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

SCIENTIFIC NAME: *Arctomecon californica*

COMMON NAME: Las Vegas bearpoppy

LEAD REGION: Region 8

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DATE INFORMATION CURRENT AS OF: June 2024

STATUS/ACTION
___Species petitioned for listing which we have determined is not a listable entity
_X_ Species petitioned for listing which we have determined does not warrant listing (does not meet the definition of a threatened or endangered species)

Petition Information:
___ Non-petitioned
_X_ Petitioned; Date petition received: August 14, 2019
90-day "substantial" finding FR publication date; citation: July 22, 2020 (85 FR 44265)

PREVIOUS FEDERAL ACTIONS:
On August 14, 2019, we received a petition from the Center for Biological Diversity requesting that the Las Vegas bearpoppy be listed as an endangered species and that critical habitat be designated for this species under the Endangered Species Act (Act). On July 22, 2020, we published a 90-day finding (85 FR 44265) that the petition contained substantial information indicating that listing may be warranted for the species. This document constitutes our 12-month finding on the August 14, 2019, petition to list the Las Vegas bearpoppy under the Act.

PLANT GROUP, ORDER AND FAMILY: Flowering Plants, Papaverales, Papaveraceae

ANALYTICAL FRAMEWORK
To assess Las Vegas bearpoppy viability, we conducted a species status assessment (SSA) using the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–311). Briefly, resiliency supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years, variation in demographic rates), redundancy supports the ability of the species to withstand

catastrophic events (for example, droughts, large pollution events), and representation supports the ability of the species to adapt to both near-term and long-term changes in its physical and biological environment (for example, climate change, disease). A species with a high degree of resiliency, representation, and redundancy is better able to adapt to novel changes and to tolerate environmental stochasticity and catastrophes. In general, species viability will increase with increases in resiliency, redundancy, and representation (Smith et al. 2018, p. 306). Using these principles, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

We use the SSA framework to assemble the best scientific and commercial data available for this species. The SSA framework consists of three sequential stages. During the first stage, we evaluate the species' needs. The next stage involves an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the species arrived at its current condition (i.e., how threats and conservation actions have influenced the species). The final stage of the SSA framework involves assessing the species' plausible range of future responses to positive and negative environmental and anthropogenic influences. The SSA framework uses the best available information to characterize viability as the ability of a species to sustain populations in the wild over time and is used to inform our regulatory decision.

The SSA report does not represent a decision by the Service on whether the Las Vegas bearpoppy should be listed under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The Species Status Assessment report for the Las Vegas bearpoppy (*Arctomecon californica* Torr. & Frém) (SSA report) is a summary of the information we have assembled and reviewed and incorporates the best scientific and commercial data available for this species. Excerpts of the SSA report are provided in the sections below. For more detailed information, please refer to the SSA report (Service 2024, entire).

## BIOLOGICAL INFORMATION

Here we summarize the biological information on the Las Vegas bearpoppy. For additional information on the species description, taxonomy, habitat/life history, historical and current range/distribution please refer to pp. 6–22 of the SSA report. For additional information on population and species needs, please refer to pp. Table 3 of the SSA report.

### Species Description

The Las Vegas bearpoppy is described as a showy and extremely attractive plant (Kartesz 1988, p. 89; Arizona Rare Plant Committee 2001, p. 68). Typical mature plants form rounded, mound-like clumps that are 2.0–6.0 decimeters (dm) (0.8–2.0 ft) tall (Meyer 1993, entire; Nelson and Welsh 1993, acts 204–208; Hickerson 1998, p. 12). Two extremes at ends of continuous variation of life form variations of Las Vegas bearpoppy have been observed. These are small

and large-rosette forms (Meyer and de Queiroz 2023, pp. 8–9) that appear tightly and loosely grouped, respectively. Plants may produce from 3 to 20 yellow flowers (Meyer 1993, entire; Nelson and Welsh 1993, pp. 204–208; Hiatt and Boone 2003, p. 110). All locations have both small and large rosette morphs but may be dominated by one (Meyer and de Queiroz 2023, p. 35). Plants in and near western Grand Canyon are morphologically distinct, having leaves with fewer tridentate tips and tear shaped capsules (Harper and Van Buren 1996, p. 14).

FIGURE 1—Flowering adult *Arctomecon californica*. Photo by Corey Kallstrom.

Taxonomy

The Las Vegas bearpoppy (*Arctomecon californica*) is a valid and accepted taxon within the Papaveraceae (Poppy) plant family (NatureServe 2022; USDA and NRCS 2022) (Service 2024, Table 1). There has been consensus from numerous scientists that the Grand Canyon area populations warrant a distinct taxonomic rank, of variety or subspecies, based on their unique morphological, habitat or ecological, and genetic differences (Harper and Van Buren 1996, p. 13; Mistretta et al. 1996, pp. 1–2 and 7; Brian 2001, pp. 1–19; The Nature Conservancy 2007, p. 47; Simpson 2014, p. 72; Massatti et al. 2022, pp. 5–6). The most recent study found four genomic groups of the species with unique alleles in each (Massatti et al. 2022, p. 5; Table 2). However, there has not been a formal peer reviewed taxonomic separation into two distinct taxa. Therefore, the SSA report and this finding evaluate the status of all populations of the currently accepted Las Vegas bearpoppy species.

Habitat/Life History

From seeds, individuals germinate to develop as juveniles or yearlings followed by reproductive flowering adults. Seeds may potentially remain dormant and viable for up to 20 years or longer (de Queiroz and Meyer 2023, p. 10; Meyer and de Queiroz 2023, pp. 16 and 46). Seed exposure to multiple hot and dry conditions followed by cold and wet periods is likely necessary to initiate germination of the Las Vegas bearpoppy (Pereira et al. 2021, p. 5; de Queiroz and Meyer 2023,

p. 12). Plants may survive typically up to a maximum of five more years as flowering adults (Phillips and Phillips 1988, p. 9; Sheldon Thompson and Smith 1997, p. 153; Simpson 2014, p. 2; Meyer and de Queiroz 2023, pp. 10 and 23).

Seeds may require a minimum of 60 mm (2.4 in) of precipitation to germinate. Subsequent survival of germinated seeds was estimated to require a minimum 80 mm (3.1 in) of winter precipitation and survival increased with more precipitation. Summer precipitation is important for seedling through yearling survival (Meyer and de Queiroz 2023, pp. 20–23). Las Vegas bearpoppy mortality is greatest during the seedling through yearling life stages (Sheldon Thompson and Smith 1997, p. 163; Meyer and de Queiroz 2023).

The Las Vegas bearpoppy may flower between March and June, but blooming most commonly occurs between April through May, followed by the maturing and dehiscing of fruit (capsules) typically before the end of June for the latest blooms (Mistretta et al. 1996, p. 22; Hickerson 1998, p. 21). For flower pollination, Las Vegas bearpoppies are primarily self-incompatible (unable to be fertilized by its own pollen) and thus dependent on pollinators for most successful seed production (Tepedino and Hickerson 1996, p. 1; Sheldon Thompson and Smith 1997, pp. 158 and 164; Hickerson 1998, p. 38). Wind is likely the primary vector of seed dispersal, but most seeds of any generation probably do not disperse more than 200 cm (7 ft) (Megill 2007, p. 36).

Twenty-three species of bees and two species of beetles have been collected from the Las Vegas bearpoppy (Tepedino and Hickerson 1996, pp. 11–12; Hickerson 1998, p. 33; Griswold et al. 2006 entire). Mojave poppy bee (*Perdita meconis*) and *Megandrena enceliae* (a larger bee) are important pollinators for the Las Vegas bearpoppy in unfragmented habitat (Hickerson 1998, p. 44; Portman et al. 2019, pp. 187–188).

Las Vegas bearpoppy habitat is open, often with bare soil, floristically distinct with low species diversity and perennial shrub cover and subsequently little apparent competition (Meyer 1986 entire; Phillips and Phillips 1988, pp. 4–7 and 14; Mistretta et al. 1996, p. 16; Sheldon Thompson and Smith 1997, p. 165; Saxena 2005, pp. 13–31; The Nature Conservancy 2007, p. 51). The slope of habitat is typically low in the small badland hills and ridges of the western part of its distributions and steep in the canyon talus areas of its eastern distributions (Phillips and Phillips 1988, pp. 7–9 and 14; Mistretta et al. 1996, p. 18; The Nature Conservancy 2007, p. 51).

The Las Vegas bearpoppy is a gypsocline, meaning it occurs primarily on gypsum but may also be found on other unusual substrates such as high-boron shales and claybeds (1986, pp. 1305 and 1308). Areas occupied by the Las Vegas bearpoppy with gypsum soils may limit competition from other plant species (Phillips and Phillips 1988, p. 10). Many occupied areas can have high amounts of cryptogamic crust cover (Mistretta et al. 1996, p. 16; Bangle and Craig 2010, p. 3). In Arizona, the distinctive Grand Canyon populations grow in habitats with dolomite or calcareous soils of very coarse rock derived from limestone parent materials (Phillips and Phillips 1988, p. 7; Brian 2000, p. 26, 2001, pp. 6–7).

Habitat occupied by the Las Vegas bearpoppy can have broad seasonal and daily temperatures with unpredictable precipitation (Mistretta et al. 1996, p. 17). The mean maximum summer temperature decreases with elevation and total annual precipitation increases from west to east throughout the range (Meyer and de Queiroz 2023, p. 14).

Historical and Current Range/Distribution

The range or global distribution of the Las Vegas bearpoppy occurs in the Mojave Desert (US Environmental Protection Agency 2013 entire). This area is predominantly in southeast Clark County, Nevada, and a smaller portion is in northwest Mohave County, Arizona.

We identified 12 populations of the Las Vegas bearpoppy in four genomic groups (Table 1; Figure 2). In the SSA report and this assessment, we use both the terms "population" and "population groups" which are made up of multiple element occurrences (an element occurrence, as defined by NatureServe, is any area of land or water in which a species is present; it can consist of either a population or just a portion of a population (NatureServe 2024, entire)). For more details on how we delineated population groups and genomic groups, please see the SSA report (Service 2024, pp. 14–17).

Out of 86 element occurrences, we consider 22 extirpated; 21 of the extirpated element occurrences occur in the Las Vegas Valley population group (Service 2024, Table 4). No element occurrences in Arizona are considered extirpated.

The total estimated habitat area throughout the range of the Las Vegas bearpoppy is 50,938 ha (125,869 ac). The Las Vegas bearpoppy estimated habitat areas occur on land administered by four federal agencies (NPS, BLM, BOR, and the U.S. Air Force); State, Tribal, and local governments; and private landowners. In total, 79 percent of the range of the species occurs on Federal lands administered by BLM and NPS, and 19 percent of the range is on private lands (Service 2024, Table 5). Population groups are found in wilderness areas, national monuments, and areas of critical environmental concern. Three of twelve population groups have habitat that is 20 percent or more designated wilderness areas. In addition, 90 percent of estimated habitat in the Grand Canyon population group is managed as wilderness.

TABLE 1—Summary of *Arctomecon californica* genomic groups, population groups, and element occurrences within Arizona and Nevada.

| **State** | **Genomic Group[1]** | **Population Group** | **Number of Element Occurrences** |
|---|---|---|---|
| Arizona | South | Detrital Valley | 4 |
| | Vulture Canyon | Grand Canyon | 6 |
| | * | Meadview NW | 2 |
| Nevada | Northeast | Bitter Spring Valley | 6 |

| | | | |
|---|---|---|---|
| | | Gale Hills | 7 |
| | | Gold Butte | 8 |
| | * | Government Wash | 1 |
| | | Valley of Fire | 4 |
| | | White Basin | 3 |
| | Northwest | Las Vegas Dunes | 5 |
| | | Las Vegas Valley | 25 |
| | | Sunrise Valley | 15 |
| Total Count | 4 | 12 | 86 |

* Location lies between two genomic groups and assigned to the group based on topographic similarity and contiguousness of predicted habitat by Lancaster and Pereira (2023, entire).

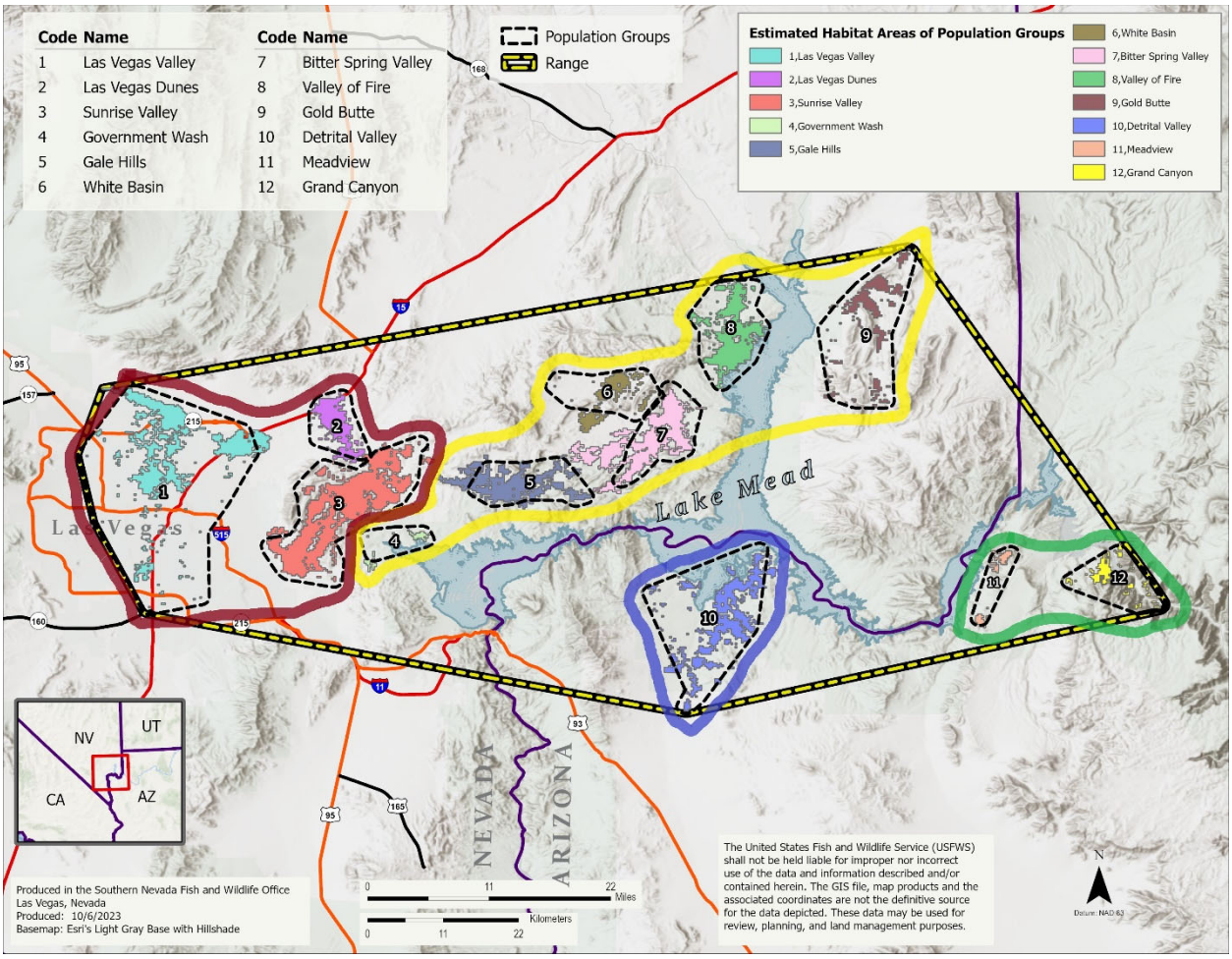


FIGURE 2—The range and distribution of Las Vegas bearpoppy and 12 population groups. Genomic groups are also outlined in bold, colored lines.

Las Vegas Bearpoppy Needs

Here we summarize the hierarchical needs of the Las Vegas bearpoppy from individuals to populations and lastly for the species.

**TABLE 2—**Summary of Las Vegas bearpoppy hierarchical needs for individuals, populations, and the species.

| Individual | Populations | Species |
|---|---|---|
| Outcrossing pollination to produce viable seed.<br><br>Seed exposure to cold and precipitation events within 20 years that can initiate germination.<br><br>Soils which inhibit competition and provide open growing conditions allowing full sunlight.<br><br>Favorable precipitation for germination (> 60 mm) and germinant survival (> 90 mm).<br><br>Favorable precipitation (> 80–200+ mm) between November and March for recruitment during seedling and yearling stages to develop a deep taproot.<br><br>Favorable temperatures during early establishment to permit survival of seedling and yearlings given individual growth environments. | Adequate pollinators.<br><br>Connectivity for pollinators to move within and between populations.<br><br>Genetic variation through morphological diversity of small and large-rosetted plants.<br><br>Sufficient frequency of above average late winter precipitation events for seed production.<br><br>Sufficient functional habitat area, of an unknown size, that allows a large number of individuals to exist within the seed bank and maintain genetic diversity. | Sufficient number of resilient populations well distributed across the range (unknown number).<br><br>Sufficient genetic diversity to adapt to change over time. |

SUMMARY OF BIOLOGICAL INFORMATION

The Las Vegas bearpoppy is a plant in the poppy family (Papaveraceae), endemic to southern Nevada and northwest Arizona occurring primarily on public lands in the eastern Mojave Desert. We identified 12 population groups from sources including 86 element occurrences of previous distribution evaluations (The Nature Conservancy 2007, entire; AZGFD 2023, entire; NDNH 2023, entire).

The species requires open areas with harsh soil conditions unfavorable to many competing species, often with gypsum soils but also limestone in the eastern parts of its range. Populations near the Grand Canyon with limestone substrates are likely an undescribed variation of the broader taxon. The Las Vegas bearpoppy can survive long periods of insufficient winter precipitation (November through March) through a long-lived seed bank, up to 20 years. Some areas may only be occupied by the species as seeds within the seedbank, appearing unoccupied until adequate winter precipitation and growing conditions support germination and development into adult plants.

## FACTORS INFLUENCING THE STATUS

The Act directs us to determine whether any species is an endangered species or a threatened species because of any factors (or threats) affecting its continued existence (i.e., whether it meets the definition of a threatened species or an endangered species). We use the term "threat" to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term "threat" includes actions or conditions that have a direct impact on individuals, as well as those that affect individuals through alteration of their habitat or required resources. The term "threat" may encompass—either together or separately—the source of the action or condition, or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an "endangered species" or a "threatened species." In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an "endangered species" or a "threatened species" only after conducting this cumulative analysis and describing the expected effect on the species now and (if evaluating whether a species is a threatened species) in the foreseeable future.

### Threats, Conservation Measures, and Existing Regulatory Mechanisms

Here we present a summary of the threats impacting the Las Vegas bearpoppy. We discuss the effects of (1) Development (including urbanization, mining, and Lake Mead filling); (2) trampling by humans and ungulates; (3) climate change; (4) habitat fragmentation, pollinator limitation, and genetic consequences; (5) nonnative plants; and (6) collection. In the SSA report, we also discuss the effects of disease and herbivory by small mammals and insects. However, both of these threats are only affecting some individual plants and not having population-level effects. Therefore, we will not present a summary of their impacts in this species assessment

form, but we fully consider all threats to the Las Vegas bearpoppy in our finding. A detailed assessment and our quantitative analyses for measuring the magnitude and impact of threats is available in the SSA report (Service 2024, pp. 31–51).

***Habitat Disturbance and Modification***

Impacts to the Las Vegas bearpoppy by habitat disturbance and modification occur where there is excavation, burying, and trampling of individuals, including seeds, as well as where habitat resources are altered. Direct habitat alteration reduces habitat area, stability, connectivity, or quality and may result in significant reduction of a population (Oostermeijer 2003, p. 19). In addition, habitat disturbance and modification may increase the potential for non-native plant species to be introduced into Las Vegas bearpoppy habitat.

**Development**

*Urbanization*

We define urbanization as complete and partial land type conversion due the construction of buildings, transportation networks, parking lots, parks, agriculture, and infrastructure. Development also includes areas where modifications to the land cover has occurred by excavation, scraping, vegetation clearing, or compaction of the ground surface to an extent that growth and reproduction of the Las Vegas bearpoppy is unlikely to occur. We use the term "urban" more broadly to include development in rural areas, as the impacts to the species are the same.

Urbanization has resulted in the largest areal loss of habitat for the Las Vegas bearpoppy. Between 1950 and 2020, the Las Vegas Valley experienced the largest increase in housing units in the United States at 99.3 percent (Ottensmann 2023, pp. 9–10). We estimate that there has been permanent habitat loss from urban developments of at least 8,256 ha (20,400 ac), or 17 percent, of Las Vegas bearpoppy estimated habitat area across its range. Habitat loss from urbanization has occurred in all population groups except Grand Canyon and Meadview (Service 2024, Table 8). Development associated with a variety of residential, industrial, commercial, military, and other land uses have impacted the Las Vegas Dunes, Las Vegas Valley, and Sunrise Valley population groups. In Detrital Valley, Bitter Spring Valley, Gale Hills, Gold Butte, Government Wash, Valley of Fire, and White Basin, most urban developments are roads.

The Las Vegas Valley population group has had the greatest area of habitat loss with estimates of up to 6,940 ha (17,150 ac) or 84 percent of its original estimated habitat area. The Sunrise Valley population group has 742 ha (1,832 ac) or 7 percent of habitat area affected by urban development. A 125.9 ha (311 ac) solar facility within the Sunrise Valley population group area, that was completed and commissioned in 2013 (GlobalData 2023 entire) eliminated all potential estimated Las Vegas bearpoppy habitat area in the project area.

Some areas of remaining Las Vegas bearpoppy habitat are on lands protected from some urbanization. In the Las Vegas Valley, the two largest remaining protected areas of Las Vegas bearpoppy habitat in the Las Vegas Valley population group occur at NPS's Tule Springs Fossil

Beds National Monument and United States Air Force's (USAF) Nellis Air Force Base in Area III. In this population group, additional protected areas of Las Vegas bearpoppy habitat occur at Nevada State Park's Ice Age Fossils State Park, North Las Vegas Airport, and Las Vegas Valley Water District's Springs Preserve. The BLM's Las Vegas Resource Management Plan, NPS's Lake Mead National Recreation Area General Management Plan, and USAF's INRMP provide guidance for management actions that may protect the Las Vegas bearpoppy from the threats of urbanization on lands they administer. However, the status of some protected lands is uncertain. In a Nevada Division of Forestry (NDF) permit signed by both NDF and the USAF (Nevada Division of Forestry 2007, pp. 1–2) for habitat destruction in Area III, the protection of other portions of Area III was specified as mitigation. However, the USAF later determined that there was no delegation of authority to State agencies on DoD land due to sovereign immunity and the federal supremacy clause to require the mitigation (USAF 2009, p. 1). There is pressure to develop remaining lands in Las Vegas and there have been suggested development ideas for Area III (Meyer 2023, p. 1). Nevada State Park lands occupied by Las Vegas bearpoppy are mostly protected from urbanization threats based on management direction.

The NDF issued a special permit (Nevada Division of Forestry 2019, pp. 1–15) to Clark County for the removal and destruction of plant species, including Las Vegas bearpoppy, for the purposes of development on non-federal and non-state lands within the county to the extent authorized by the Clark County Multiple Species Habitat Conservation Plan. The NDF permit is effective until February 1, 2031, and provides coverage for new lands which may be transferred from federal ownership.

In summary, urbanization kills individuals and eliminates habitat and all resources necessary for the Las Vegas bearpoppy. Urbanization is the most severe and concentrated within the Las Vegas Valley and the nearby Las Vegas Dunes and Sunrise Valley population groups. The effects to habitat areas from urbanization have been minimal in the remaining population groups, and nonexistent in Meadview and Grand Canyon. The threat of urbanization to the Las Vegas bearpoppy will continue on private lands in the Las Vegas Valley, Las Vegas Dunes, and Sunrise Valley population groups covered by an NDF permit (Nevada Division of Forestry 2019, pp. 1–15).

*Mining*

Mining can involve the exploration for and exploitation of mineral deposits by surface or underground methods (Bell and Donnelly 2006, p. 4). Mining can adversely affect the environment directly or indirectly, such as through destruction or degradation of topsoil, erosion, and subsidence (Allgaier 1997, pp. 132–189). Mining kills and injures individual Las Vegas bearpoppy plants, destroys habitat, and may also cause habitat fragmentation and contribute to the spread of non-native plants.

Past and current mining activities affecting Las Vegas bearpoppy habitat are present in the Gale Hills, Las Vegas Dunes, Sunrise Valley, and White Basin population groups (Service 2024, Table 8). In Arizona, there were no mining activities observed influencing estimated habitat

areas of the Las Vegas bearpoppy. Of all mining activities, those in Nevada associated with gypsum have had the largest potential influence on the Las Vegas bearpoppy and its estimated habitat areas. A map of potential mining activity that may influence the Las Vegas bearpoppy and its habitat is shown in the SSA report (Service 2024, Figure 9).

Of all mining activities, active and past gypsum mining within the 339 ha (837 ac) Sunrise Valley population group area have likely most influenced Las Vegas bearpoppy individuals and habitat with at least three percent of estimated habitat area destroyed, primarily from gypsum quarrying activities. Within the Gale Hills population group, disturbances such as roads and land clearing caused by mining activities are visible in satellite imagery within a private inholding and adjacent BLM land.

In the White Basin population group, a large area of ground disturbance caused by mining occurred approximately from 1920–1936 (USGS 2005 entire). More recent mining exploration drilling activities are planned to occur to determine the nature and extent of lithium mineralization (Rubicon Explorer Corp 2022, p. 1). There was 0.414 ha (1.023 ac) of disturbance for phase 1 exploration drilling and it is estimated that another 1.582 ha (3.931 ac) will be disturbed for additional phase 2 exploration drilling. The Nevada Division of Minerals Oil Well Location Data has two plugged well locations in both the Gale Hills and Gold Butte population groups (NDOM 2022 entire). Visual inspections of well locations in satellite imagery does not indicate readily discernible ground disturbance.

Some regulatory mechanisms and conservation measures are reducing the magnitude of mining impacts, though their effectiveness varies. Permits issued by the NDF may require seed collection and testing application methods for reclamation of mined areas with the Las Vegas bearpoppy (Gentilcore 2021, p. 1). Areas of Las Vegas bearpoppy population groups within designated Wilderness, National Monuments, National Parks, and ACECs receive protections from mining activities. Additionally, most of the estimated habitat areas of the Las Vegas bearpoppy in Lake Mead NRA are protected from mining activities as they occur in areas closed to mineral development, with the exception of an area in the southern portion of the Detrital Valley population group (NPS 1988, pp. 1–5). Though reclamation of mining areas may be required by State and Federal authorities, there is little information to suggest that these activities can appreciably, if at all in an economically feasible manner, offset lands lost or restore habitat to adequately support or function as habitat for the Las Vegas bearpoppy.

In summary, mining kills individuals or groups of individuals within areas of habitat and typically destroys the ability of habitat to support individuals. Individual mining activities throughout the range of the Las Vegas bearpoppy typically affect visually discernable, concentrated, small areas of habitat (less than 0.4 ha [1 ac]). In total, we estimate that one percent or less of estimated habitat areas rangewide have been impacted by mining-related activities.

*Lake Mead Filling*
Following the completion of Hoover Dam in 1935, Lake Mead began to fill and flood Las Vegas bearpoppy habitat (BLM 2023, p. 1). Areas of habitat at the Valley of Fire, Government Wash, and Detrital Valley population groups were likely impacted by historical flooding. There is little information to determine the area of habitat loss caused by flooding, but one estimate is 10–20 percent (Mistretta et al. 1996, p. 26). Some previously flooded areas may later become available for colonization during lower water years. For example, in the Valley of Fire population group occurrences were reported below the high water line (Powell 1999, pp. 5–6). We are unable to estimate the area of habitat lost; however, we expect Las Vegas bearpoppy habitat will continue to be impacted by water level fluctuations from Hoover Dam.

**Trampling**
Trampling of Las Vegas bearpoppies occurs when vehicles or animals move through habitat. Trampling may injure or kill individuals and degrade habitat by compacting soils and causing erosion. As the frequency of trampling increases, the likelihood of adverse negative impacts on individuals and habitat increases. Trampling disturbances tend to be linear and decrease the quality of habitat rather than result in complete habitat loss; thus, the Las Vegas bearpoppy may have some ability to withstand effects from trampling as long as suitable habitat remains in a population group.

*Anthropogenic Tramping*
Anthropogenic trampling by pedestrians and motorized vehicles, particularly off-highway vehicles (OHVs) may injure or kill individual Las Vegas bearpoppies or compact and alter soil conditions in a manner unfavorable for seedling establishment. Though less common, trash dumping and recreational shooting activities may impact the species, particularly in the Sunrise Valley population groups where they have caused surface disturbance, soil compaction, and damage to cryptogamic crusts (BLM 1998a, p. 2).

Impacts from OHVs are more pronounced and broadly distributed than other recreation activities that may cause localized impacts (Mistretta et al. 1996, p. 26). Authorized and unauthorized roads can cause loss, degradation, and fragmentation of Las Vegas bearpoppy habitat. Additionally, motorized vehicle use can destroy cryptobiotic soil crusts, compact soil, reduce rates of water infiltration, increase wind and water erosion, and destroy other native vegetation (Lovich and Bainbridge 1999, pp. 315–316). Furthermore, vehicles often leave authorized roads, compacting soils and crushing plants (Lovich and Bainbridge 1999, entire). Additionally, roads have been identified as the primary pathway for non-native, invasive species into arid and semi-arid systems because vehicles serve as the dispersal vector for non-native propagules, and disturbance within vehicle routes facilitate the establishment of invading plant species (Brooks and Pyke 2001, p. 4; Gelbard and Belnap 2003 entire; Brooks and Lair 2005, p. 8).

OHV activity accounts for the single greatest recreational use of public lands within Clark County and this threat affects more populations of rare plants in the county than any other (RECON 2000, pp. 4–70; The Nature Conservancy 2007, p. 181). The use of OHVs and the

creation of new trails has been described as significant threats for all rare plant species on BLM managed lands (TNC 2007, pp. 44, 62, 80, 91, 103, 120, 132, 145, 157). Trampling by OHVs is considered a major threat on NPS and BLM lands (Bangle 2005, pp. 11–12; Bangle and Craig 2010, pp. 5–7). Motorized vehicles have impacted the Las Vegas bearpoppy at all population groups (The Nature Conservancy 2007, pp. 62–63) except for Grand Canyon and Meadview.

A large proportion of the habitat area for the Las Vegas Valley Dunes population group coincides with areas managed for OHVs. The Nellis Dunes Special Recreation Management Area has been managed by the BLM as an area open to intensive OHV activities where management direction permits "free-play" (BLM 1998b, p. 21). Additional lands from this area are to be conveyed to Clark County from Nellis Air Force Base as identified in the Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015 (Public Law 113-291, 128 Stat. 3861, § 3092). An interlocal agreement is required between the Clark County Board of Commissioners and Nellis Air Force Base before the Federal land may be conveyed.

We estimated the potential for impacts to the Las Vegas bearpoppy by anthropogenic trampling by measuring the density of linear disturbances within estimated habitat areas (Service 2024, Table 9). Population groups in closest proximity to urbanized areas of the Las Vegas Valley have the highest density of linear disturbances (Government Wash, Las Vegas Dunes, and Sunrise Valley). The Las Vegas Valley population group has low linear disturbance values because most of the population group area has been developed and is no longer susceptible to trampling.

We expect that impacts from recreation to Las Vegas bearpoppy habitat will increase following human population growth and increased demand for recreation, particularly in the fast-growing Clark County area. Some impacts may be minimized by management action to restore habitat (e.g., decompaction and revegetation) or prevent further degradation (e.g., through barriers such as post and cable, boulders, berms). The BLM's Las Vegas Resource Management Plan and Lake Mead National Recreation Area General Management Plan provide direction for recreation management. However, illegal OHV use occurs. For example, OHVs have traveled around barriers installed to protect Las Vegas bearpoppy within the Gold Butte population group (Friends of Gold Butte 2015, pp. 24–25). Areas of ACECs, Wilderness, National Parks, and National Monuments receive protections and management which may eliminate or reduce impacts from anthropogenic trampling.

In summary, threats from anthropogenic trampling may injure or kill Las Vegas bearpoppies and damage habitat. Anthropogenic disturbances affect nearly all population groups of the Las Vegas bearpoppy except the Grand Canyon and Meadview population groups. Anthropogenic trampling affects population groups where the linear disturbance densities are high and affects localized individuals where densities are low.

*Trampling by Ungulates*
Disturbance and damage to Las Vegas bearpoppy plants and habitat may occur from feral

ungulates such as cattle (*Bos taurus*), burros *(Equus asinus*), and horses (*Equus caballus = E. ferus caballus*) (Holland et al. 1980, p. 14; Sheldon 1994, pp. 34–36; Bangle 2005, pp. 11–12; Bangle and Craig 2010, pp. 7 and 21). Burro ground disturbance, particularly where it damages cryptobiotic crusts, may result in noticeable erosion and has been characterized as a major concern for *Arctomecon* species (Sheldon 1994, p. 40; Powell 1999, p. 6). Burro or horse disturbance is present in all population groups except for Las Vegas Valley (The Nature Conservancy 2007, p. 63). Damage by cattle was observed and reported as significant at a study site in the Gold Butte population group (Bangle and Craig 2010, p. 21). We have no record of disturbance to Las Vegas bearpoppy in the Grand Canyon or Meadview population groups.

There are currently no authorized cattle grazing allotments in Las Vegas bearpoppy habitat though grazing has been historically permitted within the Bunkerville Allotment near Gold Butte (United States v. Cliven Bundy 2012, pp. 5–6). Authorizations for grazing were cancelled in 1994 (United States v. Cliven Bundy 2012, pp. 5–6). By 2011, unauthorized cattle grazing by over 900 animals spanning a distance of approximately 90 mi has been occurring around the Overton Arm of Lake Mead (United States v. Cliven Bundy 2012, pp. 6–7). In the process of moving through habitat, ungulates may create linear trails that are repeatedly used and cause soil compaction and render areas of habitat unsuitable. Many of the trails that become established may be present long after animals are gone and may be repeatedly used later by other animals.

We found little information that consumption of Las Vegas bearpoppies by grazing ungulates is currently affecting the species. Cattle have been observed grazing on flowers and flower buds of the closely related dwarf bearclaw poppy (*Arctomecon humilis*) (BLM 2014, 2018), but we did not find any record of Las Vegas bearpoppy buds, flowers, or leaves removed by ungulates. However, grazing by overpopulated feral burros and unauthorized cattle grazing have influenced the spread of invasive annual grasses throughout Gold Butte National Monument (BLM 2020a, pp. 15 and 21).

Impacts from ungulates to the Las Vegas bearpoppy will likely continue, but impacts may be reduced through management. In particular, the BLM and NPS will manage feral horses and feral burros, likely through gathers as has been done in the past. Impacts from ungulates may be reduced by actions under the Wild Free-Roaming Horses and Burros Act of 1971 and the Federal Land Policy and Management Act of 1976. The BLM's Las Vegas Resource Management Plan and Lake Mead National Recreation Area General Management Plan guide management actions that may reduce the magnitude of ungulate disturbance on the Las Vegas bearpoppy.

In summary, ungulates may impact the Las Vegas bearpoppy when they crush and trample individuals of any life stage and create trails. Ungulates impact individuals in areas of all population groups except Las Vegas Valley, Meadview, and Grand Canyon.

***Climate***

Precipitation in the winter is essential to all life stages survival and adult reproduction of the Las Vegas bearpoppy. Adequate winter precipitation events are particularly necessary for seed

germination and survival (Meyer and de Queiroz 2023, p. 17). Most years have insufficient precipitation for germinant survival as evident from observations of recently-germinated seeds in the past 27 years being limited to the years 1998, 2001, 2004, 2005, and 2010 (Meyer and de Queiroz 2023, p. 17). However, the Las Vegas bearpoppy life history is well adapted to survive climates with long periods of inadequate precipitation for recruitment. Population viability estimates indicate that the most consequential influences, though minor, of reduced precipitation and increased temperatures are in the western areas of the range which currently have the hottest and driest conditions (Meyer and de Queiroz 2023, p. 40). Overall, changes in weather patterns and climate, particularly those which result in inadequate precipitation, can cause reduced reproductive output and survival of all Las Vegas bearpoppy life stages. The duration and extent of inadequate precipitation that inhibits seedling germination and survival can influence population groups or the species rangewide.

***Habitat Fragmentation, Pollinator Limitation, and Genetic Consequences***

We have grouped habitat fragmentation, pollinator limitation, and genetic consequences together because they can be interrelated. As development caused by urban expansion has increased throughout the Las Vegas Valley, it has increasingly fragmented habitat patches. Population isolation is likely detrimental to seed set (Sheldon Thompson and Smith 1997, p. 167).

Isolation of Las Vegas bearpoppy remnant habitat patches caused by fragmentation contributes to reduced pollinator abundance and diversity and subsequently lowers seed production; isolation also reduces gene flow, potentially resulting in less genetic variation (Hickerson and Wolf 1998, pp. 29–31). Pollinator limitation was observed in unfragmented and fragmented habitats but was more pronounced for the latter (Hickerson 1998, p. 9). The Las Vegas bearpoppy was less reproductively successful in the fragmented habitat of the Las Vegas Valley where there was also a lower number and diversity of pollinators (Hickerson 1998, p. 56). Habitat fragmentation and the resulting smaller subpopulations may have a reduced capacity to withstand prolonged drought because of decreased seed production and seedbank depletion (Meyer and Forbis 2006 entire). The loss of pollinator services could strongly influence declines of population groups (Meyer and de Queiroz 2023, p. 6).

Though pollination and subsequent seed production of the Las Vegas bearpoppy may positively benefit from specialist pollinators such as the Mojave poppy bee, it is likely not a required mutualistic relationship (Hickerson 1998). The Mojave poppy bee is absent from many populations of the Las Vegas bearpoppy (Griswold et al. 2006, pp. 68–69). Within the Gold Butte population group, recent studies in 2022–2023 did not observe evidence of pollinator limitation in the Las Vegas bearpoppy even in ‘bad’ years with poor precipitation and when no Mojave poppy bees were detected (Graham and Griswold 2023, pp. 22–23).

Though there are genetic consequences or threats which may result from habitat fragmentation, the mean values of expected heterozygosity, mean number of alleles per locus, and percent polymorphic loci at the 99 percent level for Las Vegas bearpoppy in fragmented habitat still exceeded values previously published for other endemic species (Hickerson and Wolf 1998, p.

31, Table 3). More recent genetic analysis reported that inbreeding depression values were uniformly low in all the population groups sampled outside the Las Vegas Valley (all population groups except Gale Hills) (Massatti et al. 2022, p. 4). Still, unfragmented populations of the Las Vegas bearpoppy have higher genetic variability than fragmented populations (Hickerson 1998, p. 72; Hickerson and Wolf 1998, p. 28).

In summary, fragmentation caused by habitat loss and disturbance may cause disruptions of pollinator services for the Las Vegas bearpoppy that could cause pollinator limitation and may reduce viable seed production and successful reproductive output. These impacts primarily occur in the Las Vegas Valley population group. The Las Vegas bearpoppy does not appear to be dependent upon the Mojave poppy bee for pollination services but is dependent upon pollination from an abundant pollinator community. Still, though habitat has been widely fragmented in the past decade, the species maintains more genetic diversity than other endemic species. There are no conservation measures or regulatory mechanisms to specifically address threats of habitat fragmentation, pollinator limitation, and adverse genetic influences.

***Non-native Plants***

Non-native, invasive plants may influence the Las Vegas bearpoppy through competitive alterations of resource availability for water, nutrients, space, or light resources. Non-native species can affect individuals, populations, and ecosystems through competition, change in community composition, and changes in environmental conditions (Simberloff et al. 2013 entire; Willis 2017, p. 60).

Though invasive species may not typically be recorded on gypsum soils in high densities, the more recent spread of African mustard (*Malcolmia africana*) in habitat could be a potential threat to the Las Vegas bearpoppy (Bangle and Craig 2010, p. 30). Though it grows in many soil types, African mustard has been observed to be disproportionately more prevalent or invasive than expected on gypsum soils not usually prone to invasion (Abella et al. 2009, p. 226). More research is needed to understand potential influences of non-native plants on the Las Vegas bearpoppy (Powell 1999, p. 6; Bangle and Craig 2010, p. 30).

Nonnative plants have been detected throughout the range of the Las Vegas bearpoppy; however, there is little to no information on their effects to the species. Federal land management agencies (such as Lake Mead National Recreation Area) may minimize impacts from non-native plants when they actively target and treat them through herbicide use. We have no records of Las Vegas bearpoppy mortality or injury resulting from herbicide treatments.

***Collection***

The Las Vegas bearpoppy has been collected for recreational, scientific, and educational purposes. Las Vegas bearpoppy may be collected for cultivation by the public because of its attractive appearance (Holland et al. 1980, p. 13; Mistretta et al. 1996, p. 27) and for scientific description and study. Collection has previously been characterized as a significant threat (Mistretta et al. 1996, p. 27), though it is unclear in what manner this was determined.

In our review of Las Vegas bearpoppy scientific herbarium specimen records, we found 299 records of collection from 55 institutions (CCH2 Portal 2023; SEINet Portal Network 2023). Many of the collections in any given year are dispersed throughout the range. Seed collection may occur by private or other permitted activities. Seed collection may reduce the number of individuals in small, localized areas of the seed bank. Collection of seed may occur in some Las Vegas bearpoppy populations as part of permits issued by the Nevada Division of Forestry (Gentilcore 2021, p. 1). There is little information to indicate seed collection has caused negative long-term consequences for Las Vegas bearpoppy populations.

In summary, there is no information that collection has population-level effects on the Las Vegas bearpoppy. We expect that NDF and land management agency permitted collections will continue into the future during studies but that oversight of these collections through agency permitting processes will minimize the likelihood of adverse population effects.

Conservation Measures and Existing Regulatory Mechanisms

A variety of regulatory and voluntary conservation measures and activities are currently in development or in place to help reduce the potential impact from the threats. We present a summary here. A more detailed review is available in the SSA report (Service 2024, pp 29–32, Appendix C).

The Las Vegas bearpoppy is listed as critically endangered by the State of Nevada under the Nevada Administrative Code (Nevada Administrative Code, NAC 527.010) and as a sensitive species by the BLM (2023b, p. 24). The Arizona Department of Agriculture includes Las Vegas bearpoppy as a "salvage restricted native plant" on its list of protected plants (A.R.S. § 3-903(B)(2)). Through these designations, it is afforded additional conservation attention and considerations during the planning and implementation of projects by public agencies. Where the Las Vegas bearpoppy may co-occur with other species that have a status designation, it is possible that it may receive some indirect protections.

Plans specific to the Las Vegas bearpoppy and its habitat have been prepared to conserve the species. The BLM (1998a entire, 1998c entire) prepared a habitat management plan and environmental assessment of the plan for the Las Vegas bearpoppy in 1998. A sensitive plant reclamation plan was prepared for the Lima Nevada Gypsum Quarry (BLM 2017 entire). A habitat management plan was prepared for Las Vegas Valley Water District's North and South Well Fields (Bardeen and Williams 2000 entire).

Though projects for development or other land management activities may impact the Las Vegas bearpoppy, there are actions taken by agencies to avoid, minimize, or mitigate those impacts. Actions which may be taken by agencies that may reduce negative direct or indirect effects to the Las Vegas bearpoppy include surveys to identify locations of adults incorporated into planning, weed management, public and project personnel education, and funding to support other work intended to offset impacts (SWCA Environmental Consultants 2004, pp. 205–206; BLM 2014,

pp. 4–9 to 4–12, 2015, p. 3.6-1 to 3.6-96, 2023c, pp. 3–73, 3–81 to 3–82, 3–95, and Appendix C; NewFields 2017, pp. 19–21) .

The Arid Land Restoration Program by the National Park Service at Lake Mead National Recreation Area may prevent and restore ground disturbances that benefit the Las Vegas bearpoppy (NPS 2023). The inventory, monitoring, installation of barriers for prevention and restoration of ground disturbances has been a part of planning and annual tasks identified for Lake Mead NRA (NPS 1999 entire, 2005 entire). Barriers installed to prevent vehicle ground disturbances on NPS lands are present at the Sunrise Valley, Gale Hills, Bitter Spring Valley, and Valley of Fire population groups (Service 2024, p. 29)

The 121 ha (300 ac) Eglington Preserve is an area of sensitive plant habitat that includes habitat of the Las Vegas bearpoppy. Partners include the BLM, NPS, U.S. Army Corps of Engineers, and The Nature Conservancy (The Nature Conservancy 2023). The National Park Service has nearly completed agreements to conserve and protect areas of Las Vegas bearpoppy habitat at Eglington Preserve (Eichenberg 2023 entire). The Eglington Preserve is located within the Las Vegas Valley population group.

The Las Vegas bearpoppy is a covered subspecies under the 2000 Clark County Multiple Species Habitat Conservation Plan (HCP). The HCP identifies three goals for the Las Vegas bearpoppy: (1) Conserve populations on the North Las Vegas Airport, Nellis Air Force Base Area III, and Southern Nevada Water Authority North Well Field; (2) No net unmitigated loss or fragmentation of habitat in Intensively Managed Areas, Less-Intensively Managed Areas, and Multiple Use Managed Areas; and (3) Maintain and/or improve bearpoppy habitat in 4 BLM management areas (RECON 2000, Tables 2–5 and Appendix B B-210-B-214). A Draft Las Vegas Bearpoppy Memorandum of Agreement was included with the HCP (RECON 2000, pp. 2–203) but not finalized. An amendment to the habitat conservation plan is underway with proposals that include measures for protecting and restoring habitat (Jenkins 2023, pp. 4–5).

The area and protections for rare plants within Nellis AFB's Area III has changed in the last three decades, but a large area remains with some protection, including habitat occupied by the Las Vegas bearpoppy. In 2010, 94 ha (233 ac) in Area III was officially established as a Conservation Area by Nellis AFB and has remained in subsequent INRMP revisions (USAF 2019, p. 170, 2019, pp. 59 and 189).

Cumulative Effects

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have analyzed the cumulative effects of identified threats and conservation actions on the species. To assess the current and future condition of the species, we evaluate the effects of all the relevant factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative-

effects analysis.

ANALYSIS

Current Condition

To assess the current condition of the Las Vegas bearpoppy, we used the best scientific and commercial data available to analyze and describe, both quantitatively and qualitatively, past and ongoing changes in the species' habitat, demographic parameters, and distribution across the 12 population groups.

We created quantitative analyses of the current conditions of the Las Vegas bearpoppy using the remaining estimated habitat area available (i.e., not destroyed by development) and estimating habitat area not disturbed by trampling. We also considered winter precipitation (November through March) because of its importance to the life history of the Las Vegas bearpoppy. For detailed information on how we conducted our current condition analysis and how we assigned scores and rankings of habitat characteristics, please see the SSA report (Service 2024, pp 32–35; Table 8, 9, 11). Our definitions for each condition class are presented in Table 3.

TABLE 31—Condition class categories used to rate the estimated habitat areas of each population group. The condition classes are based on the area within estimated habitat areas that is lost or disturbed.

| Condition Class | Estimated Habitat Area Not Disturbed by Trampling | Habitat Disturbance Description[1] | Estimated Habitat Area Available | Overall Habitat Condition Score |
|---|---|---|---|---|
| 4 = Very High | Virtually no vehicle or animal trails | *scope of habitat areas impacted (<.1 mi / sq mi habitat areas)* | ≥ 97% | ≥ 3.88 – 4.0 |
| 3 = High | Low density or < 10% scope* of habitat impacted | scope of habitat areas impacted *(≥0.1 and* <1 mi / sq mi habitat areas) | < 97%<br>≥ 90% | < 3.88<br>≥ 3.6 |
| 2 = Moderate | Moderate density >10 <50% scope of habitat impacted | scope of habitat areas impacted (≥ 1 *and < 4* mi / sq mi habitat areas) | < 90%<br>≥ 50% | < 3.6 and<br>≥2.0 |
| 1 = Low | High density or > 50% scope of habitat impacted | *scope of habitat areas impacted (≥ 4 mi / sq mi habitat areas)* | < 50% | < 2.0 |

Condition classes adapted from The Nature Conservancy (2007, pp. 54–57 and 62–63).
[1] = Cell text with italics are characteristics added to further characterize the classes.
* = we interpret scope to mean the areal extent of habitat though this term is not specifically defined with the text of The Nature Conservancy (2007).

Where available, we considered the estimates of stochastic population growth rates (λ) and likelihood estimates of 50-yr extinction risk from the Population Viability Analysis (PVA) by Meyer and de Queiroz (2023, Table 8). However, we did not use estimates of population size or numbers because data are largely unavailable throughout the range, data are generally not collected consistently in a manner to accurately reflect trends in numbers, and the numbers of adult individuals in a population group can fluctuate widely between years (The Nature Conservancy 2007, p. 57).

POPULATION GROUP CURRENT CONDITION SUMMARY

There are 12 extant population groups of the Las Vegas bearpoppy. The results of our current condition analysis are presented in Table 4. Population groups in closest proximity to urbanized areas had the lowest overall habitat condition scores. Habitat loss or the inverse estimated habitat area available is mostly irreversible and thus weighted the highest in our analysis. Trampling disturbance (or, the inverse of habitat not disturbed by trampling) could vary and was weighted less because it is possible for habitat to still function after some trampling disturbance.

TABLE 42—Las Vegas bearpoppy population group current condition stochastic population growth rate with 50-year extinction risk likelihood (where available), normal 1990–2020 winter precipitation, and ratings for habitat area not disturbed, area available, and overall habitat condition.

| | | | | **Weight = 2** | **Weight = 10** | **Max / Total** | **1–4** |
|---|---|---|---|---|---|---|---|
| **State** | **Population Group** | **λ (50-yr Extinction Risk)[1]** | **WP (mm)[2]** | **Estimated Habitat Area Not Disturbed by Trampling** | **Estimated Habitat Area Available** | **48** | **Overall Habitat Condition** |
| AZ | Detrital Valley | | 88 | 3 | 4 | 46 | 3.83 |
| | Grand Canyon | | 131 | 4 | 4 | 48 | 4.00 |
| | Meadview | | 109 | 4 | 4 | 48 | 4.00 |
| NV | Bitter Spring Valley | | 104 | 2 | 4 | 44 | 3.67 |
| | Gale Hills | | 94 | 2 | 4 | 44 | 3.67 |
| | Gold Butte | 1.1850 (0) / 1.2631 (0) | 104 | 2 | 4 | 44 | 3.67 |
| | Government Wash | | 71 | 1 | 4 | 42 | 3.50 |
| | Las Vegas Dunes | | 73 | 1 | 2 | 22 | 1.83 |
| | Las Vegas Valley | 1.0425 (0.051) | 77 | 3 | 1 | 16 | 1.33 |
| | Sunrise Valley | | 72 | 1 | 2 | 22 | 1.83 |
| | Valley of Fire | 1.146 (0.005) | 92 | 2 | 3 | 34 | 2.83 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | White Basin | | 110 | 2 | 4 | 44 | 3.67 |

[1] λ = stochastic population growth rates from study areas within the population group from Meyer and de Queiroz (2023, p. 43 Table 8).

[2] = normal 1990–2020 mean total winter precipitation (WP; November, December, January, February, and March) in millimeters obtained for each Las Vegas bearpoppy population group geometric center using Climate NA app Wang et al. (2016, pp. 1–17).

Though development and anthropogenic trampling have negatively affected bearpoppy habitat, especially in population groups near the Las Vegas metropolitan area, many of the bearpoppy population groups maintain high resiliency (Table 4). Despite the negative influence of trampling and urbanization in much of the species' range, seven population groups are in high or very high overall habitat condition. These groups represent over 40 percent of the estimated habitat area for all population groups combined. This includes some groups with moderate impacts from trampling, as the species has some ability to withstand disturbance from trampling if suitable habitat in the population group remains available.

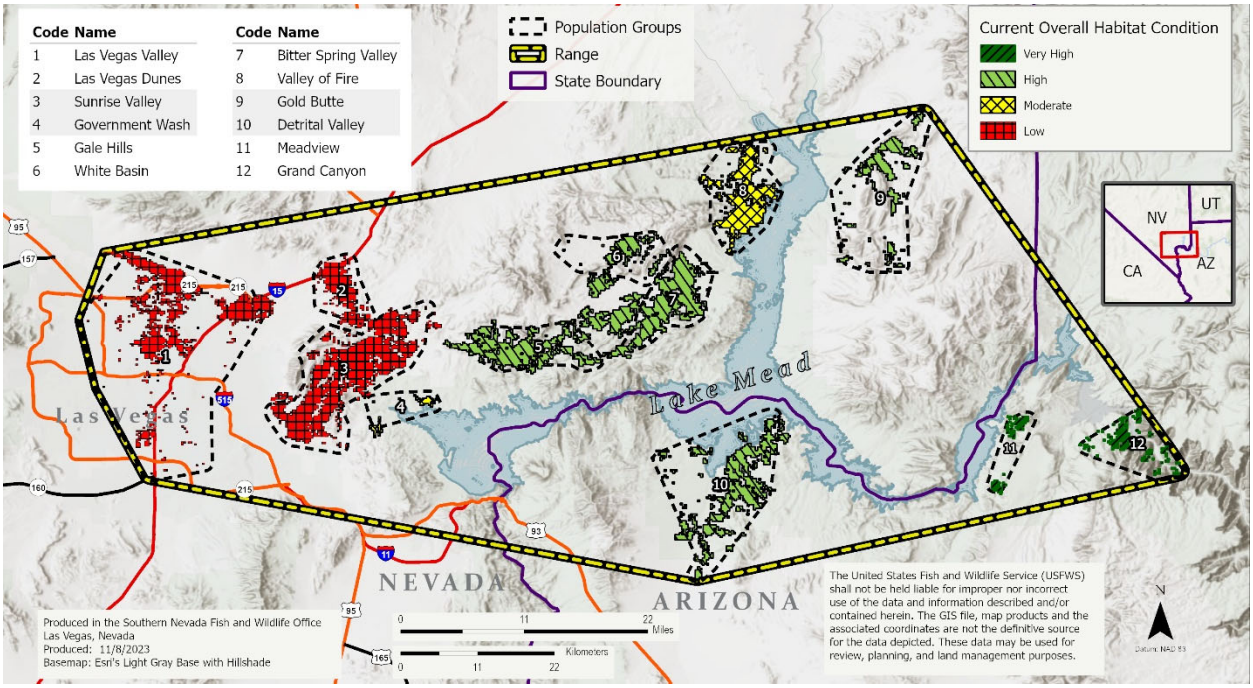


Figure 3—Las Vegas bearpoppy population group current overall habitat condition scores in the current condition. Note that the map does not represent the distribution of habitat disturbance and modification within the population group.

In regard to population resiliency, the biology and life history of the Las Vegas bearpoppy provides high resilience for surviving natural environmental and demographic stochasticity within current climatic conditions (Meyer and de Queiroz 2023, p. 45). All four areas examined in the PVA (two study areas in the Gold Butte, one in the Las Vegas Valley, and one in the Valley of Fire population group) had positive stochastic population growth rates with small to

extremely small likelihood of a 50-year extinction risk, based on current and projected climate conditions (Meyer and de Queiroz 2023, p. 43, Table 8). However, small and fragmented populations are less resilient to threats. High seed production during favorable years that can stockpile in the seed bank, along with a persistent seed bank capable of surviving long periods of inadequate precipitation, provides a key buffer against local extirpation (Meyer and de Queiroz 2023, p. 46) within populations where habitat is not overly disturbed or modified. All study areas had mean stochastic growth rates ≥ 1 in the next 50 years, which included some of the hottest and driest sites across the range of the species, indicating stable or increasing population trends (Meyer and de Queiroz 2023, p. 45). Overall, seven population groups likely have a high resiliency being a high or very high overall habitat condition (Table 4, Figure 3). The Las Vegas Dunes, Las Vegas Valley, and Sunrise Valley population groups with a large proportion of the estimated habitat area, over 40 percent, may have a reduced resiliency from past conditions with a low overall habitat condition.

In regard to representation, the broad climatic distribution and range of soil environments occupied by the 12 Las Vegas bearpoppy population groups indicates a high level of representation (Meyer and de Queiroz 2023, p. 46). Life history variation within and among populations, in the form of small and large-rosette forms, may likely be genetically founded and may provide alternative adaptive response capability of populations to long-term changes in climate. (Meyer and de Queiroz 2023, p. 47). Except for samples from the Grand Canyon population group, gene flow persists within genomically-defined populations (Massatti et al. 2022, p. 5). It is possible that the representation of the Las Vegas bearpoppy has been reduced because of extirpations of several element occurrences in the drier areas of its range in the Las Vegas Valley. Though the Las Vegas bearpoppy may have decreased representation from historical conditions, it still is found across a broad climactic and historical distribution with unique alleles in populations across the range.

In regard to redundancy, though considered rare and confined to smaller areas, populations of the Las Vegas bearpoppy are distributed across a broad area of the northeastern Mojave Desert. There are 12 population groups of Las Vegas bearpoppy dispersed across approximately 125 km (78 mi) east to west and 65 km (40 mi) north to south. The redundancy of the Las Vegas bearpoppy has been reduced by the extirpation of element occurrences in the Las Vegas Valley (Meyer and de Queiroz 2023, p. 47); however, the species is still well-distributed throughout the remainder of its range. Therefore, though the Las Vegas bearpoppy has slightly decreased redundancy from historical conditions, it is still capable of withstanding near-term catastrophes.

Future Condition

The viability of the Las Vegas bearpoppy depends on maintaining resiliency, redundancy, and representation over time. We consider the foreseeable future for the Las Vegas bearpoppy to be approximately 50 years. We selected this timeframe because it allows us to realistically predict species response and changes to resiliency, representation, and redundancy from influences to viability, and the plausible future effects of urbanization, mining, trampling, and climate change. For details on how we measured potential plausible future quantitative effects to habitat, as well

as additional details about the selected climate scenarios, please see the SSA report (Service 2024, pp. 41–46).

TABLE 5—Two plausible future scenarios, Scenario 1 and Scenario 2, used to evaluate the full range of future conditions that may be influence the viability of the Las Vegas bearpoppy. The scenarios are for projections of approximately 50 years.

| **Threat or Influence** | **Scenario 1:** | **Scenario 2:** |
|---|---|---|
| Urbanization | Urbanization as it contributes to land type conversions is built out, based on past trends, within existing lands currently available as private lands, or made available through Bureau of Land Management land disposals. | Urbanization expands beyond those land type conversions in Scenario 1 to include further land disposals, including private lands and other areas such as Nellis Air Force Base Area III. |
| Mining | Mining continues within existing areas of active claims currently having extractive operations with some slight increase of mining area. | Mining expands beyond Scenario 1 to include the extraction of materials in areas of active claims which weren't being worked. |
| Trampling | Trampling remains relatively stable and can be managed to maintain or reduce current intensities. Active feral horse and burro management maintains or reduces ungulate trampling and the area trampled by human activities does not appreciably increase. | Trampling increases as a result of growing increased human and ungulate movement activities following population increases by both across the landscape. |
| Winter Precipitation | Climate conditions throughout the range of the species, particularly winter precipitation, experience a lower decreasing trend in the amount of favorable winter precipitation (SSP2–4.5). | Climate conditions throughout the range of the species, particularly winter precipitation, experience a greater decreasing trend in favorable winter precipitation (SSP5–8.5). |
| Conservation | Areas currently conserved remain unavailable for development or trampling disturbances. | Areas currently conserved are developed and trampling disturbances increase. |

***Future Scenario Results***

In this section, we discuss our conclusions for both future scenarios in terms of the plausible future condition of all population groups as well as overall resiliency, redundancy, and representation for the Las Vegas bearpoppy.

In regard to population condition, under Scenario 1, seven of the twelve Las Vegas bearpoppy population groups remain in high or very high overall habitat condition. Under Scenario 2, five of the twelve population groups remain in high or very high overall habitat condition, with reductions in two population groups in the western areas of the range near metropolitan Las Vegas. Under both future scenarios, there will likely be a continuing decrease of resiliency of the population groups near urbanized areas with the highest exposure to development and trampling.

In both scenarios, estimated habitat in the Las Vegas Valley, Las Vegas Dunes, and Sunrise Valley population groups will decrease more from urbanization, and habitat area in the Gale Hills and Sunrise Valley population groups will decrease more from mining. Under scenario 2, habitat area in the White Basin population group area will also decrease due to mining.

In regard to future condition of habitat, the Las Vegas Valley, Las Vegas Dunes, and Sunrise Valley will have the greatest reduction in habitat in both future scenarios. Additionally, the Las Vegas Valley, Las Vegas Dunes, Government Wash and Sunrise Valley population groups may also experience a lowered resiliency in the form of lowered growth rates because they are at the lower range of precipitation for the species. Government Wash, which currently has smallest estimated habitat area and lowest winter precipitation, may have a lower resiliency under both scenarios. In Scenario 2, the White Basin population group will also have a reduction in resiliency.

Under Scenario 2, land management agencies may address trampling disturbances by exclusion or by reducing the number of trampling sources. Maintaining current conservation areas (e.g., North Las Vegas Airport and Springs Preserve) protected within the Las Vegas Valley population group will lessen the potential reductions of resiliency if these areas are to be developed. However, the loss of the conservation area at the Nellis Air Force Base Area III under this scenario would cause a large habitat loss and reduction of connectivity and may further reduce the resiliency of remaining areas in the Las Vegas Valley population group as it becomes closer to extirpation with an estimated 93 percent habitat loss. The larger portion of the remaining seven percent of estimated habitat areas of the Las Vegas population group is within the Tule Springs Fossil Beds National Monument managed by NPS. In Scenario 2, with five of the twelve population groups projected to be in high or very high overall habitat condition, the Las Vegas bearpoppy is likely to withstand environmental or demographic stochastic events over the next 50 years.

We now discuss projected shifts in species representation under both future scenarios. Under Scenario 1, representation for the Las Vegas bearpoppy will likely remain at or near the current breadth of genetic and environmental diversity within and among populations. Representation of the Las Vegas bearpoppy has been most impacted by threats at the Las Vegas Valley population group followed by Las Vegas Dunes and Sunrise Valley, and we project these will be the most affected in the future. Overall, however, there is likely to be little change in representation from current condition under this scenario. This is due to the relatively low change in threats and thus limited expected impacts to species genetics or ecological diversity or distribution.

Under Scenario 2, Las Vegas bearpoppy representation will likely remain at or near the current breadth of genetic and environmental diversity within and among populations. Representation is likely to remain high in Scenario 2, though it may slightly decrease due to losses of individuals from the increases in habitat disturbance and decreasing favorable winter precipitation.

In regard to redundancy, under Scenario 1, redundancy will likely remain at or near the current

condition across the range. Under Scenario 2, redundancy may be slightly reduced from habitat loss and resultant low overall habitat condition across the western portion of the range. However, under both scenarios, the overall distribution of the species, and thus its ability to withstand most catastrophic events, will be mostly unchanged in the next 50 years.

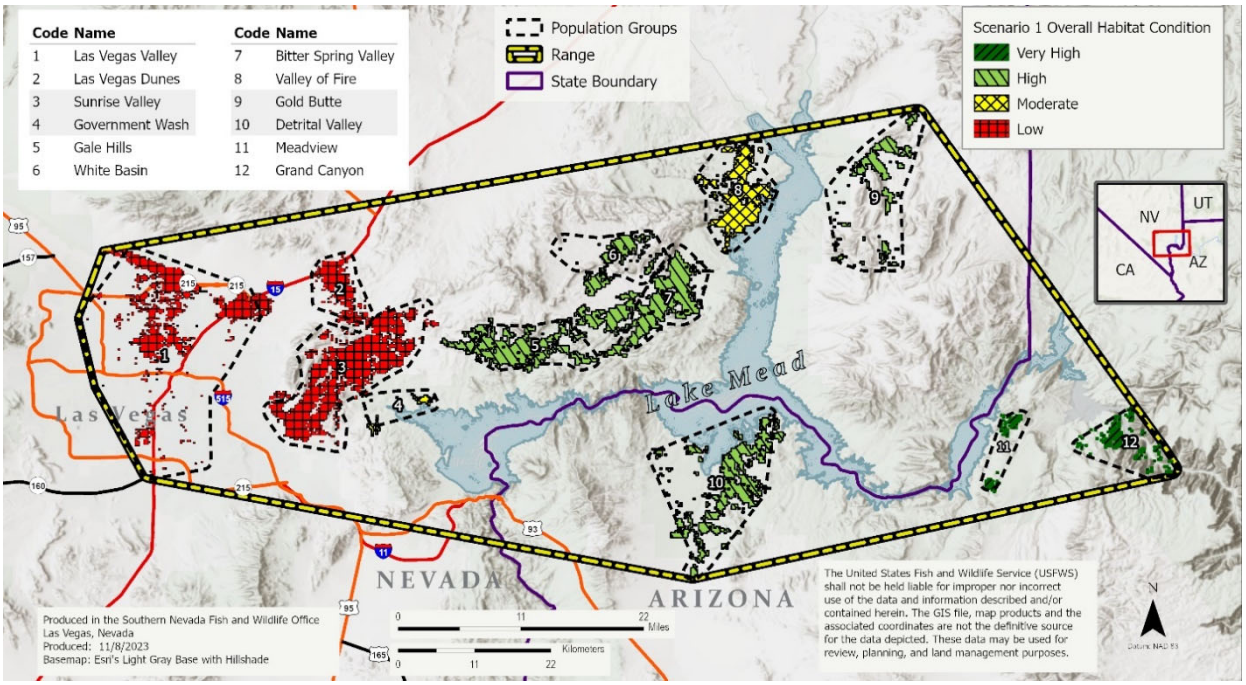

Figure 4—Las Vegas bearpoppy population group habitat condition scores under Scenario 1. Note that the map does not represent the distribution of habitat disturbance and modification within the population group.

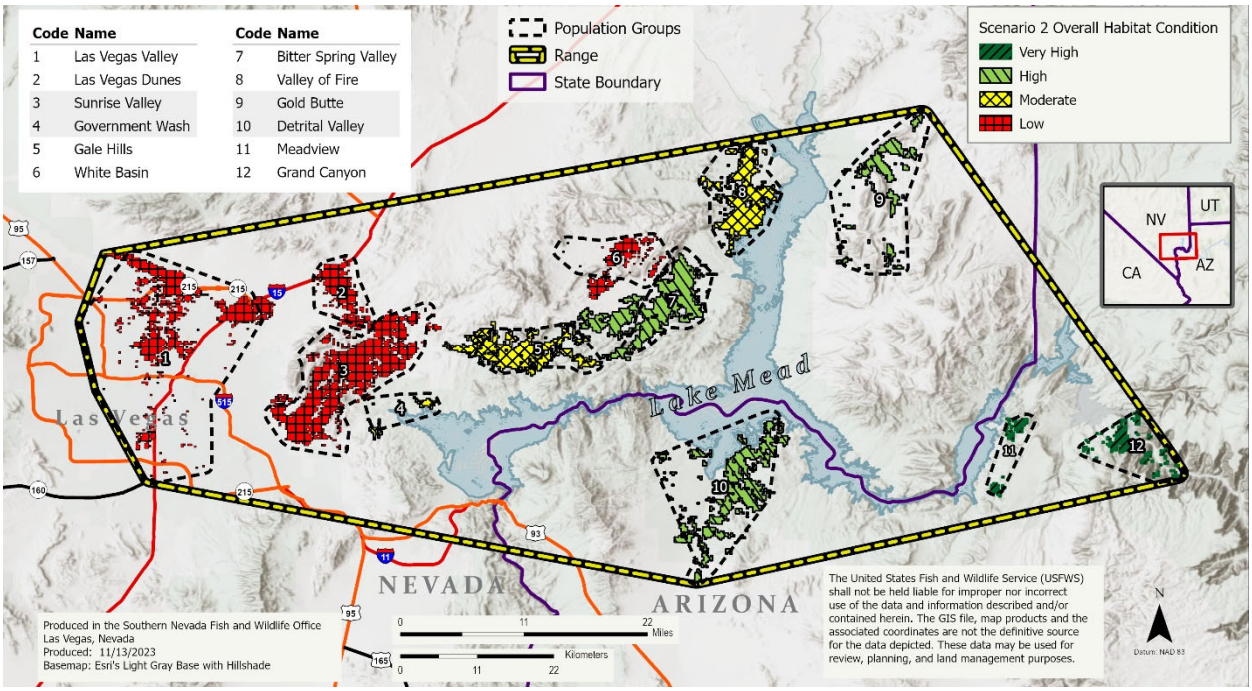

Figure 5—Las Vegas bearpoppy population group habitat condition scores for Scenario 2. Note that the map does not represent the distribution of habitat disturbance and modification within the population group.

FINDING

Regulatory Framework

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species is an "endangered species" or a "threatened species." The Act defines an endangered species as a species that is "in danger of extinction throughout all or a significant portion of its range," and a threatened species as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether any species is an "endangered species" or a "threatened species" because of any one or a combination of the following 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.

These factors represent broad categories of natural or human-caused actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and

conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

The Act does not define the term "foreseeable future," which appears in the statutory definition of "threatened species." Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis, which is further described in the 2009 Memorandum Opinion on the foreseeable future from the Department of the Interior, Office of the Solicitor (M–37021, January 16, 2009; "M-Opinion," available online at *https://www.doi.gov/sites/doi.opengov.ibmcloud.com/files/uploads/M-37021.pdf*). The foreseeable future extends as far into the future as the U.S. Fish and Wildlife Service and National Marine Fisheries Service (hereafter, the Services) can make reasonably reliable predictions about the threats to the species and the species' responses to those threats. We need not identify the foreseeable future in terms of a specific period of time. We will describe the foreseeable future on a case-by-case basis, using the best available data and taking into account considerations such as the species' life-history characteristics, threat-projection timeframes, and environmental variability. In other words, the foreseeable future is the period of time over which we can make reasonably reliable predictions. "Reliable" does not mean "certain"; it means sufficient to provide a reasonable degree of confidence in the prediction, in light of the conservation purposes of the Act.

Status Assessment

***Status Throughout All of Its Range***

In this finding, we summarized the effects of development (including urbanization, mining, and Lake Mead filling) (Factor A); trampling by humans and ungulates (Factor E); climate change (Factor E); habitat fragmentation, pollinator limitation, and genetic consequences (Factor E); nonnative plants (Factor E); and collection (Factor B). In the SSA report, we also discuss the effects of disease (Factor C) and herbivory by small mammals and insects (Factor C). However, both of these threats are only affecting some individual plants and not having population-level effects. In this finding, we consider all threats impacting the species, including cumulative effects to the species. For example, activities in areas associated with development and mining may also result in or lead to increased adverse effects from trampling, fragmentation, ungulates, and non-native plants.

The Las Vegas bearpoppy is currently found in 12 population groups in Arizona and Nevada. With a deep taproot and a diverse adult reproductive life form that produces a long-lived seed bank, the Las Vegas bearpoppy is well adapted to withstand stochastic climatic events throughout its range. The Las Vegas bearpoppy can exist for up to 20 years within the seedbank in areas where it may appear extirpated.

The primary historical threat to the Las Vegas bearpoppy was development. Currently, habitat modification or destruction associated with development is primarily affecting populations near the growing Las Vegas metropolitan area, particularly the Las Vegas Valley population group. Disturbance associated with trampling is also occurring at high magnitude in the Las Vegas Valley and in popular recreation areas in the Las Vegas Dunes and Sunrise Valley population groups.

Approximately 17 percent of the estimated habitat area occurs on private land, mostly in the Las Vegas Valley population group. But overall, 79 percent of the range of the Las Vegas bearpoppy occurs on Federal lands. Further, three of twelve population groups have habitat that is 20 percent or more designated wilderness areas. In addition, 90 percent of estimated habitat in the Grand Canyon population group is managed as wilderness. Thus, these lands are protected from threats associated with urbanization and mining, though some impacts from trampling may occur, especially outside of wilderness areas.

Other threats are continuing to impact the species, including habitat fragmentation, pollinator limitation, nonnative plants, and collection. However, these threats and others appear to be minor, and only affecting the species at the individual rather than the population level. Therefore, we expect that they are having minimal impacts to the species now.

Currently, seven of the twelve population groups across the range are in high or very high overall habitat condition, indicating that the species is able to withstand environmental or demographic stochastic events, has sufficient redundancy to withstand catastrophic events, and has sufficient representation to adapt to near-term changing conditions. Where available, demographic data indicate stable or increasing populations.

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we conclude that the Las Vegas bearpoppy maintains resilient populations across its range. Though the species is being impacted by threats such as development, trampling, and mining, those threats are occurring in a limited portion of the range. Currently, seven of twelve population groups are in high or very high overall habitat condition across the range, indicating that the species is able to withstand stochastic events. Additionally, the species remains extant across its range and has sufficient redundancy to withstand catastrophic events. The species also maintains its environmental and genetic representation from its historical condition; thus, it retains its ability to adapt to near-term changing conditions. Thus, after assessing the best available information, we conclude that the Las Vegas bearpoppy is not in danger of extinction throughout all of its range.

Therefore, we proceed with determining whether Las Vegas bearpoppy is likely to become endangered within the foreseeable future throughout all of its range. We consider the foreseeable future for this species to be approximately 50 years, which is the timeframe in which we can make reasonably reliable predictions about the primary threats to the species, as well as the species' response to those threats.

Changes in climate will continue to occur in the foreseeable future, including decreases in winter precipitation that are crucial to the germination of the Las Vegas bearpoppy. However, with a seed bank that can remain viable for up to 20 years, the species' life history is well adapted to persist through multiple years of inadequate precipitation. We expect that threats such as habitat fragmentation, pollinator limitation, nonnative plants, and collection will continue to only minimally impact the species into the foreseeable future.

In our future condition analysis, based on recent studies, the population growth rates for the Las Vegas bearpoppy are likely to remain stable or positive with the climate conditions under both scenarios. However, there may be slight potential reductions due to changing winter precipitation, particularly in western areas of the range. We also considered effects from urbanization, mining, trampling, and land management and conservation efforts in our future scenarios. Under Scenario 1, seven of the twelve population groups remain in high or very high overall habitat condition. Under Scenario 2, five of the twelve population groups remain in high or very high overall habitat condition with reductions in two population groups in the western areas of the range near metropolitan Las Vegas.

Under Scenario 1, redundancy and representation of the Las Vegas bearpoppy will likely be similar to the current condition. We anticipate slight decreases in population and habitat condition under Scenario 2 due to potential loss of habitat and individuals in the western portion of the range. Under Scenario 2, habitat disturbance will increase slightly beyond the population groups in the Las Vegas metropolitan area to those in the White Basin. Favorable winter precipitation is projected to occur at a greater decreasing trend. Overall, we expect that there will be some reduction of redundancy and representation in the future from the current conditions, but the magnitude of these changes is unlikely to dramatically increase extinction risk for the species in the next approximately 50 years. No population groups are expected to become extirpated.

Under both plausible future scenarios, between 5 and 7 population groups will remain in high and very high condition, and in the scenario with higher projected impacts from threats, two populations will decrease to moderate condition. No population groups are expected to be extirpated under either future scenario. Though there may be shifts in rainfall due to climate change and despite some potential decreases in population growth rates, population models show that the species is likely to continue to display positive growth rates even under more extreme climate scenarios. Therefore, though there may be some decreases in population resiliency and species redundancy in the foreseeable future, the Las Vegas bearpoppy is forecast to maintain enough resiliency, redundancy, and representation such that it will maintain viability. After assessing the best available information, we conclude that the Las Vegas bearpoppy is not likely to become endangered within the foreseeable future throughout all of its range.

***Status Throughout a Significant Portion of Its Range***

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. Having determined that the Las Vegas bearpoppy is not in danger of extinction or likely to become so within the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so within the foreseeable future throughout a significant portion of its range—that is, whether there is any portion of the species' range for which it is true that both (1) the portion is significant; and (2) the species is in danger of extinction now or likely to become so within the foreseeable future in that portion. Depending on the case, it might be more efficient for us to address the "significance" question or the "status" question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

In undertaking this analysis for the Las Vegas bearpoppy, we began by identifying portions of the range where the biological status of the species may be different from its biological status elsewhere in its range. For this purpose, we considered information pertaining to the geographic distribution of (a) individuals of the species, (b) the threats that the species faces, and (c) the resiliency condition of populations.

We evaluated the range of the Las Vegas bearpoppy to determine if the species is in danger of extinction now or likely to become so within the foreseeable future in any portion of its range. Because the range of a species can theoretically be divided into portions in an infinite number of ways, we focus our analysis on portions of the species' range that contribute to the conservation of the species in a biologically meaningful way. Due to the connectivity of population groups within each genomic group, apparent from the generally broad expansive areal distributions of clustered genetically similar individuals, we found the most biologically appropriate scale for the Las Vegas bearpoppy to be the genomic group scale. We then considered whether the threats or their effects on the species are greater in any genomic group than in other genomic groups such that the species is in danger of extinction now or likely to become so in the foreseeable future in that portion.

We first considered whether the species may be in danger of extinction throughout a significant portion of its range. As discussed in the *Status Throughout all of Its Range*, the primary current threats to the Las Vegas bearpoppy are urbanization, trampling, and climate change. We examined those threats along with the effects from mining, Lake Mead filling, habitat fragmentation, pollinator limitation, genetic consequences, nonnative plants, collection, disease, and herbivory by small mammals and insects, including cumulative effects, and considered whether conservation efforts and regulatory mechanisms ameliorated any of the effects.

We found one biologically meaningful portion of the range of the Las Vegas bearpoppy where the biological condition and subsequent extinction risk of the species differs from its condition elsewhere in its range such that the status of the species in that portion may differ from the status

within the rest of the range. In one genomic group, the Northwest, the Las Vegas bearpoppy may have a higher current risk of extinction than within the rest of the range. The Northwest genomic group contains the Las Vegas Dunes, Las Vegas Valley, and Sunrise Valley population groups. In this genomic group, habitat modification and destruction due to urbanization has affected the Las Vegas Valley population group. Disturbance associated with trampling is occurring in all three population groups. All three genomic groups are currently in low condition.

After identifying a portion of the range where the species has a potentially different status than within the remainder of the range, we considered whether or not that portion is a "significant portion of the range" of the Las Vegas bearpoppy. The Service's most recent definition of "significant" within agency policy guidance has been invalidated by court order (see Desert Survivors v. U.S. Department of the Interior, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018)). Therefore, in light of the court decision, for the purposes of this analysis when considering whether this portion is "significant," we considered whether the portion may (1) contain a large geographic portion of the range relative to the entire range for the species; (2) contain high-quality or high-value habitat relative to the remaining portions of the range; or (3) occur in a unique habitat or ecoregion for the species.

Collectively, the Northwest genomic group makes up 32 percent of suitable habitat in the entire range of the species identified for the Las Vegas bearpoppy. In addition, these population groups are made up largely of habitat that has been fragmented or degraded by development and anthropogenic trampling. Thus, they do not contain high quality or high-value habitat relative to the remainder of the range. They also do not contain any unique or unusual habitat for the taxon, nor do they contain any habitat essential to any life-history functions that is not found in any other portions. Therefore, this portion is not a significant portion of the range.

Therefore, we find that the species is not in danger of extinction in any significant portion of its range. This does not conflict with the courts' holdings in *Desert Survivors v. Department of the Interior*, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014), including the definition of "significant" that those court decisions held to be invalid.

We next considered whether the Las Vegas bearpoppy is likely to become an endangered species within the foreseeable future throughout a significant portion of its range. We found two genomic groups, the Northeast and Northwest, where the Las Vegas bearpoppy has a higher risk of extinction than the rest of the range.

When looking more closely at the Northeast genomic group (which contains the Bitter Spring Valley, Gale Hills, Gold Butte, Government Wash, Valley of Fire, and White Basin population groups), we conclude that the biological condition of the species differs from its condition

elsewhere in its range, such that the status of the species in that portion may differ from its status in any other portion of the species' range. Under future Scenario 2, which projects a higher magnitude of threats and lower conservation, the White Basin population group decreases from high to low condition, and the Gale Hills population group decreases to moderate condition. However, the remaining three population groups in the genomic group remain in high condition. Additionally, we define a population group in moderate condition to still maintain between 50 and 90 percent habitat available, and less than 50 percent of habitat affected by disturbance. Therefore, we conclude that the Northeast genomic group will maintain at least moderate population resiliency across most of its range. With four of six population groups projected to be in high condition in this future scenario, and the fifth group in moderate condition, the genomic group is projected to maintain similarly high redundancy to the current condition. In regard to representation, little to no decrease in environmental or genetic representation would be expected, with one population group projected to decrease to low condition and one projected to decrease to moderate condition. This is because similar genomic and environmental conditions are found in the remainder of the genomic group, which is projected to be in high condition. Overall, we conclude that this genomic group does not have a different status than the remainder of the range.

We then considered the Northwest genomic group of within the foreseeable future throughout a significant portion of its range. In the foreseeable future, this genomic group will likely continue to lose population resiliency, as these population groups are located near urbanized areas with the highest exposure to development and trampling. These population groups may also experience a lowered resiliency in the form of lowered growth rates because they are at the lower range of precipitation for the species. However, as stated above, this portion of the range is not a "significant portion of the range." Therefore, we find that the species is not in danger of extinction or likely to become so within the foreseeable future in any significant portion of its range. This does not conflict with the courts' holdings in *Desert Survivors v. Department of the Interior*, 321 F. Supp. 3d 1011, 1070-74 (N.D. Cal. 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d 946, 959 (D. Ariz. 2017) because, in reaching this conclusion, we did not apply the aspects of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014), including the definition of "significant" that those court decisions held to be invalid.

*Determination of Status*

Based on the best scientific and commercial data available, we determine that the Las Vegas bearpoppy does not meet the definition of an endangered species or a threatened species in accordance with sections 3(6) and 3(20) of the Act. Therefore, we find that listing the Las Vegas bearpoppy is not warranted at this time.

COORDINATION WITH STATES

We contacted and requested information from the Arizona and Nevada State agencies. We received information from the Arizona Game and Fish Department's Natural Heritage

Program, Nevada Department of Conservation and Natural Resource's Nevada Division of Natural Heritages, and Nevada Division of Forestry. We contacted the Arizona Department of Agriculture, Arizona State Land Department, and Nevada Department of Wildlife but did not receive responses.

LITERATURE CITED

Abella S.R., J.E. Spencer, J. Hoines, and C. Nazarchyk. 2009. Assessing an exotic plant surveying program in the Mojave Desert, Clark County, Nevada, USA. Environ Monit Assess 151:221–230.

Arizona Rare Plant Committee. 2001. Arizona rare plant field guide: a collaboration of agencies and organizations. U.S. Government Printing Office.

AZGFD. 2023. HDMS Element Occurrence Records for Arctomecon californica. Heritage Data Management System, Arizona Game & Fish Department.

Bangle D. 2005. Report on Arctomecon californica (Las Vegas bearpoppy) Monitoring, Lake Mead National Recreation Area (2005). FINAL REPORT for work performed by the National Park Service, Lake Mead National Recreation Area during the 2004 and 2005 with funding received from the Clark County Multiple Species Habitat Conservation Plan (Contract reference: 2003-NPS-363-P), Las Vegas, Nevada.

Bangle D. and J. Craig. 2010. Inventory, research and monitoring for covered plant species; Project report 2008–2010. For work performed by the National Park Service, Lake Mead National Recreation Area Funding received from the Clark County Multiple Species Habitat Conservation Plan. Project Number: 2005-NPS-535-P.

Bardeen K. and H. Williams. 2000. Habitat management plan for the Las Vegas bearpoppy (*Arctomecon californica*) populations on Las Vegas Valley Water District North and South Well Fields. Las Vegas Valley Water District and Las Vegas Springs Preserve.

Bell F.G. and L.J. Donnelly. 2006. Mining and Its Impact on the Environment. Taylor & Francis, London.

BLM. 1998a. Las Vegas bearpoppy (Arctomecon californica) habitat management plan. File Code: 6840(NV-052). Las Vegas Field Office, Bureau of Land Management.

_____. 1998b. Record of decision for the approved Las Vegas Resource Management Plan and Final Environmental Impact Statement. Bureau of Land Management.

_____. 1998c. Environmental assessment (NV-054-95-062) for the Las Vegas bearpoppy (Arctomecon californica) habitat management plan. Las Vegas Field Office, Bureau of Land Management.

_____. 2014. Final Environmental Assessment, DOI-BLM-NV-S010-2010-0091-EA, Southern

Nevada Intertie Project. Bureau of Land Management.

_____. 2017. Lima Nevada Gypsum Quarry Sensitive Plant Reclamation Plan (SPRP).

_____. 2023. Updated BLM Sensitive Species List for Nevada & Statewide BLM Nevada Special Status Species (BLM NV SSS) Observation Form. Instruction Memorandum NV-IM-2024-003.

Brian N. 2001. Status Report: Arctomecon sp nova: The Grand Canyon Population I: Species information II: Documentation. Research Office, Grand Canyon National Park.

Brian N.J. 2000. A field guide the special status plants of Grand Canyon National Park. Science

Brooks M.L. and B. Lair. 2005. Ecological effects of vehicular routes in a desert ecosystem. Las Vegas NV USA US Dep Inter Geol Surv West Ecol Res Cent (p. 23). Report prepared for the United States Geological Survey, Recoverability and Vulnerability of Desert Ecosystems Program.

Brooks M.L. and D.A. Pyke. 2001. Invasive plants and fire in the deserts of North America. Pp. 1–14 in K.E.M. Galley and T.P. Wilson eds. Proc Invasive Species Workshop Role Fire Control Spread Invasive Species Fire Conf 2000 First Natl Congr Fire Ecol Prev Manag. Miscellaneous Publication No. 11, Tall Timbers Research Station, Tallahassee, FL.

Center for Biological Diversity. 2019. Petition to list the Las Vegas bearpoppy (Arctomecon californica) under the Endangered Species Act and concurrently designate critical habitat. August 14, 2019. Center for Biological Diversity.

de Queiroz T. and S.E. Meyer. 2023. Long-term seed bank persistence in a stochastic desert environment. Ecol Evol 13:e9924.

Eichenberg E. 2023. Reply to USFWS Request for Information on the Las Vegas bearpoppy (Arctomecon californica). January 11, 2023.

Friends of Gold Butte. 2015. Damage in Gold Butte, Nevada November 2014 – July 2015.

Gelbard J.L. and J. Belnap. 2003. Roads as Conduits for Exotic Plant Invasions in a Semiarid Landscape. Conserv Biol 17:420–432.

Gentilcore D. 2021. Lima Nevada Gypsum Quarry annual report for sensitive plant reclamation plan. June 30, 2021. Prepared for H. Lima Nevada LLC. Submitted to: Nevada Division of Forestry & Bureau of Land Management.

GlobalData. 2023. Power plant profile: Spectrum Solar Power Plant, US. Power Technol.

Graham K.K. and T. Griswold. 2023. The search for Perdita meconis, the Mojave Poppy Bee.

Las Vegas, Nevada.

Greenleaf S.S., N.M. Williams, R. Winfree, and C. Kremen. 2007. Bee foraging ranges and their relationship to body size. Oecologia 153:589–596.

Griswold T., S. Higbee, and O. Messinger. 2006. Pollination ecology. Final report 2003 biennium Clark County, Nevada (2004-2005). USDA-ARS Bee Biology & Systematics Laboratory, Logan, Utah.

Harper K.T. and R. Van Buren. 1996. An analysis of DNA variation among populations of Arctomecon californica and A. merriamii in southern Nevada.

Hiatt H. and J. Boone, eds. 2003. Clark County, Nevada species account manual: November 2003. [Clark County Desert Conservation Program Public Information and Education Subcommittee], Las Vegas, Nevada.

Hickerson L.L. 1998. The reproductive ecology, demography, and population genetic structure of Arctomecon californica Torrey & Frémont (Papaveraceae) in fragmented and unfragmented habitat (Master of Science). Utah State University.

Hickerson L.L. and P.G. Wolf. 1998. Population genetic structure of Arctomecon californica Torrey & Frémont (Papaveraceae) in fragmented and unfragmented habitat. Plant Species Biol 13:21–33.

Holland J.S., W.E. Niles, and D.R. Schramm. 1980. A guide to the threatened and endangered vascular plants of the Lake Mead National Recreation Area. LAME Technical Report No. 4. National Park Service.

Kartesz J.T. 1988. A flora of Nevada (Ph.D.). University of Nevada, Reno.

Lancaster J. and T. Pereira. 2023. An ensemble model for Las Vegas bearpoppy (Arctomecon californica). Interim report. Desert Research Institute. Award Number L21AC10282. Prepared for Bureau of Land Management, Arizona State Office.

Lovich J.E. and D. Bainbridge. 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. Environ Manage 24:309–326.

Massatti R., M. Andrews, E. Sukovich, and S. Lencioni. 2022. Population genomic analyses of Arctomecon californica. U.S. Geological Survey.

Megill L. 2007. Seed fates of *Arctomecon californica*.

Meyer R. 2023. Department of Air Force Response For Information (RFI): Las Vegas bearpoppy.

Meyer S. and T. de Queiroz. 2023. Population viability modeling to evaluate Las Vegas bearpoppy (Arctomecon californica) past, present, and future population status. First phase final report to U.S. Fish and Wildlife Service, Southern Nevada Fish and Wildlife Office. Interagency Agreement #4500162700. US Fish and Wildlife Service and US Forest Service Rocky Mountain Research Station.

Meyer S.E. 1986. The ecology of gypsophile endemism in the Eastern Mojave Desert. Ecology 67:1303–1313.

_____. 1993. Papaveraceae: 8. Arctomecon. P. in Flora of North America Editorial Committee ed. Flora N Am North Mex Online. New York and Oxford.

Meyer S.E. and T. Forbis. 2006. Population viability analysis (PVA) for Arctomecon californica (Papaveraceae), an eastern Mojave Desert gypsophile perennial herb. Bot 2006 Calif State Univ - Chico July 28-August 2 2006. Chico, California.

Mistretta O., P. Rashmi, T.S. Ross, J.M. Porter, and J.D. Morefield. 1996. Current knowledge and conservation status of Arctomecon californica Torrey & Frémont (Papaveraceae, the California bearpoppy. Status report prepared for Nevada Natural Heritage Program, Department of Conservation and Natural Resources U.S. Fish & Wildlife Service, Nevada State Office.

NatureServe. 2022. Arctomecon californica, Las Vegas bear-poppy. NatureServe Explorer [web application]. NatureServe, Arlington, Virginia.

The Nature Conservancy. 2007. A conservation management strategy for nine low elevation rare plants in Clark County, Nevada. Reno, Nevada.

_____. 2023. Eglington Preserve.

Nelson D.R. and S.L. Welsh. 1993. Taxonomic revision of *Arctomecon* Torr. & Frém. Rhodora 95:197–213.

NDNH. 2023. Nevada Division of Natural Heritage Source Feature Geodatabase. January 17. Nevada Division of Natural Heritage, Nevada Department of Conservation and Natural Resources.

Nevada Division of Forestry. 2007. Conditional Permit for disturbance or destruction of critically endangered species, Construction of Detention Basins and Additional Military Family Housing Units in Area III. Nellis Air Force Base. Las Vegas bearpoppy Arctomecon californica.

_____. 2019. Special Permit for the Removal or Destruction of Plant Species in Clark County, Nevada. March 26, 2019.

NewFields. 2017. Environmental Assessment Villages at Tule Springs Roadway/Utilities Crossings and the Tufa Trail. National Park Service.

NPS. 1988. Minerals management plan. Lake Mead National Recreation Area / Arizona-Nevada. National Park Service.

_____. 1995. General Management Plan, August 1995. Grand Canyon National Park. National Park Service.

_____. 2005. Lake Mead National Recreation Area Strategic Plan 2001-2005. National Park Service, Lake Mead National Recreation Area.

_____. 2023. Restoration. Lake Mead National Recreation Area, National Park Service.

Oostermeijer J.G.B. 2003. Threats to Rare Plant Persistence. Pp. 17–58 in C.A. Brigham and M.W. Schwartz eds. Popul Viability Plants Conserv Manag Model Rare Plants. Springer Berlin Heidelberg, Berlin, Heidelberg.

Ottensmann J.R. 2023. Change in the size and distribution of large urban areas in the U.S., 1950-2020. SSRN Electron J.

Pereira T.J., L.P. Chiquoine, A.J. Larranaga, and S.R. Abella. 2021. Seed germination of a rare gypsum-associated species, Arctomecon californica (Papaveraceae), in the Mojave Desert. J Arid Environ 184:104313.

Phillips A.M. and B.G. Phillips. 1988. Status report Arctomecon californica Torr. & Frém. Museum of Northern Arizona. Submitted to Office of Endangered Species, U.S. Fish and Wildlife Service.

Portman Z.M., V.J. Tepedino, and A.D. Tripodi. 2019. Persistence of an imperiled specialist bee and its rare host plant in a protected area. (L. Packer, ed.)Insect Conserv Divers 12:183–192.

Powell E. 1999. Report on 1998 surveys for Arctomecon californica, Las Vegas bearpoppy, in Lake Mead National Recreation Area. National Park Service, Lake Mead National Recreation Area, Boulder City, Nevada.

RECON. 2000. Final Clark County Multiple Species Habitat Conservation Plan and Environmental Impact Statement for issuance of a permit to allow Incidental Take of 79 species in Clark County, Nevada September 2000. Clark County Department of Comprehensive Planning. U.S. Fish and Wildlife Service.

Rubicon Explorer Corp. 2022. Notice of intent application for exploration drilling Rubicon Explorer Corp White Basin Project Phase 2 Amendment 2 6/2/2022.

Saxena R. 2005. Differences in soil physical, chemical and mineralogical properties between inhabited and uninhabited Arctomecon californica habitats (Master of Science). University of Nevada, Las Vegas.

Shaffer, M.L. and M.A. Stein. 2000. Safeguarding our precious heritage. Pages 305–310 in B. Stein, L. Kutner, and J. Adams, editors. Precious Heritage. Oxford University Press; New York, New York.

Sheldon S.K. 1994. Life history biology and soil characteristics of two species of Arctomecon (Papaveraceae) (PhD Thesis). University of Nevada, Las Vegas.

Sheldon Thompson S.K. and S.D. Smith. 1997. Ecology of Arctomecon californica and A. merriamii (Papaveraceae) in the Mojave Desert. Madroño 44:151–169.

Simberloff D., J.-L. Martin, P. Genovesi, V. Maris, D.A. Wardle, J. Aronson, F. Courchamp, et al. 2013. Impacts of biological invasions: what's what and the way forward. Trends Ecol Evol 28:58–66.

Simpson J.M. 2014. Phylogeny and Population Genetics of the Endangered Dwarf Bear-poppy, Arctomecon humilis Coville (Papaveraceae) Using Microsatellite Markers (PhD Thesis). City University of New York.

Smith D.R., N.L. Allan, C.P. McGowan, J.A. Szymanski, S.R. Oetker, and H.M. Bell. 2018. Development of a species status assessment process for decisions under the U.S. Endangered Species Act. J Fish Wildl Manag 9:302–320.

SWCA Environmental Consultants. 2004. Clark County Flood Control District, Final Programmatic Supplemental Environmental Impact Statement. Bureau of Land Management and U.S. Army Corps of Engineers.

Tepedino V.J. and L.L. Hickerson. 1996. The reproductive ecology of Arctomecon californica. Final Rep Nat Conserv Las Vegas NV (p. 19 pp.). The Nature Conservancy, Las Vegas, Nevada.

[TNC] The Nature Conservancy. 2007. A conservation management strategy for nine low elevation rare plants in Clark County, Nevada. Reno, Nevada.

United States v. Cliven Bundy, No. Case 2:12-cv-00804-LDG-GWF (United States District Court, District of Nevada May 14, 2012).

US Environmental Protection Agency. 2013. Level III ecoregions of the continental United States: Corvallis, Oregon, US EPA–National Health and Environmental Effects Research Laboratory, map scale 1: 7,500,000.

USAF. 2009. Letter from Colonel Kenneth Keskel, Vice Commander to Mr. Allen Biaggi,

Director, Nevada Department of Conservation and Natural Resources, January 20, 2009. Follow up to issues discussed during October 2, 2008, meeting regarding Nellis AFB Las Vegas bearpoppy and Las Vegas buckwheat habitat in Area III.

_____. 2019. Final integrated natural resources management plan Nellis Air Force Base / Creech Air Force Base / Nevada Test and Training Range. Nevada Air Force Base, Nevada 99th, Civil Engineering Squadron, Environmental Management Flight.

USDA and NRCS. 2022. Arctomecon californica Torr. & Frém. The PLANTS Database. National Plant Data Team, Greensboro, North Carolina.

[Service] U.S. Fish and Wildlife Service. 2024. Species Status Assessment: Bi-State Distinct Population Segment of Greater Sage-Grouse Las Vegas Bearpoppy (*Arctomecon californica* Torr. & Frém). May 2024. 114 pp.

[USGS] United States Geological Survey. 2005. Mineral Resources Data System. White Basin. MRDS ID M242219.

Wang T., A. Hamann, D. Spittlehouse, and C. Carroll. 2016. Locally Downscaled and Spatially Customizable Climate Data for Historical and Future Periods for North America. PLOS ONE 11:e0156720.

Willis K., ed. 2017. State of the world's plants 2017. Report. Royal Botanic Gardens, Kew.

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