vandenberg monkeyflower habitat from authorized recreational uses are likely negligible because visitors walk into the Reserve and the CDFW has posted signs at the most highly used access points to direct recreational users to low-impact trails so as to reduce disturbances to the native vegetation.

The Volans Avenue occurrence of Vandenberg monkeyflower is located adjacent

to Vandenberg Village and a VVCSD pipeline easement that is used by local residents for hiking, jogging, dog walking, and other casual recreational activities. Running events have previously occurred in this area of the Reserve, and the running route was likely in close vicinity to the Volans Avenue occurrence of Vandenberg monkeyflower (Ballard *in litt.* 2012). Vandenberg monkeyflower was last observed in 2007 at this location (Meyer *in litt.* 2007; Ballard *in litt.* 2007), although habitat is still present. In the other years from 2004 to 2006, and in 2009, no plants were found (Meyer *in litt*. 2007; Ballard *in litt.* 2007; Meyer *in litt*. 2009a).

It is unknown whether disturbance created by casual human use has played a role in the absence of Vandenberg monkeyflower's aboveground expression at this location since 2007. The best available information indicates that recreational activities involving casual human use on the Reserve are having minimal to no direct effect on Vandenberg monkeyflower habitat on Burton Mesa. However, veldt grass, which produces an abundance of seeds and tends to crowd out native species and prevent their reestablishment, is likely reducing the amount of available Vandenberg monkeyflower habitat at this location (see the specific Volans Avenue discussion above under the Review of Invasive, Nonnative Species Present by Occurrence section). Additionally, because Vandenberg monkeyflower habitat is fragmented by recreational trails, the introduction of additional invasive, nonnative plants into this area is likely because spreading of nonnative vegetation is known to occur through visitors' shoes (Gevirtz *et al.* 2005, p. 225). Therefore, recreational activities may indirectly affect this species by spreading invasive, nonnative plants into the habitat (i.e., sandy openings) where

Vandenberg monkeyflower grows.

Unauthorized ORV use has been reported on the western portions of the Reserve (Santa Lucia Management Unit) from adjacent lands on Vandenberg AFB. It is likely that the trespass is originating from the general public (nonmilitary) because public roadways (such as Santa Lucia Canyon Road) cross Vandenberg AFB lands on this portion of the Base and the Air Force controls the use of ORVs by military staff on the Base. As a result of unauthorized use on the Reserve, CDFW installed a gate in 2009 to control access along Santa Lucia Canyon Road (Meyer *in litt* 2009b). Unauthorized ORV activity has also been reported at another location of the Reserve that supports Vandenberg monkeyflower occurrences and suitable habitat (i.e., east of, and adjacent to, the Clubhouse Estates project site) (Meyer *in litt* 2010c). Additionally, bicycles are prohibited in Burton Mesa (14 California Code of Regulations (CCR) 630 (b)(22)(B)). However, unauthorized mountain biking has been observed in the Reserve within Vandenberg monkeyflower habitat (Meyer *in litt.* 2013). The available information does not indicate the extent and degree to which ORV and mountain biking may be directly impacting Vandenberg monkeyflower habitat on the Reserve. However, wheeled recreational activities likely contribute to the spread of invasive, nonnative plant species within the Reserve along the travel routes, some of which occur within Vandenberg monkeyflower habitat.

The Santa Barbara County Sheriff and Fire Departments maintain facilities on a county-owned inholding within the Reserve. They have been leasing an adjacent 3-ac

(1.2-ha) parcel from the State Lands Commission (SLC) for the last 15 years to maintain their equestrian training facility, and the use of horses has expanded onto the Reserve. The lease has since expired, and the SLC is evaluating whether to renew the lease or modify its terms (Meyer *in litt.* 2012b). The Santa Barbara County Sheriff Department desires to keep horses in the stalls behind the facility; however, horse use is not allowed on Burton Mesa Ecological Reserve (14 CCR Section 630(b)(22(B)), and CDFW wants to keep the area of impact to a few acres near the stalls (Meyer *in litt*. 2012b). Vandenberg monkeyflower occurrences and suitable habitat do not occur near this facility and, therefore, no direct impacts to the habitat would occur.

The Lompoc Valley Flyers Club (Flyers Club) operated a dirt take-off and landing strip for model airplanes, a race track for model cars, and several picnic tables in the Vandenberg Management Unit of the Reserve (just south of California State Highway 1) from 1988 to 2000 (Gevirtz *et al.* 2007, p. 63). The Flyers Club routinely graded the landing strip and access road; this surface scar is still evident in aerial photographs and erosion is a continuing problem at this site (Gevirtz *et al.* 2007, p. 63). The activities occurred in Burton Mesa chaparral but not near known occurrences of Vandenberg monkeyflower. However, these activities have reduced suitable habitat for Vandenberg monkeyflower through removal and degradation of Burton Mesa chaparral and creation of open areas that allow nonnative plants to establish.

La Purisima Mission State Historic Park

La Purisima Mission SHP contains roads and trails authorized for use by local residents for hiking, dog walking, and horseback riding, and employs park rangers and staff to maintain the grounds and conduct patrols. Twelve miles (19 km) of riding and hiking trails wind through the park, including 3.7 mi (6 km) of historical trails near the mission and 8.8 mi (14 km) in the surrounding hills (California State Parks 1991, pp. 9, 107). Bicycles are permitted on approximately 5 mi (8 km) of these trails (which are also designated fire roads), and the remainder, with a few exceptions, are open to horses (California State Parks 1991, pp. 9, 107). Vehicle movement and pedestrian and equestrian use do not directly impact Vandenberg monkeyflower habitat at La Purisima Mission SHP because the roads and trails do not overlap where Vandenberg monkeyflower occurs. However, indirect impacts to Vandenberg monkeyflower habitat may occur due to nonnative plant invasions introduced through visitors' shoes, horse hoofs, vehicle tires, and tractor treads (Gevirtz *et al.* 2005, p. 225). The best available information indicates that recreational activities involving casual human use at La Purisima Mission SHP are having minimal to no direct effect on Vandenberg monkeyflower habitat on Burton Mesa.

Summary—Recreation and Other Human Activities

Off-road vehicle use and other casual recreational activities may contribute to soil disturbance and increase the potential for invasive, nonnative plants to be introduced and further spread across Burton Mesa, including into locations where Vandenberg monkeyflower and its suitable habitat occurs. At this time, the best available information

does not indicate that recreational activities pose a substantial direct threat to Vandenberg monkeyflower habitat, although these activities would indirectly affect the habitat by contributing to the spread of invasive, nonnative plants within the habitat and reducing the habitat quality. Available conservation measures to minimize the threat of recreation are discussed below under *Factor A—Conservation Measures Undertaken*.

Climate Change

Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). The term "climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007a, p. 78). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (for example, temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007a, p. 78).

Scientific measurements spanning several decades demonstrate that changes in climate are occurring, and that the rate of change has increased since the 1950s. Examples include warming of the global climate system, and substantial increases in precipitation in some regions of the world and decreases in others (For these and other examples, see IPCC 2007a, p. 30; and Solomon *et al*. 2007, pp. 35–54, 82–85). Results

of scientific analyses presented by the IPCC show that most of the observed increase in global average temperature since the mid-20th century cannot be explained by natural variability in climate, and is "very likely" (defined by the IPCC as 90 percent or higher probability) due to the observed increase in greenhouse gas (GHG) concentrations in the atmosphere as a result of human activities, particularly carbon dioxide emissions from use of fossil fuels (IPCC 2007a, pp. 5–6 and figures SPM.3 and SPM.4; Solomon *et al*. 2007, pp. 21–35). Further confirmation of the role of GHGs comes from analyses by Huber and Knutti (2011, p. 4), who concluded that it is extremely likely that approximately 75 percent of global warming since 1950 has been caused by human activities.

Scientists use a variety of climate models, which include consideration of natural processes and variability, as well as various scenarios of potential levels and timing of GHG emissions, to evaluate the causes of changes already observed and to project future changes in temperature and other climate conditions (for example, Meehl *et al*. 2007, entire; Ganguly *et al*. 2009, pp. 11555, 15558; Prinn *et al*. 2011, pp. 527, 529). All combinations of models and emissions scenarios yield very similar projections of increases in the most common measure of climate change, average global surface temperature (commonly known as global warming), until about 2030. Although projections of the magnitude and rate of warming differ after about 2030, the overall trajectory of all the projections is one of increased global warming through the end of this century, even for the projections based on scenarios that assume that GHG emissions will stabilize or decline. Thus, there is strong scientific support for projections that warming

will continue through the 21st century, and that the magnitude and rate of change will be influenced substantially by the extent of GHG emissions (IPCC 2007a, pp. 44–45; Meehl *et al*. 2007, pp. 760–764, 797–811; Ganguly *et al*. 2009, pp. 15555–15558; Prinn *et al*. 2011, pp. 527, 529). (See IPCC 2007b, p. 8, for a summary of other global projections of climate-related changes, such as frequency of heat waves and changes in precipitation. Also see IPCC 2011 (entire) for a summary of observations and projections of extreme climate events.)

Various changes in climate may have direct or indirect effects on species. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as interactions of climate with other variables (for example, habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). Identifying likely effects often involves aspects of climate change vulnerability analysis. Vulnerability refers to the degree to which a species (or system) is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the type, magnitude, and rate of climate change and variation to which a species is exposed, its sensitivity, and its adaptive capacity (IPCC 2007a, p. 89; see also Glick *et al.* 2011, pp. 19–22). No single method for conducting such analyses applies to all situations (Glick *et al.* 2011, p. 3). We use our expert judgment and appropriate analytical approaches to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

As is the case with all stressors that we assess, even if we conclude that a species

is currently affected or is likely to be affected in a negative way by one or more climate-related impacts, it does not necessarily follow that the species meets the definition of an "endangered species" or a "threatened species" under the Act. If a species is listed as endangered or threatened, knowledge regarding the vulnerability of the species to, and known or anticipated impacts from, climate-associated changes in environmental conditions can be used to help devise appropriate strategies for its recovery.

Global climate projections are informative and, in some cases, the only or the best scientific information available for us to use. However, projected changes in climate and related impacts can vary substantially across and within different regions of the world (for example, IPCC 2007a, pp. 8–12). Therefore, we use "downscaled" climate projections when they are available and have been developed through appropriate scientific procedures, because such projections provide higher resolution information that is more relevant to spatial scales used for analyses of a given species (see Glick *et al*. 2011, pp. 58–61, for a discussion of downscaling). With regard to our analysis for Vandenberg monkeyflower, downscaled climate projections are available.

Within central-western California (i.e., counties along the California coast from the San Francisco Bay area south to Santa Barbara County), regional climate models project a mean annual temperature increase of 1.6 to 1.9 degrees Celsius (^{o}C) (2.9–3.4 degrees Fahrenheit (°F)) and a mean diurnal temperature range increase of 0.1 to 0.2 ^{o}C (0.2–0.4 °F) by 2070 (Point Reyes Bird Observatory (PRBO) Conservation Science 2011, p. 35). The projected impacts of climate change are warmer winter temperatures, earlier

warming in the spring, and increased summer temperatures (PRBO Conservation Science 2011, p. 35). Additionally, regional climate models project a decrease in mean annual rainfall of 2.4 to 7.4 in (6.1 to 18.8 cm) (PRBO Conservation Science 2011, p. 35). The large range of possible precipitation change (-11 percent to -32 percent) is due to different model projections and sensitivity. This sensitivity indicates substantial uncertainty in precipitation projections (PRBO Conservation Science 2011, p. 35). Other scientific sources (Snyder *et al.* 2004, pp. 594–595) project similar temperature increases and precipitation decreases along the central California coast.

Of the three major vegetation types within central-western California, decreases in cover are projected for chaparral-coastal scrub habitat (-19 to -43 percent) and blue oak woodland-foothill pine habitat (-44 to -55 percent), and an increase in cover projected for grassland habitat (85 to 140 percent) to 2070 (PRBO Conservation Science 2011, p. 38). Lenihan *et al.* (2008) also projects decreases in cover for conifer forests and shrublands, and increases in cover for grasslands in central-western California by the 2070–2099 period. Additionally, changes in vegetation communities could also be hastened by more and larger wildfires, as well as effective wildfire suppression (PRBO Conservation Science 2011, pp. 37–38) (see *Factor A—Anthropogenic Fire* section).

To estimate what changes in rainfall and temperature, if any, would occur in the Burton Mesa area over the next 50 years, we used both local weather data and an available projection tool called ClimateWizard (2012). Temperature and precipitation data have been recorded in the City of Lompoc, approximately 4 mi (6.4 km) to the south

of Burton Mesa Ecological Reserve. Between 1950 and 2006, the average annual temperature was approximately 58 °F (14 °C); the average annual precipitation was approximately 15 in (38 cm) (Western Regional Climate Center 2012). We then used ClimateWizard (2012) to project future climate conditions and compare to baseline values (the latter of which is defined as the average temperature or precipitation between 1961 and 1990 (ClimateWizard 2012)). ClimateWizard (2012) projects that rainfall would decrease an average of 8 to 12 percent from baseline and temperature would rise approximately 2.5 °F (1.4°C) by the 2050s. A comparison between the Burton Mesa area and the eastern portion of Santa Barbara County (for example, 30 mi (48 km) east of the Burton Mesa area, which is projected to rise approximately 5 °F (2.8 °C)), indicates that the change in temperature is expected to be less in the Burton Mesa area. This is likely due to the moderating influence of ocean temperatures in coastal areas.

In a changing climate, conditions could change in a way that would allow both native and nonnative plants to invade the habitat where Vandenberg monkeyflower occurs. A growing body of literature discusses the specific mechanisms by which climate change could affect the abundance, distribution, and long-term viability of plant species, as well as current habitat configuration over time, including (but not limited to): Root *et al.* (2003), Parmesan and Yohe (2003), and Visser and Both (2005). While studies on response to climate change have not been conducted for Vandenberg monkeyflower, responses may be similar to other plant species with a similar life history. Some of the responses by plants to climate change presented by Root *et al.* (2003), Parmesan and Yohe (2003), Visser and Both (2005), and others include the following:

(1) Drier conditions may result in less suitable habitat, or a lower germination success and smaller population sizes.

(2) Higher temperatures may inhibit germination, dry out soil, or affect pollinator services.

(3) The timing of pollinator life cycles may become out-of-sync with timing of flowering.

(4) A shift in the timing and nature of annual precipitation may favor expansion in abundance and distribution of nonnative species.

(5) Drier conditions may result in increased fire frequency, making the ecosystems in which a species currently grows more vulnerable to threats of nonnative plant invasion.

We recognize that climate change is an important issue with potential impacts to species and their habitats, including Vandenberg monkeyflower. Regional climate projections indicate that a warming and drying trend is likely in central-western California, which would likely make habitat less favorable for Vandenberg monkeyflower. However, as stated above, these warming and drying effects may be moderated by the marine influence. Therefore, climate change may not affect Vandenberg monkeyflower or its habitat as quickly or as extensively as may be projected. We will continue to seek additional information concerning how climate change may affect the Burton Mesa area (see **Information Received** section above).

Conservation Measures Undertaken

The Air Force has an approved Integrated Natural Resources Management Plan (INRMP) on Vandenberg AFB, and the CDFW and California State Parks have established natural resources management plans for the Reserve and La Purisima Mission SHP, respectively. Herein, we discuss specific conservation measures as they apply to each threat described above (see *Factor A—Development, Utility Maintenance and Miscellaneous Activities, Invasive, Nonnative Plants, Anthropogenic Fire, and Recreation* sections above); however, not all landowners implement conservation measures that address each threat.

Vandenberg Air Force Base (AFB)

The Air Force developed an INRMP in 2011 (Air Force 2011c) pursuant to the Sikes Act Improvement Act of 1997 (Sikes Act). The Sikes Act requires the Department of Defense to develop and implement INRMPs for military installations in the United States. INRMPs direct the management and use of the lands on a military installation and are prepared in cooperation with the Service and State fish and wildlife agencies to ensure proper consideration of fish, wildlife, and habitat needs. This Vandenberg AFB INRMP was prepared to provide strategic direction to ecosystem and natural resources management on Base. The long-term goal of the INRMP is to integrate all management activities in a manner that sustains, promotes, and restores the health and integrity of ecosystems using an adaptive management approach. The INRMP was designed to: (1)

Summarize existing management plans and natural resources literature pertaining to Vandenberg AFB; (2) identify and analyze management goals in existing plans; (3) integrate the management goals and objectives of individual plans; (4) support Base compliance with applicable regulatory requirements; (5) support the integration of natural resource stewardship with the Air Force mission; and (6) provide direction for monitoring strategies. The INRMP includes a chapter that identifies step-down goals for the management of threatened and endangered species on Base; however, since Vandenberg monkeyflower was not a listed species at that time, specific goals for it were not included. In 2012, the Air Force approved an addendum that addresses specific goals for Vandenberg monkeyflower (Air Force 2012). The INRMP and addendum provide for measures that would conserve Vandenberg monkeyflower, as follows:

(1) *Development*. The Air Force is not likely to construct new launch facilities within suitable habitat near human-populated areas, and the future siting of community facilities is expected to occur in a manner that capitalizes on existing infrastructure and circulation systems (Air Force 2009a, p. 32). Thus, no specific conservation measures have been proposed to minimize the threat of development to Vandenberg monkeyflower or its habitat on Base.

(2) *Utility Maintenance and Miscellaneous Activities*. Construction of new facilities is not likely to occur within Vandenberg monkeyflower habitat; however, existing utilities will require periodic maintenance. No specific conservation measures were proposed in the addendum to the INRMP (Air Force 2012). The main objective is

to avoid any impacts to habitat, when possible, by either confining the work to existing disturbed areas or rerouting the work to avoid suitable habitat completely, and minimize the impact as much as possible (Air Force 2012, p. 2). For Vandenberg monkeyflower, the Air Force would avoid impacting Burton Mesa chaparral as much as possible if utility maintenance is required in suitable habitat.

(3) *Invasive, Nonnative Plants*. The INRMP (Air Force 2011a) includes an Invasive Plant Species Management Plan that identifies the threat of invasive, nonnative plants on Base, and proposes removal methods to limit further spread and assist in restoration of habitat degraded by invasive species. In most cases, the Air Force would utilize chemical application to manage for invasive plants (Air Force 2011a, p. 43). Although the INRMP identified invasive, nonnative plants as a threat and calls for their removal, it did not identify which nonnative species, and which areas on Base, were a priority for treatment.

In the 2012 addendum to their INRMP, the Air Force identifies veldt grass as the most problematic invasive, nonnative plant on Base for Vandenberg monkeyflower. As part of this addendum, the Air Force also identified their 10-year funding program, which included more than $500,000 to treat veldt grass, starting in 2009 and continuing through 2019 (Air Force 2012). While the Air Force does not specify precisely where, when, or how much veldt grass will be treated or removed in specific years, they state that a substantial portion of this effort will focus on areas within the range of Vandenberg monkeyflower (Air Force 2012, p. 1). Through 2012, the Air Force has chemically

treated approximately 141 acres (57 ha) of invasive, nonnative plants, mostly treating pampas grass within Burton Mesa chaparral but not near extant Vandenberg monkeyflower occurrences (treatment was to benefit *Eriodictyon capitatum* (Lompoc yerba santa)). Other invasive, nonnative plants treated included veldt grass, iceplant, *Eucalyptus* spp. (Eucalyptus), and *Pinus* spp. (Pine)). Only a small proportion of this chemical removal occurred within Burton Mesa chaparral at two locations where Vandenberg monkeyflower occurs (Lake and Pine Canyons) (Lum *in litt.* 2013).

(4) *Fire*. For fires that would affect Vandenberg monkeyflower and its habitat, the Air Force developed a GIS layer incorporating all potential suitable habitat areas, which has been made available to fire response crews for use during actual fire events. Multiple conservation measures that address the potential threat of fire are included in the addendum (Air Force 2012, p. 2), including the following:

(a) Established roads, both paved and unpaved, would be used to the greatest extent possible as fire lines unless an emergency dictates otherwise.

(b) Burned areas would be assessed after a fire for rehabilitation options within 10 days of the area being declared safe for entry.

(c) Vandenberg monkeyflower habitat affected by wildfire and rehabilitation projects will be monitored, which would include recommendations for nonnative species control.

(d) Following any significant wildfire event within the range of Vandenberg monkeyflower on Base, a Burn Area Emergency Response (BAER) project will be initiated. This generally includes implementation of erosion control, native vegetation

restoration, firebreak rehabilitation, and invasive species management.

Additionally, the addendum proposes to incorporate portions of Vandenberg monkeyflower habitat in a controlled burn program (Air Force 2012, p. 2).

(5) *Recreation*. No conservation measures have been proposed to address the threat of recreation to Vandenberg monkeyflower.

Burton Mesa Ecological Reserve (Reserve)

Ecological Reserves are established under California State law to provide protection for rare, threatened, or endangered native plants, wildlife, aquatic organisms, and specialized terrestrial or aquatic habitat types. According to the California Code of Regulations (14 CCR Section 630), public entry and use of ecological reserves shall be compatible with the primary purposes of such reserves, and subject to general rules and regulations. The State Lands Commission signed a 49-year lease of the Burton Mesa Ecological Reserve on January 20, 2000. The purpose of the lease is to manage, operate, and maintain these sovereign lands for the sensitive species and habitats they support (Gevirtz *et al.* 2007, p. 3). The CDFW developed a management plan for the Reserve that guides management of habitats, species, and programs to achieve the mission of CDFW to protect and enhance wildlife values (Gevirtz *et al.* 2007, p. 1).

Conservation measures are proposed in the management plan, as outlined below.

However, implementation of the management goals is contingent upon available funding and staffing. Currently, no funding is dedicated for the management of the Reserve and it is staffed by 10 percent of one biologist position. Some grant funding has been used for specific management needs.

(1) *Development*. Because new development would not occur on the Reserve, there are no conservation measures to implement that would minimize this threat to Vandenberg monkeyflower.

(2) *Utility Maintenance and Miscellaneous Activities*. Several public utilities and local governmental agencies provide services to the local community and use the Reserve to accomplish their roles. Within the Reserve, agencies responsible for conducting maintenance activities submit maintenance plans for all scheduled activities to CDFW, who in turn may request conservation measures (such as modifying the size and frequency of actions) to minimize impacts on natural resources (Gevirtz *et al.* 2007, pp. 230–236). We are not aware of specific projects in which the CDFW has requested conservation measures to minimize the impacts to Vandenberg monkeyflower and its habitat. However, the goal is to minimize damage to sensitive biological and cultural resources (Gevirtz *et al.* 2007, p. 230), which would include minimizing impacts to Burton Mesa chaparral.

(3) *Invasive, Nonnative Species*. The Reserve's management plan encourages minimizing the impact and presence of invasive, nonnative plants, including monitoring

and removing nonnative plants; preventing new introductions by working with public utilities, local governmental agencies, and recreationists that use the Reserve; and restoring disturbed and degraded areas with native species (Gevirtz *et al.* 2007, pp. 241–242, 249–253). Additionally, during spring of 2011, the Santa Barbara Botanic Garden conducted a 2-day educational workshop at the Reserve to discuss Burton Mesa chaparral and identify the local plants, learn more about the distribution and habitat requirements of some of the County's rare plants, and document populations of rapidly spreading weeds, such as Sahara mustard, that are threatening rare species (Junak 2011). Furthermore, volunteers, CDFW, and our staff have occasionally mapped, removed, or chemically treated a few populations of invasive, nonnative plants on the Reserve, including Sahara mustard, veldt grass, iceplant, and pampas grass (Junak 2011; Meyer 2012, pers. comm.). We recently provided funding ($60,000) to CDFW to compare various removal methods for invasive species, in which part of the funding would be used to enhance suitable Vandenberg monkeyflower habitat on the Reserve and monitor the results; work will commence in 2013 (CDFG 2011, entire).

(4) *Fire*. The CDFW management plan for the Reserve calls for coordination among the Santa Barbara County Fire Department, enforcement agencies, local governmental agencies, and adjacent small and large landowners to ensure that fire risk is reduced, that new development projects adjacent to the Reserve are reviewed by CDFW staff and address fuel reduction needs and requirements, and that appropriate and efficient post-fire remediation takes place, where needed (Gevirtz *et al.* 2007, pp. 255–262). Reducing the risk of fire would limit the potential for wildfire to occur within

Vandenberg monkeyflower habitat, and thus reduce the impact of fire suppression activities and the impact of invasive, nonnative plants invading the habitat post-fire (see *Factor A—Invasive, Nonnative Plants and Anthropogenic Fire* sections above). Additionally, the plan suggests prohibiting the use of prescribed fire for the purposes of reducing fuel load, but allowing use of controlled burns for small-scale restoration projects (such as suppression of annual grasses or stimulation of chaparral seed bank for restoration projects) (Gevirtz *et al.* 2007, p. 258). No controlled burns within Vandenberg monkeyflower habitat have occurred to date.

(5) *Recreation*. CDFW developed a trails plan that shows existing trails within the Reserve as well as proposed new trail construction; seasonal trail closures or restrictions may occur to protect sensitive resources such as wildlife breeding locations or rare plant assemblages that vary from year to year (Gevirtz *et al.* 2007, p. 70). This system of trails would reduce the risk of authorized recreational uses directly impacting suitable Vandenberg monkeyflower habitat. The management plan calls for maintaining public access to the Reserve through pedestrian hiking trails by providing a network of trails, including loop trails, linking interesting areas while protecting resources, and preventing unauthorized uses (Gevirtz *et al.* 2007, p. 231).

La Purisima Mission State Historic Park

General plans for State Parks are prepared to guide future management and development of State Park System units. The goal of the State Parks natural resource

management program is to protect, restore, and maintain the natural resources in the State Park System. A general plan is the primary management document for each unit of the California State Park System, defining a park's primary purpose, and establishing a management direction for its future. The General Plan must satisfy certain requirements of the Public Resources Code and be approved by the California State Park and Recreation Commission before the Department undertakes any development in the park that would constitute a permanent commitment of natural or cultural resources. Further, broad resource management policies concerning State Historic Parks are stated in the Public Resources Code, the California Code of Regulations, and the Department's Resource Management Directives (California State Parks 1991, p. 54). A general management plan for La Purisima Mission SHP was completed in 1991 (California State Parks 1991, entire), and an ecosystem characterization of La Purisima Mission SHP was completed in 2005 (Gevirtz *et al.* 2005, entire). Directives specific to La Purisima Mission SHP that concern the habitat where Vandenberg monkeyflower occurs include preserving Burton Mesa chaparral, protecting and managing rare and endangered plants in perpetuity, controlling nonnative plants that have become established, and developing a prescribed-burn plan (California State Parks 1991, p. 54).

Conservation measures are proposed in the general management plan, as outlined below. However, implementation of the management goals is contingent upon available funding and staffing. State Parks often rely upon the dedicated work of volunteers. Additionally, while the management plan contains biological resource conservation measures, the primary goal of the plan for La Purisima Mission SHP is to preserve the

historical setting and maintain the historical “sense of place”—visitors' sense of stepping back in history (California State Parks 1991, p. 3).

(1) *Development*. The significance of the historical setting at La Purisima Mission SHP has always been given a high priority, as has management of the existing facilities (California State Parks 1991, p. 120). There are multiple existing structures within the park, and any new structures must provide for visitors' needs without competing for attention with historical buildings or the natural setting. All new development must be sensitive to that purpose of providing appropriate visitor facilities without detracting from the historical and natural setting of La Purisima Mission (California State Parks 1991, p. 121). Additionally, Burton Mesa chaparral habitat areas are designated as low-intensity use areas (California State Parks 1991, p. 66). Therefore, any new development is unlikely to impact Vandenberg monkeyflower or its habitat in the park.

(2) *Utility Maintenance and Miscellaneous Activities*. No conservation measures are proposed for the threat of utility maintenance actions within the park; however, there is no indication that the maintenance activities for existing utilities have affected Vandenberg monkeyflower or its habitat.

(3) *Invasive, Nonnative Species*. California State Parks’ resource management programs try to remove or control invasive, nonnative species and reestablish indigenous native species (California State Parks 2013). Stands of veldt grass and pampas grass

within Burton Mesa chaparral were chemically treated in 2009 and 2010 (California State Parks 2010, p. 3). Veldt grass removal efforts have focused on hand removal in areas where it is encroaching into intact native habitat and into sparsely vegetated areas where native annual herbs grow, including Vandenberg monkeyflower. California State Parks received funding from the Service's Coastal Program in August 2012 and anticipates commencing veldt grass eradication efforts in 2013 to enhance Vandenberg monkeyflower habitat (Service 2012c, pp. 5–6). Specifically, California State Parks will enhance 91 ac (37 ha) of upland habitat surrounding extant occurrences of Vandenberg monkeyflower by removing veldt grass (Service 2012c, entire).

(4) *Fire*. California State Parks requires that a wildfire management plan be developed for every State Park. They developed a general management plan in 1991 and stated their intent to continue to work with the Santa Barbara County Fire Department, the California Department of Forestry and Fire Protection, local fire districts, and other appropriate agencies to implement and keep this plan current (California State Parks 1991, p. 57). In 2007, California State Parks initiated development of a wildfire management plan that would include management strategies to protect the existing infrastructure (buildings) and protect cultural resources and biological resources of the park (which would include Vandenberg monkeyflower habitat), as well as informing fire suppression agencies of the areas with high-value resources and the limits of fire suppression activities in those areas. No prescribed burns currently occur within the park (Cox 2013, pers. comm).

(5) *Recreation*. As part of the general management plan, California State Parks developed a trail management plan to reduce conflicts between recreational use and historical values of the park (California State Parks 1991, pp. 5, 109). Consideration will be given to designating trails for specific types of uses and constructing new trail segments to avoid conflicts (California State Parks 1991, p. 65). The trail system requires continual brush and erosion control, in which California State Parks often relies on numerous volunteers such as scouts and environmental groups to assist the park each year in various projects, from litter pickup to trail construction (California State Parks 1991, p. 109). A designated trail system would reduce the risk of authorized recreational uses directly impacting Vandenberg monkeyflower habitat. However, as described above in the *Recreation and Other Human Impacts* section, the best available information indicates that recreational activities are currently having minimal to no effect on Vandenberg monkeyflower habitat at La Purisima Mission SHP.

Summary of Conservation Measures Undertaken for Vandenberg AFB, the Reserve, and La Purisima Mission SHP

Management goals for the Air Force, CDFW, and California State Parks in these plans include, but are not limited to, minimizing the spread and impact of invasive, nonnative species; working with local agencies to recognize the importance of, and resource protections afforded to, sensitive species like Vandenberg monkeyflower and its habitat; and maintaining the natural resources of Burton Mesa, especially Burton Mesa chaparral habitat. The Air Force, CDFW, and California State Parks have attempted to

address the greatest threat to Vandenberg monkeyflower by removing or chemically treating invasive, nonnative plants on their lands, respectively. Working collaboratively in some instances, the Service has funded and volunteered manpower to help reduce the spread and impact of invasive, nonnative plants. Overall, because implementation of the management plans is dependent upon available funding and staffing, because of the quantity of invasive, nonnative species that threaten Vandenberg monkeyflower habitat (Burton Mesa chaparral), and because of the difficulty eradicating invasive, nonnative species once they become established on Burton Mesa, the implementation of the management plans as currently constituted would not eliminate the threats described in Factor A.

Summary of Factor A

Most of the historical loss of Burton Mesa chaparral is due to military, residential, and commercial development that occurred in the past and resulted in many developed areas that have existed for decades, although historical loss of chaparral is also due to the presence and expansion of invasive, nonnative plants. Prior to 1938, there were approximately 23,550 ac (9,350 ha) of Burton Mesa chaparral (Hickson 1987, p. 34). In 2012, approximately 10,057 ac (4,070 ha) of Burton Mesa chaparral remained, which represents a loss of 53 percent of the original upland habitat (Service 2012a, unpublished data). Based on the habitat characteristics of Burton Mesa chaparral, it is probable that an equivalent percent loss of sandy openings that occur in-between shrubs may have occurred over this timeframe (see *Background—Habitat* section above).

The majority of remaining Burton Mesa chaparral where Vandenberg monkeyflower occurs is within Federal or State-owned lands and is protected from development. Therefore, large-scale future development of remaining Burton Mesa chaparral is not likely to occur and thus is not a significant threat to Vandenberg monkeyflower. However, smaller scale private property development; access to easements; maintenance of utility, oil, and gas pipelines; fire and fire suppression; and authorized and unauthorized recreational activities may continue to take place throughout Burton Mesa. Some of these activities may occur within Burton Mesa chaparral or adjacent to occurrences of Vandenberg monkeyflower, resulting in the destruction and possible removal of Vandenberg monkeyflower habitat and creating open areas for nonnative plants to invade. Therefore, the direct destruction and alteration of chaparral habitat could continue to occur on a relatively small scale and is thus considered a threat to Vandenberg monkeyflower both currently and in the future.

The presence and proliferation of invasive, nonnative plants is a threat to Vandenberg monkeyflower habitat that has the most significant impact to the species because nonnatives are spreading rapidly across Burton Mesa. The Air Force, CDFW, and California State Parks are implementing conservation measures to address the threat of nonnative plants within Vandenberg monkeyflower habitat. Nevertheless, invasive, nonnative plants are present at all locations where Vandenberg monkeyflower occurs, are known to alter native habitat, including that of Vandenberg monkeyflower, and are reducing the abundance and diversity of native plant species. Many of the nonnative

species that occur on Burton Mesa are species deemed to pose significant ecological concerns because they displace native vegetation and occupy sandy openings where Vandenberg monkeyflower grows. Additionally, development that has fragmented the mesa, ground disturbances along easements, and authorized and unauthorized recreational activities increase the pathways for nonnative plants to establish and spread. Moreover, fire increases the potential for the invasion of nonnative plants by creating bare ground that facilitates the spread of nonnative vegetation. Therefore, with the prevailing onshore wind, an abundant upwind source of nonnative plants and seed, and continued ground disturbances, we conclude that the presence and expansion of invasive, nonnative plants is a threat to Vandenberg monkeyflower habitat both currently and in the future.

Climate change may have potential impacts on Vandenberg monkeyflower and its habitat, such as increased temperatures and decreased precipitation that would likely reduce suitable habitat. However, because of the moderating influence of the ocean, the effect of climate change on Burton Mesa flora may be moderated.

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

No available information indicates any impacts to Vandenberg monkeyflower related to overutilization for commercial, recreational, scientific, or educational purposes

or that these activities would increase in the future. Therefore, we do not consider this factor to be a threat to Vandenberg monkeyflower, nor do we expect it to be in the future.

Factor C. Disease or Predation

There is no available information indicating any impacts to Vandenberg monkeyflower related to disease or predation, or that disease or predation may become a concern in the future. Therefore, we do not consider disease or predation to be threats to Vandenberg monkeyflower, nor do we expect them to become threats in the future.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

Under this factor, we examine whether existing regulatory mechanisms are inadequate to address the threats to Vandenberg monkeyflower discussed under other factors. We give strongest weight to statutes and their implementing regulations, and management direction that stems from those laws and regulations. They are nondiscretionary and enforceable, and are considered a regulatory mechanism under this analysis. Examples include State governmental actions enforced under a State statute or constitution, or Federal action under statute.

Some other programs are more voluntary in nature or dependent on available funding (see *Conservation Measures Undertaken* section above); in those cases, we analyze the specific facts for that effort to ascertain its effectiveness at mitigating the

threat and the extent to which it can be relied on in the future. Having evaluated the significance of the threat as mitigated by any such conservation efforts, we analyze under Factor D the extent to which existing regulatory mechanisms adequately address the specific threats to the species. Regulatory mechanisms, if they exist, may preclude the need for listing if we determine that such mechanisms adequately address the threats to the species such that listing is not warranted.

Vandenberg monkeyflower is not federally or State-listed as endangered or threatened. The Service added this species to the Federal list of candidate species on November 10, 2010 (75 FR 69222; see **Previous Federal Actions** section above); however, candidate species are afforded no protections under the Act. The California Native Plant Society (CNPS) classifies this species as 1B.1, which denotes that a taxon is seriously endangered in California (CNPS 2012).

State Regulations

The California Endangered Species Act (CESA) allows the Fish and Game Commission to designate species, including plants, as threatened or endangered. The CESA makes it illegal to import, export, "take," possess, purchase, sell, or attempt to do any of those actions to species that are designated as threatened, endangered, or candidates for listing, unless permitted by CDFW. Vandenberg monkeyflower is not listed as threatened or endangered under the CESA (CDFW 2012).

The Native Plant Protection Act (NPPA) was enacted in 1977 and allows the Fish and Game Commission to designate plants as rare or endangered. The NPPA prohibits take of endangered or rare native plants, but includes some exceptions for agricultural and nursery operations, emergencies, and (after properly notifying CDFW) vegetation removal from canals, roads, and other sites, changes in land use, and certain other situations. Vandenberg monkeyflower is not designated as rare or endangered under the NPPA (CDFW 2012).

Ecological Reserves are established under California State law to provide protection for rare, threatened, or endangered native plants, wildlife, aquatic organisms, and specialized terrestrial or aquatic habitat types. Likewise, the goal of the State Parks resource management program is to protect, restore and maintain the natural resources in the State Park System (see *Conservation Measures Undertaken* section above).

The California Environmental Quality Act (CEQA) requires a full disclosure of the potential impacts that proposed projects on non-Federal lands will have on the environment, including sensitive resources. CEQA does not confer any protection to sensitive species, but merely requires disclosure of potential impacts. Lead CEQA agencies are also required to disclose potential impacts to CNPS list 1B.1 species, including Vandenberg monkeyflower. The lead agency for CEQA analysis is the public agency with primary authority or jurisdiction over the project, and is responsible for conducting a review of the project and consulting with other agencies responsible for resources affected by the project; this agency is typically a county, city, or special district

agency. Three proposed projects have undergone CEQA analysis on Burton Mesa in recent years, and the CEQA process adequately disclosed impacts of these projects (see *County or Local Regulations* below for a discussion of the CEQA process for these three proposed projects).

County and Local Regulations

(1) The County of Santa Barbara, which is the lead agency responsible for CEQA review for projects on non-Federal lands where Vandenberg monkeyflower occurs, approved the Clubhouse Estates residential development in August 2005 (County of Santa Barbara Planning Commission 2005) (see *Factor A—Development* for a description of the project).

While the CEQA review disclosed impacts to Vandenberg monkeyflower and its habitat at the Clubhouse Estates project site, the CEQA review does not afford protection to this species or its habitat. Therefore, the County of Santa Barbara included conditions to their approval of the Clubhouse Estates development project. County stipulations to the Clubhouse Estates approval that would benefit Vandenberg monkeyflower and its habitat included: onsite habitat restoration and preservation plan, an open space management plan, onsite habitat restoration, and native plant propagation. Thus, the project proponent (LFR, Inc.) developed a restoration, construction monitoring, and resource protection plan to address the mitigation of native ecological resources impacted by the development project, to provide for restoration of disturbed habitat within the

designated open space (Lot 54), and to describe ecological resource protection measures that would be implemented during construction (LFR, Inc. 2006, p. 1, pp. 34–60). The restoration plan was developed (LFR, Inc. 2006) but has not been fully implemented, possibly due to the development project falling into foreclosure in December 2009 (VVCSD 2011). Additionally, LFR, Inc. conducted actions to further preserve Vandenberg monkeyflower by collecting seeds and storing them at the Santa Barbara Botanic Garden, salvaging topsoil from where Vandenberg monkeyflower previously occurred on the project site (which likely contained a seed bank), and depositing the topsoil outside of the project site and within suitable habitat, and transplanting three individual plants (McGowan *in litt.* 2007).

The County is also responsible for permitting other activities, such as grading, according to Santa Barbara County Grading Code, Chapter 14. A grading permit would have associated erosion and sediment controls, including best management practices and other conditions of approval that would minimize impacts to sensitive biological resources (County of Santa Barbara Planning and Development 2013; LFR, Inc. 2006, entire). Our records indicate that the Clubhouse Estates project site was cleared prior to the developer's acquisition of a grading permit from the County (Mooney *in litt* 2006; Meyer *in litt.* 2006). Thus, in this case, County regulations concerning grading were inadequate to ensure proper implementation of the permitting process, which would have included implementing the conditions of approval that serve to minimize impacts to sensitive biological resources. As a result, clearing the Clubhouse Estates project site destroyed Burton Mesa chaparral that was occupied by Vandenberg monkeyflower

individuals and removed adjacent habitat that likely harbored a seed bank (Meyer *in litt.* 2010b; see *Development—Private Lands* under Factor A). Additionally, this unpermitted ground disturbance created open areas where veldt grass and Sahara mustard have expanded to areas where they did not occur prior to the vegetation being cleared from the project site (Meyer *in litt.* 2010b; see *Invasive, Nonnative Species* section above).

(2) The City of Lompoc conducted a CEQA review for the Burton Ranch (see *Factor A—Development* for a description of the project). Approximately 141 of 149 ac (57 of 60 ha) of the project site would be developed, including removal of 83 ac (34 ha) of chaparral habitat on Burton Mesa. No Vandenberg monkeyflower has been observed within this project site. A 100-ft (30-ha) buffer between the development and the Reserve boundary to the north of the project site and 10 ac (4 ha) of onsite open space were proposed as part of the project (SAIC 2005a). Additionally, to mitigate for the removal of native vegetation at the Burton Ranch project site, the project proponent completed a conservation easement with the Land Trust for Santa Barbara County (Land Trust) that will protect 95 ac (38 ha) of land featuring unique Burton Mesa chaparral, coastal scrub and oak savannah habitat near Vandenberg Village, an area that is known as the Burton Ranch Chaparral Preserve (Feeney *in litt.* 2012). The Land Trust received this 95 ac (38 ha) and will monitor the property and work with CDFW to protect and enhance the ecological resources of the site (Land Trust 2013). This area straddles adjacent portions of the Burton Mesa Ecological Reserve and is connected to the Reserve via walking trails (Land Trust *in litt*. 2011).

(3) The Allan Hancock College District conducted the CEQA analysis for a proposal to construct a public safety complex at Allan Hancock College (see *Factor A—Development* section for a description of the project). The proposal includes removal of at least 40 ac (16 ha) of chaparral habitat on Burton Mesa along the northern project boundary that is contiguous with the Davis Creek drainage. Vandenberg monkeyflower has not been observed within this project site. Approximately 105 of the 200 ac (42 of 81 ha) of the site is covered with chaparral habitat and, minus the 40 ac (16 ha) of chaparral within the project footprint, approximately 65 ac (26 ha) of chaparral habitat that is contiguous would be preserved (Allan Hancock College 2009, pp. 9, 135). Preserving chaparral in this area may reduce the potential for nonnative plants to invade the intact Burton Mesa chaparral that is contiguous with the Reserve to the north of this project site.

Despite implementation of the CEQA process and disclosure of the impacts to this species or its habitat, these projects illustrate that development can constitute a direct threat (removal of Vandenberg monkeyflower individuals) to Vandenberg monkeyflower and/or suitable habitat, and this threat is present and is expected to continue into the future (see *Development—Private Lands* section under Factor A above) within Burton Mesa chaparral (Vandenberg monkeyflower habitat) on non-Federal lands. Threats to the habitat are exacerbated because ground-disturbing projects further fragment chaparral habitat and create open areas (i.e., vectors) for invasive, nonnative plants to establish and further expand into Burton Mesa (see the *Invasive, Nonnative Species* section above).

Federal Regulations

The National Environmental Policy Act (NEPA) requires full disclosure of potential impacts that proposed projects on Federal lands or with Federal involvement will have on the environment, including sensitive resources. The NEPA process would apply to projects proposed on Vandenberg AFB and projects on non-Federal lands that include a Federal nexus, such as funding or permitting by a Federal agency. The NEPA analysis, like CEQA, does not confer any protection to sensitive species, but merely discloses potential impacts. Although Federal agencies may include conservation measures for Vandenberg monkeyflower as a result of the NEPA process, any such measures are typically voluntary in nature and are not required by statute.

For example, although the Vandenberg monkeyflower is not yet a federally threatened or endangered species, it is recognized by Vandenberg AFB as a species deserving of conservation measures as demonstrated by the Air Force's recent submittal of a proposal to include Vandenberg monkeyflower in their INRMP (Air Force 2012). The Air Force could include conservation measures for Vandenberg monkeyflower and its habitat as a result of the NEPA process. The NEPA would not itself regulate activities that might affect Vandenberg monkeyflower, but it would require full evaluation and disclosure of information regarding the effects of contemplated Federal actions on sensitive species and their habitats.

The Sikes Act requires the Department of Defense to develop and implement INRMPs for military installations in the United States. INRMPs direct the management

and use of the lands on a military installation and are prepared in cooperation with the Service and State fish and wildlife agencies (i.e., CDFW) to ensure proper consideration of fish, wildlife, and habitat needs (see *Conservation Measures Undertaken* section above for more discussion of Vandenberg AFB's INRMP).

Summary of Factor D

The existing regulatory mechanisms at the Federal and State levels require evaluation of potential actions that may impact Vandenberg monkeyflower and its habitat on Burton Mesa. At the Federal level, the NEPA only requires evaluation of impacts to the human environment. The Sikes Act requires military installations to develop INRMPs to ensure proper consideration of fish, wildlife, and habitat needs on their lands. However, no protections are in place at the local, State, and Federal levels that are intended to protect a plant species that is not Federally or State-listed, although Vandenberg AFB has proposed to include this species in their INRMP. Additionally, at least one incident of unauthorized grading occurred without following the required local permit process; loss of Vandenberg monkeyflower individuals and habitat was documented.

Federal and State ownership of much of the occupied Vandenberg monkeyflower habitat and the regulatory purposes that define the use of those Federal and State lands protect the species from direct losses of habitat and provide further protection from many of the forms of disturbance described above. However, the current regulatory regime

does not address the majority of impacts associated with loss of Vandenberg monkeyflower habitat (i.e., development of private lands that result in habitat loss, fire and fire suppression efforts, authorized and unauthorized recreation activities, and the invasion and expansion of invasive, nonnative species). As described above under Factor A, the primary threat with the greatest severity and magnitude of impact to Vandenberg monkeyflower is invasive, nonnative species invasion and expansion. The existing regulatory mechanisms currently in place at the local, State, and national levels are inadequate to address this threat to Vandenberg monkeyflower and its habitat.

Factor E. Other Natural or Manmade Factors Affecting Its Continued Existence

Competition for Resources with Invasive, Nonnative Species

In Factor A, we discussed how invasive, nonnative plants alter the habitat that supports Vandenberg monkeyflower. In this section, we discuss how invasive, nonnative plants compete with individuals of Vandenberg monkeyflower for light, water, and soil nutrients.

Invasion of nonnative plants and in particular nonnative grasses are a threat to Vandenberg monkeyflower because small annuals such as this species most likely cannot compete with fast-growing nonnative plants for light, water, and soil nutrients (refer to Barrows *et al.* 2009; Lambrinos 2000; D'Antonio and Vitousek 1992). Grasses have long been recognized as effective competitors with herbaceous and woody species (Davis

and Mooney 1985; D'Antonio and Vitousek 1992).

(1) *Sunlight*. Rapidly growing nonnative grasses can reduce light at the soil surface and thereby reduce the photosynthetic ability of competitors (Thompson 1991, pp. 394–395). Like certain other annual *Diplacus* taxa, Vandenberg monkeyflower only grows in habitats with little to no competition from invasive, nonnative plants (VFWO 2013). As described in *Factor A—Invasive, Nonnative Plants*, high densities of veldt grass would easily overtop Vandenberg monkeyflower because of monkeyflower's small stature, which in turn creates shaded conditions that are not suitable for germination and growth of Vandenberg monkeyflower. Additionally, Sahara mustard is able to form a canopy up to 3 ft (1 m) aboveground; this forces the native plants growing under the canopy to put more energy into growing taller at the expense of producing branches, flowers, and fruits (Barrows *et al.* 2009, p. 683). Therefore, because veldt grass and Sahara mustard grow taller in stature and more quickly than Vandenberg monkeyflower, these invading nonnative plants would likely shade and reduce the productivity and survival of Vandenberg monkeyflower where these species occur in close proximity to one another. Veldt grass in particular is of immediate concern given its presence at: (1) All of the Vandenberg monkeyflower extant occurrences; and (2) one potentially extirpated occurrence (i.e., Lower Santa Lucia Canyon (Meyer *in litt.* 2012c)), where veldt grass is a dominant species within the sandy openings and where herbs that are commonly associated with Vandenberg monkeyflower are absent.

(2) *Water and Soil Nutrients*. Nonnative grasses compete effectively with native

species for water and soil nutrients (D'Antonio and Vitousek 1992, p. 70). The effective uptake of water and nutrients by grasses is the result of their dense shallow root systems. The root systems of most woody species are deeper and less dense than those of grasses; once woody species become large, they are generally thought to have access to moisture and nutrients from portions of the soil profile below grass roots (D'Antonio and Vitousek 1992, p. 70). Shallow-rooted herbs that occur in open areas were found to deplete soil moisture to a maximum depth of 1.6 ft (0.5 m); grassland plants had roots active to 2.5 ft (0.75 m); and chaparral had roots extending below 6.6 ft (2.0 m) (Davis and Mooney 1985, p. 525). Therefore, grasses are most effective as competitors against seedlings and shallow-rooted annuals rather than saplings or adults of woody species (Davis and Mooney 1985, p. 528; D'Antonio and Vitousek 1992, p. 70). However, Knoop and Walker (1985, p. 249) demonstrated that grasses can reduce water availability in the subsoil at a depth of 1 to 4.25 ft (0.3 to 1.3 m) where shrub roots are common.

Many examples exist of invasive, nonnative plants outcompeting native herbs and shrubs for water and soil nutrients, some of which include the following:

(1) Davis and Mooney (1985, p. 528) demonstrated across a grassland-chaparral ecotone in Jasper Ridge Biological Preserve (approximately 7.5 mi (12 km) west of Palo Alto, California) that bare-zone annual herbs, such as *Navarretia heterodoxa* (Calistoga pincushionplant) and *Lessingia germanorum* var. *glandulifera* (valley lessingia), would be poor competitors against grassland species, in part, because these annual plants are shallow rooted and nonnative annual grasses are able to deplete the water in shallow soil.

(2) Eliason and Allen (1997, p. 252) conducted a study in the Santa Margarita Ecological Reserve (near Temecula, California) and determined that the growth and survival of transplanted *Artemisia californica* (California sagebrush) seedlings was significantly reduced in the presence of Mediterranean annual grasses from germination through the first growing season. This effect was due to the depletion of soil water because young California sagebrush and nonnative annual grasses are both shallow rooted.

(3) Melgoza *et al.* (1990, pp. 11–12) conducted a study in Belle Flats (approximately 22 mi (35 km) north of Reno, Nevada) and demonstrated that competition with *Bromus tectorum* (cheatgrass) negatively affected the productivity and water status of native perennial species. Melgoza *et al.* (1990, pp. 7, 11–12) found cheatgrass suppressed productivity of native species for an extended period of time (12 years after a fire) once it was established in open areas around native species, thus enhancing its capability after a fire to exploit soil resources and enhance its status in the community.

Because individuals of Vandenberg monkeyflower are small in stature (growing up to 10 in (25.4 cm) tall), invasive, nonnative plants that grow taller in stature and quicker than this species (such as veldt grass and Sahara mustard; see *Factor A—Invasive, Nonnative Plants and Anthropogenic Fire* section) may inhibit the growth and production of Vandenberg monkeyflower attempting to grow nearby. Moreover, because Vandenberg monkeyflower likely is shallow rooted like other small annual plants that

grow in sandy openings within chaparral, invasive, nonnative grasses that occur within and near the species are likely outcompeting it by depleting the water at shallow depths and soil nutrients that it requires. Veldt grass is of particular concern because: (1) It is present at nine (100 percent) of the Vandenberg monkeyflower extant occurrences and one potentially extirpated occurrence (i.e., Lower Santa Lucia Canyon); and (2) it has deep-reaching roots that are able to tolerate Mediterranean climates (Tothill 1962, pp 132–161). Thus, veldt grass could deplete the water and soil nutrients that would otherwise be available for Vandenberg monkeyflower.

Small Population Size and Restricted Range

According to the criteria put forth by the World Conservation Union, as modified for plants, a species that has life history, population, and distribution attributes similar to those of Vandenberg monkeyflower is considered to have a high risk of extinction in the wild in the immediate future (Keith 1998, pp. 1085–1087). Species with few populations and individuals are vulnerable to the threat of naturally occurring events, which can cause extinction through mechanisms operating either at the genetic, population, or landscape level (Shaffer 1981, pp. 131–134; Primack 1998, pp. 279–308). Environmental stochasticity is annual variation in reproduction and death rates in response to weather, disease, competition, predation, or other factors external to the population (Shaffer 1981, p. 131). Natural catastrophes or prolonged drought could also result in the extirpation of a small population (Shaffer 1981, p. 131).

The genetic characteristics of Vandenberg monkeyflower have not been investigated; therefore, the degree to which genetic characteristics contribute to the likelihood of this species being vulnerable to extinction is unknown. However, random events operating at the population and landscape levels may increase the chance of extinction for Vandenberg monkeyflower. Although data are not available to determine population trends for this species, the best available information gained from multiple survey years between 2003 and 2012 indicate that 3 occurrences (33 percent) have fewer than 100 individuals. Six occurrences (67 percent) were recently shown to harbor more than 100 individuals, and 2 of those 6 occurrences (22 percent) contained more than 1,000 individuals (see *Current Status of Vandenberg Monkeyflower* section above). Numbers of plants observed during the most recent surveys are low for the three occurrences that have historically had fewer than 100 individuals observed (but a seed bank may still exist):

(1) Four individuals were found in 2006 at Oak Canyon, although no individuals were found during the most recent surveys in 2010 and 2012 (VFWO 2013; Air Force 2012, p. 1; Lum *in litt.* 2012b; Rutherford *in litt.* 2012).

(2) Twenty-five individuals were found in 2006 at the Santa Lucia Canyon occurrence, and one individual was found during the most recent survey in 2010 (Ballard 2006; Lum *in litt.* 2012b).

(3) Five individuals were found in 2003 at the Volans Avenue occurrence, one in

2007, and no plants were found in other years surveyed between 2004 and 2009 (Meyer *in litt.* 2007; Ballard *in litt.* 2007).

Vandenberg monkeyflower fits the profile of a species that is considered to have small population numbers for an annual plant and is vulnerable to extinction because it has a restricted geographic range, and less than 10 known occurrences with less than 10,000 mature individuals (Keith 1998, pp. 1085–1087) (see *Distribution of Vandenberg Monkeyflower—Current Status* section above). Additionally, the potential further fragmentation of habitat and resulting increased isolation of Vandenberg monkeyflower occurrences affect the species rangewide by increasing the risk of population loss and potentially subsequent loss of genetic characteristics.

Species with few populations or those with low numbers may be subject to forces at the population level that affect their ability to complete their life cycles successfully. The number and density of flowering plants in a population can be important determinants of pollinator abundance and behavior (Jennersten 1988, pp. 361–363; Bernhardt *et al.* 2008, p. 948). Reduced numbers of individuals of flowering plants may lead to a reduction in abundance of pollinators and subsequent seed set and fitness of seed progeny (Menges 1991, p. 162). Specific information is not available for Vandenberg monkeyflower; however, these studies on other plant-pollinator relationships point out the importance of pollinators that is likely applicable to Vandenberg monkeyflower.

The invasion of nonnative plants has the ability to reduce the abundance of pollinators, which can have deleterious effects on reproduction of native plants. Jennersten (1988, p. 363) found that insect diversity, insect visitation rates to *Dianthus deltoides* (maiden pink), and number of seeds produced were significantly reduced where maiden pink was in a more fragmented habitat compared to continuous habitat. Lambrinos (2000, pp. 228) found that invasion of nonnative plants such as pampas grass can reduce the abundance of pollinators because pampas grass replaces nectar- and pollen-rich flowers of native shrubs and reduces the diversity of feeding sites provided by woody perennials. Lambrinos (2000, p. 227) also noted that arthropod (spiders and insects) abundance is lower overall, and known to be absent in areas dominated by pampas grass. In contrast, Bernhardt *et al.* (2008, p. 948) found that pollination of a native species such as *Lupinus perennis* (sundial lupine) increased with both population size and population density, which significantly affected insect visitation rates. Therefore, because Vandenberg monkeyflower has less than 10 occurrences, consists of low numbers of individuals, and invasive, nonnative plants are replacing native vegetation of Burton Mesa, this species may experience reduced reproduction because of reduced visitation by insect pollinators. However, we are unaware of specific information concerning the extent to which this may be a threat for Vandenberg monkeyflower.

Annual plants that are subject to wide fluctuations in population numbers from year to year, such as Vandenberg monkeyflower, may have difficulty maintaining a viable population size after a series of poor seed-production years. Additionally, if the

host plants (plants being visited by pollinators) are partially self-incompatible, reduction in population size may lead to increased self-pollination and may reduce the level of genetic variability. At the landscape level, random natural events, such as storms, drought, or fire, could destroy a significant percentage of individuals or entire populations. Because Vandenberg monkeyflower comprises a small number of locations and individuals, and is restricted to a small geographic area on Burton Mesa, this species' risk of extinction increases from such naturally occurring events. No empirical information is available to estimate trends for Vandenberg monkeyflower populations; however, the continued decrease in habitat (especially from nonnative plant invasions) is contributing to habitat fragmentation and impacting the species' ability to persist.

Recreation

Recreational use occurs on Burton Mesa within Vandenberg AFB, the Reserve, and La Purisima Mission SHP. We discussed the effects to Vandenberg monkeyflower habitat resulting from recreational use (see *Factor A—Recreation*); however, recreational activities may also result in trampling individuals of Vandenberg monkeyflower. The Volans Avenue occurrence of Vandenberg monkeyflower is adjacent to a sewer line easement that is also used for hiking and dog walking. Recreational users are encouraged to stay within existing and designated trails (see *Factor A—Recreation*). No other location where this species occurs is adjacent to designated trails. Therefore, the best available information indicates that recreational activities involving casual human use are having minimal effect on individuals of Vandenberg monkeyflower. Unauthorized

recreational activities such as mountain biking and ORV use have resulted in damaged native vegetation, and squashed and sometimes broken plant parts (Meyer *in litt.* 2010c; Meyer *in litt.* 2013). Determining where the unauthorized ORV activity originates on the Reserve is difficult because of the historical network of trails and roads. Available information does not indicate the extent and degree to which ORV activity and mountain biking may be impacting Vandenberg monkeyflower individuals.

Summary of Factor E

Competition for light, water, and soil nutrients from invasive, nonnative vegetation, particularly nonnative grasses, is a threat to Vandenberg monkeyflower. Because this species has a restricted range and small population numbers, it is vulnerable to naturally occurring events such as a wildfire, storms, and drought that could negatively affect its growth and productivity. Additionally, because of the restricted range, small number of individuals at each occurrence, and the spread of invasive, nonnative plants adjacent to each occurrence, this species is vulnerable to a reduction of visits by pollinating insects. The best available information indicates that casual recreational use has a minimal impact to individuals. Unauthorized recreational uses (ORVs and mountain biking) have the potential to result in damage to the native vegetation; however, the best information available does not indicate a direct threat to individuals of Vandenberg monkeyflower. Indirect effects of potential ground disturbance could create openings in the vegetation and assist the seed spread and establishment of nonnative vegetation. Therefore, we conclude that competition for resources with invasive,

nonnative species and small population size and restricted range are threats to Vandenberg monkeyflower currently and in the future.

Combination of Factors

Many of the threats discussed above act in concert, and the resulting effects to Vandenberg monkeyflower are amplified. For example, some land uses and development or maintenance activities (Factor A) create ground disturbance and subsequent openings in the vegetation where nonnative plants (Factor A) can invade, expand, and outcompete native vegetation (Factor E). Fires on Burton Mesa (Factor A) result in an increase in nonnative vegetation (Factor A). Similarly, an abundance of nonnative vegetation, particularly grasses (Factor A and E), may result in an increase in fire frequency (Factor A). The availability of habitat and small overall population size (Factor E) may be affected in a changing climate and by events such as wildfire (Factor A). Thus, Vandenberg monkeyflower's productivity may be reduced because of these threats, either singularly or in combination. Existing regulatory mechanisms have not proven effective at protecting Vandenberg monkeyflower or its habitat from these threats (Factor D).

The presence of invasive plants is the most significant threat to this species, both alone and in combination with other Factors (e.g., anthropogenic fire, recreation). The combination of factors would likely create a cumulative or synergistic threat to the existence of Vandenberg monkeyflower. Given these circumstances, the combined effects of current threats to the population put the species at risk rangewide, although the

magnitude or extent of such threats to the viability of the species is not at this time determinable from available information.

Proposed Determination

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to Vandenberg monkeyflower. We have identified threats to Vandenberg monkeyflower attributable to Factors A, D, and E.

In the summary of the threats described in detail above, we found that Vandenberg monkeyflower suitable habitat on Burton Mesa has been displaced by military, residential, and commercial development, although the most significant ongoing threat to Vandenberg monkeyflower is the loss of habitat due to the presence and continual spread of invasive, nonnative plants (Factor A). Approximately 53 percent of Burton Mesa chaparral habitat has been lost, with only 10,057 ac (4,070 ha) of the 23,550 ac (9,350 ha) that existed before 1938 remaining.

Additionally, invasive, nonnative plants, in particular veldt grass, are present and continuing to expand at all nine extant locations. No Vandenberg monkeyflower individuals have been observed at the three smallest extant locations (in the last 3 years at one location and the last 6 years at the other two locations) even though a residual seed bank is likely present. Burton Mesa chaparral is also subject to an anthropogenic fire

regime that can increase the presence of invasive plants (Factor A). Casual human recreational use and utility maintenance activities can contribute to habitat disturbance that facilitates pathways for nonnative species to invade Burton Mesa chaparral habitat (Factor A).

Furthermore, invasive, nonnative plants are likely competing with Vandenberg monkeyflower for sunlight, water, and soil resources, and the species' restricted range and small population size makes it vulnerable to changing environmental conditions due to climate change and other random, naturally occurring events (Factor E). Small population size is a highlighted concern in part due to the low number of individuals found to exist at the 3 smallest extant occurrences, in particular 3 of the 9 occurrences that have a range of 0 to 25 individuals documented between 2003 and 2012. The threats described above for Vandenberg monkeyflower occur across its entire range, resulting in a negative impact on the species' distribution, abundance, and probability of long-term persistence. Existing regulatory mechanisms are not adequate to protect the species or its habitat from these identified threats (Factor D).

The Act defines an endangered species as any species that is "in danger of extinction throughout all or a significant portion of its range" and a threatened species as any species "that is likely to become endangered throughout all or a significant portion of its range within the foreseeable future." We find that Vandenberg monkeyflower has a restricted range and is facing ongoing and projected threats across its range. We conclude that it meets the definition of an endangered species throughout its entire range

due primarily to: (1) The invasion, spread, and competition of invasive, nonnative species at all nine extant locations; and (2) small population size that makes it vulnerable to stochastic events. These impacts are heightened due to anthropogenic fire conditions that promote further invasion of nonnative species; recreation and other human activities that contribute to the spread of invasive, nonnative species; and continued development on private lands that further reduces and fragments the remaining suitable habitat. The threats to its continued existence are not commencing in the foreseeable future (which would result in a status determination of a threatened species), but are immediate and ongoing. We base this determination on the immediacy, severity, and scope of the threats described above. Therefore, on the basis of the best available scientific and commercial information, we propose listing Vandenberg monkeyflower as an endangered species in accordance with sections 3(6) and 4(a)(1) of the Act.

Under the Act and our implementing regulations, a species may warrant listing if it meets the definition of an endangered or threatened species throughout all or a significant portion of its range. The Vandenberg monkeyflower that is proposed for listing in this rule is highly restricted in its range and the threats occur throughout its range. Therefore, we assessed the status of Vandenberg monkeyflower throughout its entire range. The threats to the survival of the species occur throughout the species range and are not restricted to any particular significant portion of that range. Accordingly, our assessment and proposed determination applies to the species throughout its entire range.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and conservation by Federal, State, Tribal, and local agencies, private organizations, and individuals. The Act encourages cooperation with the States and requires that recovery actions be carried out for all listed species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act requires the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed, preparation of a draft and final recovery plan, and revisions to the plan as significant new information becomes available. The recovery outline guides the

immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. The recovery plan identifies site-specific management actions that will achieve recovery of the species, measurable criteria that indicate when a species may be downlisted or delisted, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (comprising species experts, Federal and State agencies, nongovernmental organizations, or stakeholders) are often established to develop recovery plans. If a final listing rule is completed for Vandenberg monkeyflower, the Service will develop and complete a recovery outline, draft recovery plan, and the final recovery plan that will be available on our Web site (*http://www.fws.gov/endangered*), or from our Ventura Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribal, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (for example, restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If this species is listed, funding for recovery actions may be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. Additionally, pursuant to section 6 of the Act, the State of California would be eligible for Federal funds to implement management actions that promote the protection and recovery of Vandenberg monkeyflower. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants*.

Although Vandenberg monkeyflower is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act 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 designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of

the species or 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 consultation with the Service.

Federal agencies proposing activities within the species' habitat that may need to conference or consult or both with the Service as described in the preceding paragraph include the Department of Defense, the Bureau of Prisons, the Federal Energy Regulatory Commission, and the Federal Highway Administration. Activities potentially include management and any other landscape-altering activities on Federal lands administered by the Department of Defense or the Bureau of Prisons, issuance of section 404 Clean Water Act permits by the Army Corps of Engineers, construction and management of gas pipeline and power line ROWs licensed by the Federal Energy Regulatory Commission, and funding by the Federal Highway Administration for the construction and maintenance of roads or highways.

The Act and its implementing regulations set forth a series of general prohibitions and exceptions that apply to endangered plants. All 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 remove and reduce the species to possession from areas under Federal jurisdiction. Additionally, for plants listed as endangered, the Act prohibits the malicious damage or destruction on areas under Federal jurisdiction and

the removal, cutting, digging up, or damaging or destroying of such plants in knowing violation of any State law or regulation, including State criminal trespass law. Certain exceptions to the prohibitions apply to agents of the Service and State conservation agencies. Vandenberg monkeyflower is not currently designated as rare or endangered under the NPPA or the CESA (CDFW 2012).

CEQA requires a full disclosure of the potential impacts that proposed projects on non-Federal lands will have on the environment, including sensitive resources. However, CEQA does not confer any protection to sensitive species, but merely discloses potential impacts. The lead agency for CEQA analysis is the public agency with primary authority or jurisdiction over the project, and is responsible for conducting a review of the project and consulting with other agencies responsible for resources affected by the project. Under CEQA, lead agencies are required to disclose potential impacts from proposals to CNPS list 1B.1 species; this mechanism may indirectly provide some protection to Vandenberg monkeyflower.

We may issue permits to carry out otherwise prohibited activities involving endangered and threatened wildlife and plant species under certain circumstances. Regulations governing permits are codified at 50 CFR 17.62 for endangered plant species, and at 17.72 for threatened plant species.

It is our policy, as published in the **Federal Register** on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those

activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effects of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing. The following activities could potentially result in a violation of section 9 of the Act; this list is not comprehensive:

Removing and reducing to possession Vandenberg monkeyflower from areas under Federal jurisdiction; malicious damage or destruction of Vandenberg monkeyflower from areas under Federal jurisdiction; unauthorized collecting, handling, possessing, selling, delivering, carrying, or transport across State lines and import or export across international boundaries, except for properly documented antique specimens of these taxa at least 100 years old, as defined by section 10(h)(1) of the Act.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Ventura Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**). Requests for copies of the regulations concerning listed plants and general inquiries regarding prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Endangered Species Permits, Regional Recovery Permit Coordinator, Carlsbad Fish and Wildlife Office, 6010 Hidden Valley Road, Suite 101, Carlsbad, California 92011; (telephone 760–431–9440 ext. 225; facsimile 760–930–0846).

Peer Review

In accordance with our joint policy on peer review published in the **Federal Register** on July 1, 1994 (59 FR 34270), we will seek the expert opinions of at least three appropriate and independent specialists regarding this proposed rule. The purpose of peer review is to ensure that our listing determination is based on scientifically sound data, assumptions, and analyses. We have invited these peer reviewers to comment during this public comment period.

We will consider all comments and information received during this comment period on this proposed rule during our preparation of a final determination. Accordingly, the final decision may differ from this proposal.

Public Hearings

Section 4(b)(5) of the Act provides for one or more public hearings on this proposal, if requested. Requests must be received within 45 days after the date of publication of this proposed rule in the **Federal Register**. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and places of those hearings, as well as how to obtain reasonable accommodations, in the **Federal Register** and local newspapers at least 15 days before the hearing.

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq*.). This rule will not impose recordkeeping or reporting requirements on State or local

governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the NEPA (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with listing a species as endangered or threatened under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the 10th Circuit, we do not need to prepare environmental analyses pursuant to NEPA in connection with designating critical habitat under the Endangered Species Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the 9th Circuit (*Douglas County* v. *Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).]

References Cited

A complete list of references cited in this rulemaking is available on the Internet

at *http://www.regulations.gov* at Docket No. FWS–ES–R8–2013–0078 and upon request from the Ventura Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this package are the staff members of the Ventura Fish and Wildlife Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

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

Authority: 16 U.S.C. 1361–1407; 1531–1544; 4201–4245; unless otherwise noted.

2. In § 17.12(h) add an entry for "*Diplacus vandenbergensis* (Vandenberg monkeyflower) to the List of Endangered and Threatened Plants in alphabetical order under Flowering Plants to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
Flowering Plants							
* * * * * * *							
Diplacus vandenbergensis	Vandenberg monkeyflower	U.S.A. (CA)	Phrymaceae	E	--	--	NA
* * * * * * *							

September 30, 2013.

Rowan W. Gould,

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

Billing Code 4310–55–P

[FR Doc. 2013-25397 Filed 10/28/2013 at 8:45 am; Publication Date: 10/29/2013]