U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Mimulus fremontii* (Benth.) A. Gray var. *vandenbergensis* D. M. Thompson

COMMON NAME: Vandenberg monkeyflower

LEAD REGION: Pacific Southwest, Region 8

INFORMATION CURRENT AS OF: April 15, 2010

STATUS/ACTION:

___ Initial 12-month Petition Finding: ___ not warranted
___ warranted
___ warranted but precluded (also complete (c) and (d) in section on petitioned candidate species- why action is precluded)

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

_X_ New candidate

___ Continuing candidate

_X_ Non-petitioned

___ Petitioned - Date petition received:

_ 90-day positive - FR date:

_ 12-month warranted but precluded - FR date:

_ Is the petition requesting a reclassification of a listed species?

___ Listing priority change

Former LP: ___

New LP: ___

Latest Date species became a Candidate:

___ Candidate removal: Former LP: ___

___ A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___ F - Range is no longer a U.S. territory.

___ I - Insufficient information exists on biological vulnerability and threats to support listing.

___ M - Taxon mistakenly included in past notice of review.

___ N - Taxon may not meet the Act's definition of "species."

___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY:

Flowering plants; Phrymaceae (no common name)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE:
California, Santa Barbara County, United States

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:
California, Santa Barbara County, United States

LAND OWNERSHIP: Of the seven known extant populations, two occur on Federal property; four occur on State property; and one occurs mostly on private property, but with a small portion also occurring on State property. Most of the intervening areas between these populations are either already developed or privately owned. Both populations on Federal lands occur on Vandenberg Air Force Base (AFB). Of the populations on State property, two occur on La Purisima Mission State Historic Park and two occur on the Burton Mesa Ecological Reserve. One of the two populations on the Burton Mesa Ecological Reserve may be in the right-of-way for State Route 1.

LEAD REGION CONTACT:
Pacific Southwest Region; Andy DeVolder, 916-414-6481

LEAD FIELD OFFICE CONTACT:
Ventura Fish and Wildlife Office; Mark A. Elvin, Biologist, 805-644-1766 ext. 258
Ventura Fish and Wildlife Office; Connie Rutherford, Listing and Recovery Coordinator for Plants, 805-644-1766 ext. 306

BIOLOGICAL INFORMATION:
Taxonomy and Description: *Mimulus fremontii* (Benth.) A. Gray var. *vandenbergensis* D. M. Thompson (Vandenberg monkeyflower) is a monkeyflower in the Phrymaceae family (no common family name). The Phrymaceae is a family that is closely related to the Scrophulariaceae (snapdragon family). *Mimulus fremontii* var. *vandenbergensis* was described in August 2005 by David M. Thompson in his monograph: *Mimulus* subgenus *Schizoplacus* (2005 p. 134). The plant is an erect annual herb ranging from 0.5 to 10 inches (in) (1 to 20 centimeters (cm)) tall. It can produce a solitary flower or be branched throughout. The stems are usually green with purplish tinting and are glandular. The flowers are bright yellow with reddish brown markings near the mouth. *Mimulus fremontii* var. *vandenbergensis* differs from the nominative variety, *Mimulus fremontii* var. *fremontii* (Fremont's monkeyflower), in that the latter has dark reddish purple flowers.

Mimulus fremontii var. *vandenbergensis* also differs in habitat and distribution from *Mimulus fremontii* var. *fremontii.* The latter occurs "…often on soft sandy soils, locally common along washes, on floodplains of larger streams, or along areas of water runoff in sunny openings among shrubs; 75 to 2075 m." (Thompson 2005 p. 130). It occurs at higher elevations and ranges from Monterey County south to Baja California, and inland to the Tehachapi Mountains, the southern Sierra Nevada Mountains, and the Mojave Desert.

Photo by Mary Meyer, CDFG

Above, Vandenberg monkeyflower in open sand habitat between native chaparral shrubs on Burton Mesa Ecological Reserve.

In contrast, *Mimulus fremontii* var. *vandenbergensis* occurs only in western Santa Barbara County, at lower elevations and closer to the coast, in sandy openings of coastal scrub, chaparral, and woodlands (Wilken 2010 p. 2). The nearest occurrence of *Mimulus fremontii* var. *fremontii* is approximately 25 miles (mi) (40 kilometers (km)) to the northeast in the San Rafael Mountains (Consortium 2010; Thompson 2005 p. 133). There appears to be no overlap in range or habitat between these two taxa. At one location in La Purisima State Historical Park, there are a few individuals of *Mimulus* that are morphologically identical to *Mimulus fremontii* var. *vandenbergensis* except they are a reddish color; the relationship of these few individuals to *Mimulus fremontii* var. *vandenbergensis* and *Mimulus fremontii* var. *fremontii* needs to be studied further.

Life History: The life history of *Mimulus fremontii* var. *vandenbergensis* has not been studied; however, we believe that certain characteristics are similar to those of other annual *Mimulus* species. As with other small annual herbaceous species within the Mediterranean climate of California (Major 1988, pp. 34-38), the seeds most likely germinate during the winter rains; flowering peaks during the month of April, and seed sets shortly thereafter. The seeds of *Mimulus fremontii* var. *vandenbergensis* are small and numerous, and seed is likely dispersed by the wind as the seed pods dehisce (Dieter Wilken, Director of Conservation, Santa Barbara Botanic Garden (SBBG), pers. comm. 2009). As with other annual species that are sensitive to annual levels of rainfall, germination of resident seed banks may be low or nonexistent in unfavorable years, with little or no aboveground expression of the species visible.

Habitat: *Mimulus fremontii* var. *vandenbergensis* is restricted to a distinct ecological-geographic region known as Burton Mesa that is approximately 15 mi (24 kilometers (km)) due north of

Point Conception and 7 to 13 mi (11 to 21 km) inland from the Pacific Ocean in western Santa Barbara County, California. Burton Mesa is located in a transitional area between geographic regions caused by the change in coastline orientation at Point Conception, which affects the local climatic conditions. Because of these local climatic conditions, as well as extensive sandy soils, a highly diverse and rich assemblage of plant and wildlife species occur here and nowhere else in the world (Gevirtz et al. 2005b pp. 79-82, Davis 1987 pp. 317-324, Davis et al. 1988 pp. 1-11, Ferren et al. 1984 pp. 75-81).

Soils, geology, and topography: Burton Mesa is comprised of an old dune sheet that extends from Shuman Canyon on Vandenberg Air Force Base (Vandenberg AFB) southeasterly to the Purisima Hills (Cooper 1967 p. 89-91). This dune sheet was subsequently covered by newer dunes deposited by offshore winds primarily between 10,000 and 25,000 years ago. These dunes are comprised of sands that are poorly-consolidated with a clay-enriched B-horizon profile, and the substratum is generally a dense, cemented sand layer which may contribute to the water-holding capacity of the soil (Shipman 1972 in Hunt 1993 p. 16). The frequently strong transoceanic winds blow across the Mesa, sometimes causing localized blowouts in the sandy soils (Ferren et al. 1984 p. 4). Burton Mesa is comprised of a series of flat-topped hills averaging 400 feet (ft) (122 meters (m)) in elevation. *Mimulus fremontii* var. *vandenbergensis* is almost exclusively found on thin layers of aeolian- (wind-) deposited sands within these habitat types between approximately 100 and 400 ft (30 and 122 m) in elevation (Wilken 2010).

Vegetation: The primary native vegetation in the Burton Mesa area is maritime chaparral dominated by chamise (*Adenostema fasciculatum*), Santa Barbara ceanothus (*Ceanothus impressus*), and various manzanita (*Arctostaphylos*) species, some of which are endemic to Burton Mesa. Coast live oaks (*Quercus agrifolia*) are interspersed throughout the chaparral; in older undisturbed patches of habitat, the oaks attain a 40 to 70 percent crown cover. The vegetation transitions to coastal sage scrub as it nears the ocean. Within this area, *Mimulus fremontii* var. *vandenbergensis* typically grows in sandy openings of coastal scrub and maritime chaparral with patches of native grasslands (Wilken 2010). The vegetation in this area has been described by Ferren et al. 1984 p. 131, Davis et al. 1988, Gevirtz et al. 2005b pp. 167-170, SAIC 2005 pp 4.3.1-4.3.18, Odion et al. 1992 pp. 3-14).

Numerous human uses have altered the vegetation on Burton Mesa, and have been summarized in Gevirtz et al. 2005b (pp. 53-66, 181-185 and elsewhere (Odion et al. 1992 pp. 3-14). Starting in the 1800s, wheat farming and cattle grazing removed native vegetation. In the early 1900s, approximately 30 oil wells were drilled in this area. During the 1940s, Vandenberg AFB, which includes the western portion of Burton Mesa, was established as an armory and infantry training camp. In the 1960s, urban development in the communities of Vandenberg Village, Mesa Oaks, and Mission Hills also started removing the vegetation on Burton Mesa and fragmenting the remaining stands of chaparral. Roads, both dirt and asphalt, now criss-cross the area and facilitate the introduction and spread of nonnative plant and animal species (Gevirtz et al. 2005b pp. 53-66, 181-185).

Fire ecology: With all these human activities in the area, the frequency of fires has increased. While some of the chaparral species are adapted to fire (e.g., many of the ceanothus (*Ceanothus*

spp.) and manzanita are "stump sprouters"), the change in fire frequency, intensity, and the more recent presence and spread of invasive nonnative species has influenced how the native vegetation on Burton Mesa responds to fire (Hickson 1988 29 pp.). In some portions of Burton Mesa, chaparral stands may be 80 years or older (Gevirtz et al. 2005b pp. 57-61). Larger individuals of coast live oak also tend to be in areas not recently disturbed by burning or clearing (Davis & Goetz 1990 12 pp.).

Burton Mesa has been noted for the very high numbers of herbaceous annuals and perennials that appear after a fire (Harrison in Gevirtz et al. 2005b pp. 57-61, 102-105; Odion in Gevirtz et al. 2005b pp. 57-61). The response of *Mimulus fremontii* var. *vandenbergensis* to fire is unknown at this time. On the one hand, the decrease in cover by chaparral shrubs may provide additional habitat, albeit temporary, for *Mimulus fremontii* var. *vandenbergensis*. However, due to the presence of veldt grass within the Burton Mesa area, fire events may provide the opportunity for this invasive species to increase, which in turn would likely be detrimental for *Mimulus fremontii* var. *vandenbergensis* due to increased competition.

Historical and Current Distribution: The entire range of *Mimulus fremontii* var. *vandenbergensis* occurs on the eastern portion of Burton Mesa (Wilken 2010). *Mimulus fremontii* var. *vandenbergensis* is bounded by Purisima Hills to the north and east, Santa Ynez River to the south, and the mesa edge on the west side of Santa Lucia Canyon, including the tributary canyons to the west (e.g., Lakes, Oak, and Pine Canyons). The habitat and soils that it grows on are only found in a crescent-shaped area approximately 7 mi (10.7 km) long by 2 mi (3.0 km) wide that comprises less than 15,000 acres (ac) (6,070 hectares (ha)). All known populations of this taxon are located within this area (Consortium of California Herbaria (Consortium) 2010), but are found at sites comprising less than 500 ac (202 ha) (Figure 1).

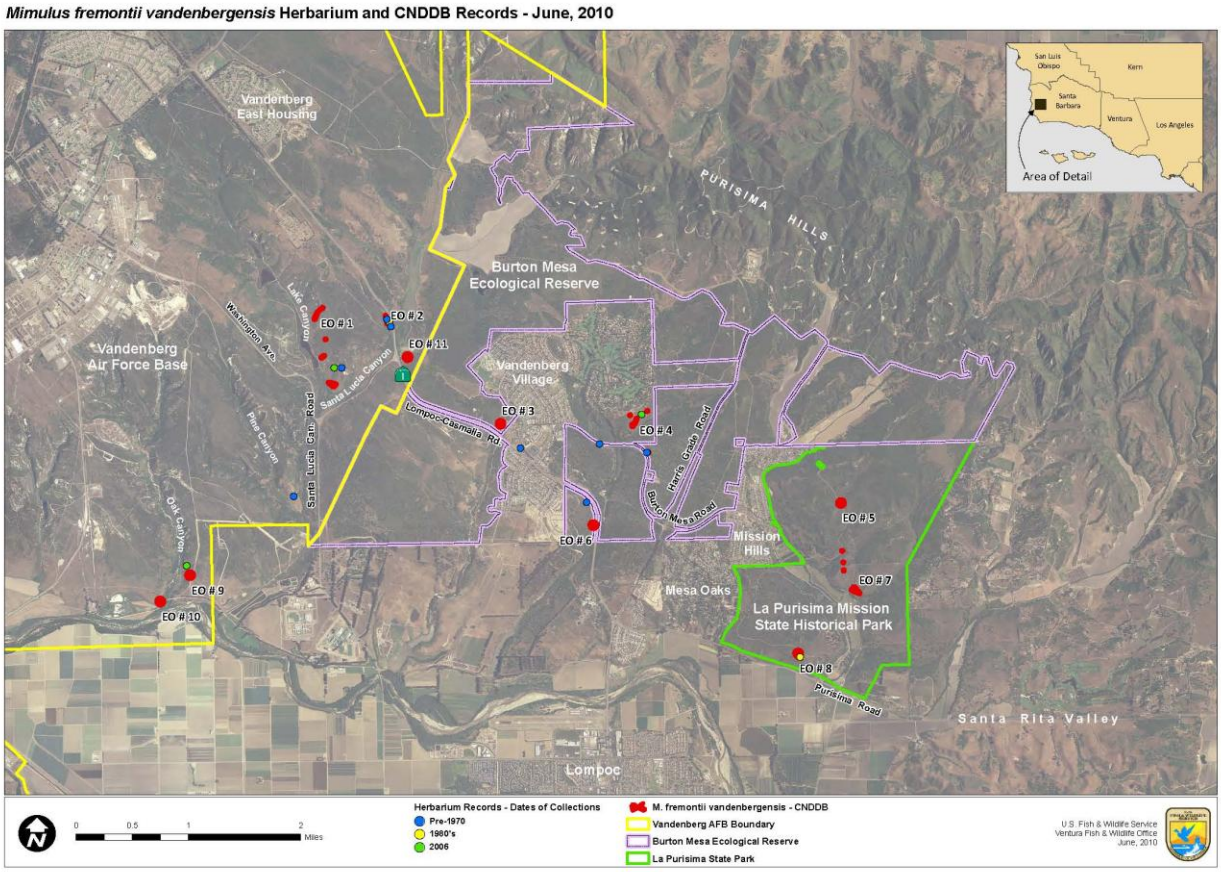

Figure 1: Locations of current and historic records for *Mimulus fremontii* var. *vandenbergensis* in the Burton Mesa region, Santa Barbara County, California.

Among the historical collections included in the Consortium database (Consortium 2010), there are two collections that were made from sites that do not currently support populations of *Mimulus fremontii* var. *vandenbergensis*:

1) One of these populations was located near Pine Canyon, on the eastern edge of Vandenberg AFB, and to the north of Oak Canyon. *Mimulus fremontii* var. *vandenbergensis* has not been documented from this site (on Vandenberg AFB) since it was collected there in 1960 (Rancho Santa Ana Botanic Garden 2006, Jepson Herbarium 2006). *Mimulus fremontii* var. *vandenbergensis* appears to be extirpated from this site; however, suitable habitat still exists.

2) In 1931, a historical collection was made in the Santa Ynez Valley, approximately 5 mi (8 km) southeast of this area, along Highway 246 east of La Purisima (SBBG 2010, Consortium 2010); at some point prior to 1931, seed from Burton Mesa may have blown downwind to this site. This site was surveyed multiple times in 2006 (Wilken 2010) and no plants were seen; no suitable habitat remains due to conversion to agriculture (vineyards, berries (Mark A. Elvin,

Service biologist, 2009 pers. obs.) and heavily grazed pastureland (Wilken 2010)). We believe *Mimulus fremontii* var. *vandenbergensis* has been extirpated from this site because no suitable habitat remains.

Status of Currently Known Populations:

The status of the seven currently known populations is discussed below and is summarized in Table 1. In 2006, approximately 2,000 individuals total were observed during surveys of the known populations, historical sites, and other suitable areas within the range of the taxon (Ballard 2006, Wilken 2006). As of 2009, the status of the seven known populations is as follows:

1) Oak Canyon: This population occurs on the eastern edge of Vandenberg AFB, on the mesa edge at the mouth of Oak Canyon, and southeast of the Santa Lucia Canyon population. It was reported to be "common" at this site in the late 1980s or early 1990s (Dennis Odion, Southern Oregon University, *in litt.* 2006); however, only four individuals could be found in 2006 (Elvin, pers. obs. May 15, 2006). A fire burned part of lower Oak Canyon where *M. fremontii* var. *vandenbergensis* occurred in 2006 (Elvin, pers. obs. 2006). This fire resulted in the conversion of the scrub and grassland habitats to dense veldt grass (*Ehrharta calycina*) fields, which are threatening the persistence of *M. fremontii* var. *vandenbergensis* through competition for resources (Elvin, pers. obs. 2006). Underground utilities pass directly under and through this site, and may need maintenance in the near future (VAFB 2008, Service 2008); typical maintenance activities could include digging up and replacing sections of pipe or cable, which would cause disturbance of surface soils that support *M. fremontii* var. *vandenbergensis*.

2) Santa Lucia Canyon: This population occurs on the eastern edge of Vandenberg AFB at the mesa edge at the junction of Santa Lucia and Lakes canyons; it abuts the Burton Mesa Ecological Reserve which lies to the east. Approximately 1,000 individuals were observed in 2006 (Elvin 2006). In September 2009, sparks from a powerline started a wildfire ("Highway Incident") in upper Pine Canyon that burned 617 ac (250 ha) (VAFB 2009). The southern boundary of the fire burned to within 0.25 mi (0.4 km) of the population of *M. fremontii* var. *vandenbergensis* that occurs down-slope. The Burned Area Emergency Response plan notes that impacts from the fire on native habitats includes expansion of nonnative species already present in the area, including pampas grass, veldt grass, hottentot fig (*Carpobrotus edulis*), and bull thistle (*Cirsium vulgare*) (VAFB 2009 pp. 29-31), Other threats to down-slope habitat include changes in hydrology from installation of dozer lines during firefighting efforts and the application of fire retardants (65,000 gallons over the entire site of the fire). The application of retardants is known to act as a fertilizer enhancing the growth of nonnative species (Avery 2001). A previous fire in 1997 (Azalea Incident) burned 1,351 ac (547 ha) in upper Lakes Canyon (Luanne Lum, botanist, Vandenberg AFB, pers. comm. 2010); it is unknown to what extent the fire overlapped with the distribution of *M. fremontii* var. *vandenbergensis*.

   Construction of a space museum is being considered for a 105-ac (43 ha) site that is

upslope of this population (TetraTech 2008, ManTech SRS Technologies 2009, Service 2010). Underground utilities may also pass near this site and which may need maintenance in the future.

3) East of Vandenberg Village (also called Davis Creek): Three individuals were reported from this site in 2006 (Ballard 2006), and approximately 100 individuals were seen in 2009. This site is on the border of the Burton Mesa Ecological Reserve and the right-of-way for Highway 1 (the latter is managed by the State of California Department of Transportation). Potential threats to the taxon at this site include road maintenance, water pipeline repair, well drilling, construction of solar facilities, and stochastic events due to its small size.

4) Clubhouse Estates: This population is located on a mesa that encompasses both the privately owned Clubhouse Estates development and an adjacent portion of the Burton Mesa Ecological Reserve. Prior to 2006, approximately 90 percent of the *Mimulus fremontii* var. *vandenbergensis* in this population occurred on private property. Approximately 100 to 285 individuals were reported here in 2006 (Wilken 2010). The County of Santa Barbara approved plans for a housing development proposed for the private lands (SAIC 2005, LFR 2006, County of Santa Barbara 2006). Grading of the construction site for 52 housing units was carried out in January, 2007; in March, 2007, only a few individuals of *M. fremontii* var. *vandenbergensis* were observed within areas that had been graded (McGowan *in litt*. 2007). Over the past three years since it was graded, it has been invaded by numerous invasive plant species which has degraded the habitat for *Mimulus fremontii* var. *vandenbergensis* and also increased the source of seed of these invasive species that are spreading to adjacent ungraded habitat. Nonnative species present that could pose threats to remaining *M. fremontii* var. *vandenbergensis* at this site include pampas grass, veldt grass, and Sahara mustard (*Brassica tounefortii*).

   One parcel of the development (Lot 54) comprising 120 ac (49 ha) was designated for transfer to California Department of Fish and Game for inclusion in the Burton Mesa Ecological Reserve. However, as of April, 2010, ownership of the property has defaulted back to Santa Barbara Bank and Trust, and all mitigation activities, including transfer of this parcel, are in suspension (Meyer *in litt.* 2010). This parcel supported a small percentage of the total number of individuals in this population prior to grading on the adjacent construction site in 2007. In 2009, between 350 and 400 individuals were observed on Lot 54 (McGowan *in litt.* 2009).

5) La Purisima Mission State Historical Park, West: This park supports two populations (La Purisima West and La Purisima East). On the west side, one discrete population supported approximately 1,500 individuals in 2009 (Rutherford and Ballard pers. obs. 2009). This population is within 30 ft (10 m) of an advancing stand of veldt grass.

6) La Purisima Mission State Historical Park, East: on the east side, several scattered colonies comprise a population that supported approximately 850 individuals in 2006 (Ballard 2006). Threats to the plant at this eastern site include competition from invasive

nonnative species, including veldt grass and brome grass (*Bromus diandrus*); and trampling by horses, hikers, and bikers that stray off designated trails (Wilken 2010).

7) Volans Court: This population occurs on lands within Burton Mesa Ecological Reserve that are located between a portion of Vandenberg Village and Highway 1. The population was first observed in 2003 and supported 5 individuals. The location has been checked each year since then, and no other individuals have been observed (Meyer *in litt*. 2009). We consider the species to be extant at this site because it has been only 7 years since individuals were last seen, and it is probable that a seed bank still occurs at this site.

Assessment of Survey Efforts: Because *Mimulus fremontii* var. *vandenbergensis* was only recently described, surveys focused specifically on this taxon have only been conducted since 2004. However, Burton Mesa and the surrounding areas have been surveyed by numerous expert botanists for more than 60 years (see historical reviews in Smith 1976 pp. 39-47, Gevirtz et al. 2005b p. 82). Vegetation surveys and post-fire ecological floristic research projects have also complimented our understanding of this unique area (Davis 1987, Davis et al 1988, Odion et al. 1993, Gevirtz et al. 2005b pp. 95-130). Numerous floristic surveys have been completed on Vandenberg AFB in the last 30 years (e.g., Keil and Holland 1998, Smith circa 1983, Oyler et al. 1995 (also see collections made by Holly Forbes, Wayne Ferren, Anuja Parikh in: Consortium 2010). These surveys have varied in their level of intensity, ranging from base-wide floristic surveys prepared in conjunction with management plans, to more focused surveys on sensitive species.

Within the last decade, Larry Ballard (Research Associate, SBBG) has conducted surveys for *Mimulus fremontii* var. *vandenbergensis* between 2004 and 2008, particularly within La Purisima Mission State Park and the adjacent Burton Mesa Ecological Reserve; his reporting of negative survey results increases the level of certainty that existing populations in these specific surveyed areas have been located (Ballard 2006, Ballard *in litt*. 2009) and it is unlikely more will be found. Dieter Wilken (Director of Conservation, SBBG) and Mark A. Elvin (Service) have also been active in conducting surveys over the past 5 years. Because seed banks may remain dormant during years that are unfavorable to germination and suitable habitat is present between some of the currently known populations, it is possible that additional previously undetected populations may be located in future years.

Table 1: Status of *Mimulus fremontii var. vandenbergensis* populations and current threats. Multiple entries under each population denote separately mapped patches or colonies.

CNDDB # (Ballard #)	Location	Land Ownership	Pop size (year)	Threats
Population 1: OAK CANYON				
9 (LB21)	Oak Canyon, E slope	Vandenberg AFB	"common" in late 1980s (Odion 2006) 2 (Ballard 2006) 0 (Elvin 2008)	Competition with nonnative species
10 (LB22)	Oak Canyon, W slope	V AFB	1 (Ballard 2006) 0 (Elvin 2008)	Competition with nonnative species
Population 2a: LAKES CANYON				
1 (LB12, 13, 14)	0.25 mi NW of Pine Cyn Gate	VAFB	3, 87, and 103 (Ballard 2006)	Competition with nonnative species
1 (LB15, 16,	NE slope of Lake Cyn	VAFB	1, 11, and 3 (Ballard	Competition with nonnative

17)			2006)	species
1 (LB18, 19, 20)	NE slope of Lake Cyn, NE of S end of lake	VAFB	8, 11, and 15 (Ballard 2006)	Competition with nonnative species
1	Lakes Canyon area		1,500 (Elvin 2006) 2 (Elvin 2008 partial survey)	Indirect effects from development, utilities access, competition with nonnative species
Population 2b: SANTA LUCIA CANYON				
2 (LB10 and 11)	0.4 mi NW of Santa Lucia Cyn Rd and SW of Hwy 1, NE side of ridge and SW side of ridge	VAFB	8 and 13(Ballard 2006)	Indirect effects from development, utilities access, competition with nonnative species
11 (LB24)	E of intersection of Hwy 1 and Santa Lucia Rd	VAFB	6 (Ballard 2006)	Competition with nonnative species
Population 3: BURTON MESA ECOLOGICAL RESERVE				
6 (LB 23)	0.1 mi NW of Davis Creek along SW side of Hwy 1	CDFG	3 (Ballard 2006) 100 (Ballard & Rutherford 2009)	Utilities access, OHV trespass, competition with nonnative species
Population 4: CLUBHOUSE ESTATES				
4	Near intersection of Clubhouse Rd and Burton Mesa Blvd.	Private and CDFG Burton Mesa Ecological Reserve	25+, 2, 16, 4 in colonies (Ballard 2006). 285+ (anonymous). "A few" (McGowan 2007), 350-400 (McGowan 2009)	Habitat destruction, OHV trespass, competition with nonnative species
Population 5: LA PURISIMA STATE HISTORIC PARK, WEST				
8 (LB9)	0.1 mi W of junction of service road and Cuclillo de Tierra Trail	State Parks	298 (Ballard 2006) 1,500 (Ballard & Rutherford 2009)	Competition with nonnative species
Population 6: LA PURISIMA STATE HISTORIC PARK, EAST				
(LB1)	Trail heading NE from lower reservoir	State Parks	6 (Ballard 2006)	Competition with nonnative species
(LB2)	N slope of Arca de Agua trail	State Parks	6 (Ballard 2006)	Competition with nonnative species
(LB3)	Western edge of large open sandy area	State Parks	52 (Ballard 2006) 13 (Ballard &Rutherford 2009)	Competition with nonnative species
7 (LB4)	Dry drainage due E of upper reservoir	State Parks	205 (Ballard 2006)	Competition with nonnative species
7 (LB5)	N of paved road to water tank	State Parks	28 (Ballard 2006)	Competition with nonnative species
5 (LB6)	Disturbed roadside along paved road to water tank	State Parks	7 (Ballard 2006)	Competition with nonnative species
7 (LB7)	S side of Las Colinas Manzanita Trail	State Parks	14 (Ballard 2006)	Competition with nonnative species
(LB8)	E and uphill from Las Zanjas Rd, N of lower reservoir	State Parks	236 (Ballard 2006) 375 (Ballard & Rutherford 2009)	Competition with nonnative species
(LB25)	Top of ridge NE of Arca de Agua trail. Note this is the location of the red form	State Parks	23 (Ballard 2006) 9 (Ballard 7 Rutherford 2009)	Competition with nonnative species
Population 7: VOLANS COURT (NEAR VANDENBERG VILLAGE)				
3	Along sewer line access road halfway between Volans Court and Hwy 1	CDFG – Burton Mesa Ecological Reserve	5 (Meyer 2003) 0 (2004), 0 (2005), 0 (2006), 0 (2007), 0 (2008), all in Meyer 2009	Utilities access, recreation, competition with nonnative species

THREATS:

A. <u>The present or threatened destruction, modification, or curtailment of its habitat or range</u>.

Threats to the continued existence of *Mimulus fremontii* var. *vandenbergensis* consist of habitat

destruction by development; and habitat alteration by invasive nonnative species (e.g., veldt grass), underground utilities management and maintenance, and changing wildfire patterns that lead to type conversion of habitat.

Development

The Clubhouse Estates site was approved for a housing development in 2006 (County of Santa Barbara 2005); grading for construction occurred in early 2007 (McGowan *in litt*. 2007). Approximately 90 percent of the *Mimulus fremontii* var. *vandenbergensis* individuals in this population were inside or within 10 ft (3 m) of the approved development footprint and graded. Due to the slowdown in housing construction, the graded area has not been built out. In 2007, a few individual *Mimulus fremontii* var. *vandenbergensis* appeared within the graded area (McGowan *in litt.* 2007). In 2009, between 350 and 400 individuals were observed on Lot 54 which was designated as open space and ungraded (McGowan *in litt.* 2009). Since 2007 when grading occurred, nonnative species have increased in abundance at this site (Meyer *in litt.* 2010). In particular, the veldt grass which moved into the area after grading has now matured and is dispersing seed into adjacent, previously uninfested areas, including Lot 54, a parcel that was to be designated as open space (Meyer *in litt.* 2010).

Alteration of Habitat due to Development

In addition to habitat destruction due to development, secondary effects of development have been well-documented in conservation biology literature to occur in adjacent native areas, including clearing of vegetation, addition of nonnatural water supplies, introduction of nonnative ant species that can disrupt natural insect-plant relationships, the introduction of pets that disrupt native rodent-plant relationships, and an increase in habitat fragmentation (for example, see Alberts et al. 1993, Conservation Biology Institute 2000).

On a landscape scale, fragmentation of the Burton Mesa chaparral community that supports *Mimulus fremontii* var. *vandenbergensis* by development continues to occur. The extent of Burton Mesa chaparral was estimated to be over 22,000 acres (8,900 hectares); by 1938, the extent had been reduced to 14,500 acres (5,868 ha), and by 1988 to 8,654 acres (3,502 ha) (Odion et al. 1992). Lands for the Burton Mesa Ecological Reserve were originally granted to the State of California in 1991 by Union Oil Company (Gevirtz et al. 2005). However, these lands had previously been used for oil development, agriculture, and recreation, and have already been fragmented by the development of housing areas including Vandenberg AFG East Housing, Vandenberg Village, Mission Hills, and Mesa Oaks. The Burton Mesa Ecological Reserve is divided into five management units, which are separated from each other by highways, roads, housing developments and other pre-existing facilities (oil refinery, water tanks, etc.), and overlain by easements for pipelines, powerlines, and roads. Private lands between the management units continue to be developed, and evidence of recent clearing in preparation for construction are clearly evident in recent aerial photograph images (Google Earth 2010, and see map in Appendix 1).

The Volans Court population of *Mimulus fremontii* var. *vandenbergensis* occurs directly adjacent to a housing development (Vandenberg Village). The population, which was last seen in 2003, is located adjacent to a sewer maintenance access road that is used by residents for hiking jogging,

dog walking, and other casual recreational activities. It is unknown whether disturbance of this habitat through casual human use has contributed to its decline.

A few *Mimulus fremontii* var. *vandenbergensis* individuals in the Clubhouse population are located within the adjacent Burton Mesa Ecological Reserve. This portion of the population may be subject to competition from nonnative species which have increased in abundance on the adjacent Clubhouse Estates property. In 2010, the veldt grass which had become established on the Clubhouse site after grading reached maturity and set seed, which has now spread to the adjacent Burton Mesa Ecological Reserve. Although buildout of the adjacent Clubhouse Estates development has been temporarily delayed due to the economic downturn, secondary effects of development, such as trampling by residents and their pets, the introduction and spread of additional nonnative plants, and overspray from landscaping may become additional threats in the future.

Another development project for a visitor's center and museum on the eastern boundary of Vandenberg AFB may have secondary effects on the Santa Lucia Canyon population of *Mimulus fremontii* var. *vandenbergensis* that occurs down slope (ManTech SRS Technologies, Inc. 2009). Project proponents are estimating that the 105-ac (43 ha) facility will receive 500,000 visitors per year. The close proximity of *M. fremontii* var. v*andenbergensis* to this facility makes it vulnerable to human impacts, including trampling of plants and alteration of the soil structure and hydrology, and facilitating the spread of nonnative species that will compete for resources.

Habitat alteration due to nonnative species

Several invasive plant species, including veldt grass, pampas grass, bromes, Sahara mustard, star thistle (*Centaurea solstitialis*), and Italian thistle (*Carduus pycnocephalus*), and bull thistle are present at various sites where *Mimulus fremontii* var. *vandenbergensis* occurs. The first five of these species have a ranking of "A" by California Invasive Plants Council (Cal-IPC), denoting the highest level of impact on native habitats; bull thistle has a ranking of "B" by Cal-IPC, denoting a moderate level of impacts on native habitats (Cal-IPC 2007). Veldt grass is the most pervasive of these, and is present on at least four of the *M. fremontii* var. *vandenbergensis* sites, including the Burton Mesa Ecological Reserve and La Purisima Mission State Historical Park (Wilken 2010). This species spreads rapidly, both vegetatively, and through a persistent seedbank, and is extremely difficult to eradicate once it has become established (Bossard et al. 2000 pp 164-170).

On Vandenberg AFB, veldt grass was planted to stabilize sand dunes in the 1950s; with the aid of the prevailing onshore winds, it rapidly spread across Vandenberg AFB and onto Burton Mesa between 1979 and 1996 (U.S. Air Force 1996). It has also eliminated much of the suitable habitat at all of the sites that support *M. fremontii* var. *vandenbergensis* and most of the suitable habitat areas in between populations. Veldt grass has taken over an extensive amount of formerly suitable *M. fremontii* var. *vandenbergensis* habitat in Oak Canyon. *Mimulus fremontii* var. *vandenbergensis* was reported as being "common" at this location in the late 1980s or early 1990s by Odion (*in litt.* 2006), while four individuals were observed here in 2006 (Elvin, pers. obs. 2006). By 2006, veldt grass filled virtually every opening in the scrub (Elvin, pers. obs.

2006); see also Factor E for a discussion of competitive effects.

On left, veldt grass advancing from Clubhouse development into Vandenberg monkeyflower habitat on adjacent Burton Mesa Ecological Reserve. On right, veldt grass advancing into population of Vandenberg monkeflower at La Purisima State Historic Park.

Habitat alteration due to changing wildfire patterns

The effects of fire on Burton Mesa chaparral on Vandenberg AFB have been specifically studied by Tyler (1996), Davis et al. (1998), Hickson (1998), and Zedler and Scheid (1988). Post-fire response can include a "flush" of germination and growth caused by: 1) heating or burning of seed, especially for shrub and subshrub species; 2) the removal of competitors, particularly shrubs, which allows seedlings to access resources; and 3) the removal of insect and vertebrate herbivores (e.g., deer, rabbits, rodents). While the response of annual herbs to fire in chaparral stands in other portions of the California coast may also show a flush of germination ("fire annuals"), Tyler's study showed the presence of annual herbs dropped within an experimental burn area on Burton Mesa, likely because their seeds were killed by the fire.

Invasive plants such as veldt grass can change the fuel properties of a site, which can in turn affect fire behavior, and ultimately alter fire regime characteristics such as frequency, intensity, extent, and seasonality of fire. Fire regime changes may promote the establishment and dominance of the invaders and restoration to preinvasion conditions becomes more difficult (Brooks et al. 2004). This may be due to several factors, including changes in soil chemistry; in addition, the preponderance of seed bank produced by the non-native species can quickly colonize the site; in contrast, it may take 40 years before typical chaparral species such as manzanita (*Arctostaphylos* spp.) produce seed.

The two populations on Vandenberg AFB (Oak Canyon and Santa Lucia Canyon) are threatened by veldt grass and subsequent increases in the frequency of wildfires. The corresponding type conversion of habitat from scrub with openings to veldt grass fields has been discussed by numerous researchers including D'Antonio and Vitousek (1992), Bossard et al. (pp 164-170) and Brooks et al. (2004). In 2006, a wildfire burned in Oak Canyon on Vandenberg AFB adjacent to the population of *Mimulus fremontii* var. *vandenbergensis.* In 2009, another wildfire on Vandenberg AFB ("Highway Incident") burned 617 acres (250 ha) on a mesa north of and

adjacent to the Santa Lucia population of *Mimulus fremontii* var. *vandenbergensis* (VAFB 2009). Although these fires did not burn the locations of the standing population of *Mimulus fremontii* var. *vandenbergensis*, they burned within 0.25 mi (0.4 km) of the populations. Secondary effects, including the spread of nonnative species (exacerbated by fire retardant drops and the blading of fire lines), are anticipated from these events.

Habitat alteration due to maintenance activities

The Oak Canyon population is potentially threatened by maintenance and repair of triple-wide underground oil pipelines on Vandenberg AFB (VAFB 2008). Even if maintenance activities occur outside the footprint of the population, secondary effectsmay take place, which affect the ability of *Mimulus fremontii* var. *vandenbergensis* to persist. For instance, to test the integrity of aging pipelines, the soil surrounding the pipelines is excavated and redeposited; this process can alter the permeability of the soil layers and affecting both surface and subsurface hydrology in the immediate and downslope areas, which would in turn affect annual species that are sensitive to soil moisture during seed germination and seedling stages. In addition, the ground-disturbing activities associated with pipeline repair and other maintenance activities provide a conduit for invasive species such as veldt grass to increase in abundance and distribution. Other populations are also located adjacent to where maintenance activities would occur. The Volans Court population is located within Burton Mesa Ecological Reserve; it is also within a sewer line easement held by Vandenberg Village Community Services District. Another population that occurs within Burton Mesa Ecological Reserve (Davis Creek) also is within a water line easement held by Vandenberg Village Community Services District. The Vandenberg Village Community Services District has recently filed a request with the State Lands Commission to lease or transfer 27 acres (10.9 ha) at this site for the installation of solar panels and water well drilling (Meyer *in litt.* 2010b).

Habitat alteration due to recreational activities

In 2007, Meyer reported recreational off-highway vehicles (OHV) were trespassing onto the western and southwestern portions of Burton Mesa Ecological Reserve from adjacent lands on Vandenberg AFB (Elvin *in litt.* 2007). Because public highways cross Vandenberg AFB lands on this portion of the base, and because the base controls the use of OHVs from military staff on base, it is likely that this trespass use is originating from the general public (e.g., non-military sources). We have not had the opportunity to evaluate the extent and degree to which OHV activity is impacting *Mimulus fremontii* var. *vandenbergensis* habitat on Burton Mesa Ecological Reserve at this location. Meyer has also reported OHV trespass on another portion of the Burton Mesa Ecological Reserve that is east of and adjacent to Clubhouse Estates and that supports *Mimulus fremontii* var. *vandenbergensis* (Meyer *in litt* 2010c). Because of the historic network of trails and roads throughout Burton Mesa Ecological Reserve, it is difficult to determine the origins of the trespass activity. Illegal recreational activity causes soil disturbance, which then allows for the rapid spread of nonnative plant species which render habitat less suitable for *M. fremontii* var. *vandenbergensis.*

In summary, habitat destruction is a threat to one of the largest populations of *Mimulus fremontii* var. *vandenbergensis*, specifically the Clubhouse Estates population; habitat is within the footprint of an approved housing development. Habitat alteration is also a threat to *Mimulus*

fremontii var. *vandenbergensis* at all sites. Habitat alteration is occurring at some sites more rapidly than others, depending in part on the extent the site has been disturbed. Activities that alter habitat include secondary effects of development, an increase in competing, nonnative species, changing wildfire patterns, utilities maintenance activities, and recreational activities. The patches of open sand that *M. fremontii* var. *vandenbergensis* occurs in are easily altered by these activities, rendering them less suitable for the taxon.

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Overutilization is not currently known to be a threat to *Mimulus fremontii* var. *vandenbergensis*; therefore, we do not consider this to be a threat at this time.

C. Disease or predation.

No data exist on the effects of disease or predation on *Mimulus fremontii* var. *vandenbergensis*. We do not consider disease or predation to be threats at this time.

D. The inadequacy of existing regulatory mechanisms.

County and State regulations

Existing regulatory mechanisms afford this taxon limited protections. *Mimulus fremontii* var. *vandenbergensis* is not currently listed by the State of California. The California Native Plant Society recognizes it as a 1B.1 taxon (CNPS 2009); this denotes a taxon that is seriously endangered in California. 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. The lead agency 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 concerned with the resources affected by the project. Conservation of state- and federally-listed species through CEQA depends on the discretion of the lead agency involved. If the County finds that the impacts to particular resources to a species are significant, it has the discretion under CEQA to determine that the impacts could be mitigated, or that other overriding considerations would allow the proposed project to proceed.

The County of Santa Barbara is the lead agency responsible for CEQA review for projects on non-Federal lands where this taxon occurs. The County of Santa Barbara approved the proposed housing development at the Clubhouse Estates site in 2005. Grading of the approved homesites eliminated approximately 90 percent of the individuals of *Mimulus fremontii* var. *vandenbergensis* mapped there in 2005 (McGowan *in litt.* 2007, Meyer *in litt.* 2010a). Stipulations to the approval included the following: a habitat restoration and management plan will be developed and implemented; topsoil from the site where the population was observed will be collected and stored at Santa Barbara Botanic Garden; habitat for the remaining individuals will be designated as Open Space, then transferred to the California Department of Fish and Game for inclusion in the Burton Mesa Ecological Reserve (County of Santa Barbara 2005); annual monitoring for compliance will be conducted. To date, few of these measures have been

implemented. A habitat and restoration management plan has been developed (LFR 2007) but not implemented; transfer of the Open Space parcel to California Department of Fish and Game has not occurred (Meyer *in litt.* 2010a).

California State Parks has guidelines for the management of natural resources and sensitive species (California State Parks 2008). A general management plan for La Purisima State Park was completed in 1991 (California State Parks 1991), and an ecosystem characterization for the Park was completed in 2005 (Gevirtz et al. 2005a). However, no management plan specific to sensitive species at this park unit has been developed.

The California Department of Fish and Game developed a management plan for the Burton Mesa Ecological Reserve (Gevirtz et al. 2005b). Goals of the plan include maintaining and enhancing the biological diversity of the Reserve, protecting rare plant populations from unplanned disturbance, and minimizing the presence and impact of nonnative species (Gevirtz et al. 2005b pp. 234-242). However, implementation of management goals is contingent upon available funding and staffing. Currently, there is no dedicated funding for the management of the Reserve, and it is staffed by 10 percent of 1 biologist position; some grant funding has been used for specific management needs.

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 lands, and projects on non-Federal lands that include Federal involvement, such as funding or permitting from a Federal agency. However, as with CEQA, NEPA does not confer any protection to sensitive species, but merely discloses potential impacts. A current biological assessment for a project to develop a visitor's center and museum on Vandenberg AFB does not include discussion of potential impacts to *Mimulus fremontii* var. *vandenbergensis* (Man Tech SRS Technologies, Inc. 2009). The future replacement, management, and maintenance of utility pipelines along the eastern edge of Vandenberg Air Force Base may involve permitting from the Federal Energy Regulatory Commission and may require NEPA documentation.

In summary, current local, state, and Federal regulatory processes have not been sufficient to protect habitat for *Mimulus fremontii* var. *vandenbergensis* from being destroyed at the site of the Clubhouse Estates population, have not provided any mechanism for considering secondary impacts from activities on Federal lands, and do not provide mechanisms that require landowners to undertake measures to manage habitat for the long-term conservation of the species.

E. Other natural or manmade factors affecting its continued existence.

Stochastic extinction

This species is considered to have a high risk of extinction in the wild in the immediate future based on criteria put forth by the World Conservation Union, as modified for plants (Keith 1998). Species with few populations and individuals are vulnerable to the threat of naturally

occurring events, causing extinction through mechanisms operating either at the genetic, the population, or the landscape level. A decrease in genetic variability will reduce the likelihood that individuals in a population will persist in a changing environment. Additionally, populations with lower levels of genetic diversity are more likely, on average, to experience reduced reproductive success due to inbreeding depression.

Species with few populations or those that are low in number may be subject to forces at the population level that affect their ability to complete their life cycles successfully. For example, reduced numbers of individuals may lead to a reduction in number of pollinators and subsequently seed set (Menges 1991). Annual plants, such as *Mimulus fremontii* var. *vandenbergensis*, that are subject to wide fluctuations in population numbers from year to year may have difficulty in maintaining a viable population size after a series of poor seed production years. Additionally, if the host plants 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; a hot fire could destroy a seedbank as well. The restriction of colonies to small sites increases their risk of extinction from such naturally occurring events.

The genetic characteristics of *M. fremontii* var. *vandenbergensis* have not been investigated; therefore, the degree to which these characteristics contribute to the likelihood of *M. fremontii* var. *vandenbergensis* being vulnerable to extinction for these reasons is unknown. However, random events operating at the population and landscape levels clearly have the potential for increasing the chance of extinction for *M. fremontii* var. *vandenbergensis.*

Competition with nonnative plants

Like some other annual *Mimulus* taxa, this plant only grows in habitats with little to no competition from other plants (Mark A. Elvin, pers. obs. 2006). Invasion of this habitat by nonnative species (particularly veldt grass (see Bossard et al. 2000)) is a threat to all of the *Mimulus fremontii* var. *vandenbergensis* populations because individuals cannot compete well for light, water, and resources (D'Antonio and Vitousek 1992). Veldt grass creates a dense thatch which creates cover and shade that is likely to inhibit the germination and growth of small annual taxa such as *Mimulus fremontii* var. *vandenbergensis* which require open sand. Other nonnative species that compete for light, water, and resources within *Mimulus fremontii* var. *vandenbergensis* habitat include pampas grass, bromes, Sahara mustard, star thistle, Italian thistle, and bull thistle. The effects of competition with nonnative species is most problematic immediately adjacent to urban areas and in habitat that is isolated or fragmented by development (Alberts et al. 1993, Conservation Biology Institute 2000), conditions which apply to *Mimulus fremontii* var. *vandenbergensis*. This is because conditions adjacent to development, including increased soil disturbance, increased fragmentation due to secondary impacts (trailing, dirt-biking), and addition of unnatural water supplies (from activities such as landscape watering) are just the conditions that favor the increase of nonnative species and a decrease in native species that cannot tolerate such habitat conditions.

Alteration of Fire Cycles

Please see discussion under Background and Factor A.

Climate Change

Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field et al. 1999, Cayan et al. 2005, IPCC 2007). Recently, the potential impacts of climate change on the flora of California were discussed by Loarie et al. (2008). Based on modeling, they predicted that species' distributions will shift in response to climate change, specifically that the species will "move" or disperse to higher elevations and northward, depending on the ability of each species to do so. Species diversity will also shift in response to these changes with a general trend of diversity increases shifting towards the coast and northwards with these areas becoming de facto future refugia. However, predictions of climatic conditions for smaller sub-regions such as California remain uncertain. It is unknown at this time if climate change in California will result in a warmer trend with localized drying, higher precipitation events, or other effects. While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate information to make accurate predictions regarding its effects to *Mimulus fremontii* var. *vandenbergensis* at this time.

In summary, the most immediate and obvious Factor E threats to *M. fremontii* var. *vandenbergensis* are competition with nonnative species. We also believe that stochastic extinction due to the small sizes of populations and numbers of individuals is a large threat and is exacerbated by competition with nonnative species; this based on conservation biology literature and concepts that apply to small short-lived annual species and not on any specific study that has been conducted on *M. fremontii* var. *vandenbergensis.* We believe the combination of threats associated with development (Factor A threats) and associated secondary effects, particularly the spread of veldt grass and other nonnative species, and the already-low numbers of individuals and populations of *M. fremontii* var. *vandenbergensis* make it particularly vulnerable to extinction from stochastic events. The lack of regulatory mechanisms (Factor D) has clearly been a threat in the recent past, and contributed to most of the habitat loss for one of the largest populations in 2007; we cannot predict to what extent the lack of regulatory mechanisms will continue to be in the future. Factors B and C are not considered threats at this time.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED:

We have discussed the need to reduce threats to *Mimulus fremontii* var. *vandenbergensis* with representatives of Vandenberg AFB, California Department of Fish and Game, California State Parks, and the County of Santa Barbara. We have participated in surveys with Vandenberg AFB, California Department of Fish and Game, and California State Parks. We discussed the possibility of acquiring the Clubhouse Estates parcels prior to grading with The Nature Conservancy and the Santa Barbara Land Trust in 2006, but these efforts were unsuccessful.

SUMMARY OF THREATS: *Mimulus fremontii* var. *vandenbergensis* is a narrow endemic taxon with a limited distribution in western Santa Barbara County, California. It is an annual species that, like other annual taxa, may express large numbers of individuals in only the most

favorable years. Because large fluctuations in annual numbers are expected for a taxon with this type of life history, maintaining habitat for the taxon during less favorable years becomes even more important. The habitat that supports all seven known extant populations faces one or more of the following threats: alteration, destruction, and increasing fragmentation from development; alteration due to secondary effects of development in adjacent areas; an increase in nonnative species that compete for resources; and an increase in fire frequency that modifies the suitability of habitat for the long-term persistence of the taxon. In addition, this taxon faces a lack of existing regulatory protections; small population sizes that exacerbate the possibility of stochastic extinction; and inability to compete with non-native species.

RECOMMENDED CONSERVATION MEASURES:

1. Work with California State Parks to reduce threats at La Purisima State Historic Park. In 2007 and 2008, we contacted California State Parks concerning the status of *Mimulus fremontii* var. *vandenbergensis* on La Purisima Mission State Historic Park, the presence of veldt grass and the threat it poses, and need for a specific management plan for *Mimulus fremontii* var. *vandenbergensis*. Due to understaffing and underfunding, California State Parks was unable to undertake additional management activities at that time. We recontacted park staff in 2010 and are initiating discussions with them about measures that could be undertaken to address the spread of veldt grass and potential recreational impacts.

2. Work with Vandenberg AFB to ensure that projects they undertake do not have impacts on *Mimulus fremontii* var. *vandenbergensis* and its habitat. In 2006 and 2008, Service staff worked with staff from Vandenberg AFB to survey for *Mimulus fremontii* var. *vandenbergensis* in historical locations in Oak Canyon, Pine Canyon, and Santa Lucia/Lakes Canyon, with a particular emphasis placed on future project locations within these areas. These surveys reconfirmed the presence of a small population at the Oak Canyon site; no individuals were found at the historical Pine Canyon site; and a larger and more widely scattered population was found at the Santa Lucia/Lakes Canyon site. Staff from Vandenberg AFB are continuing surveys in 2010.

3. Work with California Department of Fish and Game to reduce threats at Burton Mesa Ecological Reserve. The Reserve was established to conserve sensitive species and habitats, and a detailed management plan has been developed. We should assist staff of California Department of Fish and Game in identifying potential sources of funding that would assist them in initiating management of the Reserve. For *Mimulus fremontii* var. *vandenbergensis*, the most immediate needs are to install fencing to reduce trespass OHV traffic into its habitat, and to reduce the spread of veldt grass.

4. Work with the County of Santa Barbara to develop better permit conditions for projects that may impact *Mimulus fremontii* var. *vandenbergensis* and its habitat. In 2006 and 2007, the Service contacted the County of Santa Barbara, the California Department of Fish and Game, and the applicant for the Clubhouse Estates development to encourage additional avoidance and mitigation measures be taken to protect habitat for *Mimulus fremontii* var. *vandenbergensis* on the project site; however, none were adopted beyond

those included in the approval of the project by the County of Santa Barbara.

LISTING PRIORITY:

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	2
		Subspecies/population	3*
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

__Y__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Rationale for listing priority number:

Magnitude:
There are only seven known extant populations of *Mimulus fremontii* var. *vandenbergensis* with approximately 2,000 individuals observed in 2009. Threats to the continued existence of *M. fremontii* var. *vandenbergensis* are high. Habitat for one of the three largest populations (at Clubhouse Estates) was destroyed in 2007 when the project site was graded for development; remaining habitat is degraded from invasion of veldt grass and Sahara mustard. Habitat for one other large population (west La Purisima) is threatened by veldt grass invasion; complete invasion may occur by 2011 if no management actions are taken. The third large population is threatened by secondary impacts from a planned development, firefighting activities, and invasive nonnative species. Losses of some or all of the three largest populations will increase the risk of extinction of the taxon because the remaining populations are smaller and more vulnerable to stochastic extirpation, which compounds the other threats these small populations face.

All of the small populations also face threats. Almost all suitable habitat for the Oak Canyon population has undergone type conversion to veldt grass; the status of this population has declined from being "common" to having only four individuals in 2006, and is not likely to

persist without intensive management. Habitat for the east La Purisima population has been degraded by red brome and veldt grass. Veldt grass also occurs within habitat of the remaining two populations. The small size of all the populations exacerbates other threats and makes them vulnerable to stochastic extirpations.

Imminence:
Mimulus fremontii var. *vandenbergensis* is a narrow endemic comprised of seven small populations. All seven populations are currently being adversely affected by the above threats to some degree. The threats to two of the three largest populations (Clubhouse Estates and west La Purisima) are ongoing. For the third large population (Santa Lucia Canyon), threats from planned development may occur within 2 to 3 years, but may be slowed by the current economic downturn; threats from nonnative species already exist and are increasing over time.

Of the small populations, the Oak Canyon population has already had a substantial decline because of fire and nonnative species invasion, and the Vandenberg Village population has also declined in the last five years; the causes are unclear, but habitat is vulnerable due to human impacts. The other three small populations are threatened by invasion of nonnative species (veldt grass and brome); given the rapid spread of veldt grass, we believe this threat may decrease habitat quality for all populations within the next few years.

Is Emergency Listing Warranted?

Emergency Listing is not warranted at this time.

DESCRIPTION OF MONITORING
Monitoring of *Mimulus fremontii* var. *vandenbergensis* has been performed by various parties; see discussion under sections on Abundance, Distribution, and Assessment of Survey Efforts. Most of the monitoring has been conducted by staff from California Department of Fish and Game (Mary Meyer), Santa Barbara Botanic Garden (Larry Ballard and Dieter Wilken), the Service (Mark A. Elvin), and Luanne Lum and other staff at Vandenberg AFB.

COORDINATION WITH STATES
We have coordinated with the regional California Department of Fish and Game representative ecologist (Mary Meyer), who has extensive knowledge of ongoing activities at the Burton Mesa Ecological Reserve (owned and managed by California Department of Fish and Game) as well as the Clubhouse Estates site, which underwent CEQA review by California Department of Fish and Game. We have also contacted staff at La Purisima State Historic Park to alert them to threats facing the populations on their lands.

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes to the candidate list, including listing priority changes; the Regional Director must approve all such

recommendations. The Director must concur on all 12-month petition findings, additions of species to the candidate list, removal of candidate species, and listing priority changes.

Approve: _____
Regional Director, Fish and Wildlife Service Date 4/15/2010

Concur: _____
ACTING
Director, Fish and Wildlife Service Date: October 22, 2010

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: 5/28/10
Conducted by: Mark Elvin

Comments:

FY2010, R8 CNOR: Vandenberg monkeyflower