

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

SCIENTIFIC NAME: *Mimulus gemmiparus*

COMMON NAME: Rocky Mountain monkeyflower

LEAD REGION: Legacy Region 6/Interior Region 7

DATE INFORMATION CURRENT AS OF: April 2020 (the date of the current Species Status Assessment (SSA) Report for the Rocky Mountain monkeyflower; we have received no new information since that time.)

STATUS/ACTION

Species assessment - determined either we do not have sufficient information on threats or the information on the threats does not support a proposal to list the species and, therefore, it was not elevated to Candidate status

Listed species petitioned for uplisting for which we have made a warranted-but-precluded finding for uplisting (this is part of the annual resubmitted petition finding)

Candidate that received funding for a proposed listing determination; assessment not updated

New candidate

Continuing candidate

Listing priority number change

Former LPN: \_\_\_\_

New LPN: \_\_\_\_

Candidate removal: Former LPN: \_\_\_\_

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

U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

F – Range is no longer a U.S. territory.

I – Insufficient information exists on taxonomy, or biological vulnerability and threats, to support listing.

- M – Taxon mistakenly included in past notice of review.
- N – Taxon does not meet the Act’s definition of “species.”
- X – Taxon believed to be extinct.

Date when the species first became a Candidate (as currently defined): NA, not currently a candidate species

Petition Information:

- Non-petitioned
- Petitioned; Date petition received: October 4, 2011
  - 90-day substantial finding FR publication date: August 29, 2012
  - 12-month warranted but precluded finding FR publication date: NA

FOR PETITIONED CANDIDATE SPECIES:

- a. Is listing warranted (if yes, see summary of threats below)? No
- b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? NA
- c. Why is listing precluded? Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for this species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The “Progress on Revising the Lists” section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months. NA

PREVIOUS FEDERAL ACTIONS:

WildEarth Guardians petitioned the Service to list the Rocky Mountain monkeyflower (hereafter, monkeyflower) on October 4, 2011. We published a 90-day finding in the *Federal Register* in response to this petition on August 29, 2012; it found that the petition presented substantial information that listing may be warranted. This assessment, along with the *Federal Register* notice, constitutes the 12-month finding for this species in response to the 2011 petition.

ANIMAL/PLANT GROUP AND FAMILY: Flowering Plants, Scrophulariaceae (Figwort) family. However, the taxonomy of this species is currently under debate. Recent phylogenetic studies suggest that this species is a member of the Phrymaceae (Lopseed) family, not the Scrophulariaceae (Figwort) family, as previously recorded. See Taxonomy below for further discussion.

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Unknown; however, since the species is only known to occur in Colorado, historical range likely included Colorado.

**CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE:** The monkeyflower is found in Boulder, Clear Creek, Grand, Jefferson, and Larimer Counties in Colorado.

**LAND OWNERSHIP:** All known occurrences are on state or Federal public lands owned or managed by Colorado Parks and Wildlife (CPW), the National Park Service (NPS), or the U.S. Forest Service (USFS). The monkeyflower occupies approximately 7 acres (ac) in Staunton State Park, approximately 25 ac in Rocky Mountain National Park, and approximately 28 ac in Pike-San Isabel National Forest and Arapahoe-Roosevelt National Forest (see Figure 2 for current distribution).

**LEAD REGION CONTACT:** Alex Kasdin, Mountain-Prairie Regional Office, 303-236-4419

**LEAD FIELD OFFICE CONTACT:** Dara Suich, formerly of the Western Colorado Ecological Services Field Office, 703-358-2097

## **BIOLOGICAL INFORMATION**

### Species Description

The monkeyflower is a small, annual herb from 1 to 10 centimeters (cm) tall with glabrous (lacking hairs or projections on the surface), usually unbranched stems (Beatty 2003, p. 13-14). The leaves are opposite, entire, ovate, glabrous, and up to 10 millimeters (mm) long and 7 mm wide (see Figure 1 below). The petioles (the stalk that connects the leaf blade to the stem) are 2 to 3 mm long and are laterally compressed with a small pouch that contains a lens-shaped propagule function in asexual reproduction (Beatty 2003, p. 14). All of the leaves produce bulbils except the first (lowermost) pair because these leaves were pre-formed in the originating bulbil (Weber 1972, pp. 423-425); bulbils are small bulb-shaped buds that have all the components needed to develop into a new plant, including a shoot axis and rudimentary leaves and roots. The bulbil is technically not an embryo, but it is morphologically and functionally analogous to one. The leaves at the top of the plant produce the largest propagules and the most reduced leaves (Weber 1972, pp. 423-425). The yellow, solitary, bilabate flowers are terminal or axillary, 4 to 5 mm long, with spreading lobes and an open throat (Beatty 2003, p. 14).

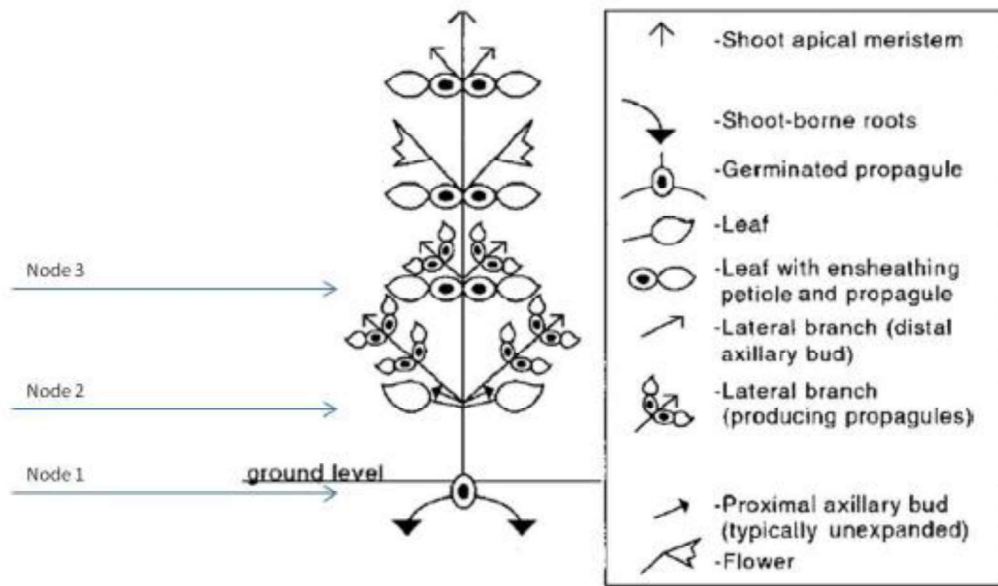


Figure 1. Diagram of *Mimulus gemmiparus* from Moody *et al.* (1999) depicting the general pattern of growth. Node 1 represents the germinated propagule.

### Taxonomy

Ruth Ashton Nelson discovered the monkeyflower in Rocky Mountain National Park in 1950, but it was not officially described until 1972, when William Weber published its genus and species, *Mimulus gemmiparus* (Weber 1972). The taxonomy of the monkeyflower is currently under debate. Recent phylogenetic studies suggest that this species is a member of the Phrymaceae (Lopseed) family, not the Scrophulariaceae (Figwort) family, and belongs in the *Erythranthe* genus and not *Mimulus*, as previously recorded. This recent research would thus suggest that the scientific name should be *Erythranthe gemmipara*, instead of *Mimulus gemmiparus*. Researchers also found that the monkeyflower is genetically distinct from all other members of the genus *Mimulus* (Beardsley *et al* 2004, pp 474-489; Bradbury 2016, pp. 193-205). Until modern genetic data can help to resolve the considerable taxonomic uncertainties (Lowry *et al* 2019, p. 5), we will continue to use the original classification below (Weber 1972):

Class: Magnoliopsida  
 Subclass: Asteridae  
 Order: Scrophulariales  
 Family: Scrophulariaceae (Figwort family)  
 Genus: *Mimulus*  
 Species: *Mimulus gemmiparus*

Regardless of the taxonomic classification, we accept the monkeyflower as a valid species and

therefore a listable entity under the Act.

### Habitat/Life History

The monkeyflower is a montane to subalpine species that grows at elevations of 2,400 - 3,400 m (7,874 - 11,154 ft) and is found under overhangs of south-facing cliffs or boulders (Beardsley 1997, p.6). The monkeyflower is further restricted to sites that are supplied by a consistent supply of water such as a seep or spring (Beardsley 1997, p. 6). Few plants of other species typically occupy the areas where the plant grows (Beardsley 1997, p. 6). Microhabitat descriptions indicate that the monkeyflower forms patches in the protection of rocky (granite, biotite schist) outcrops, under overhanging surfaces of boulders, on alluvial deposits, or amongst roots of dead trees (CNHP 2003 in Beatty 2003, p.17). The monkeyflower occurs within spruce-fir-aspen communities (*Picea* spp.-*Abies* spp.-*Populus tremuloides*.) and communities that often have other *Mimulus* species (e.g., *M. floribundus*, *M. guttatus*, *M. rubellus*) nearby (Weber 1972, CNHP 2003 in Beatty 2003, p. 19).

The monkeyflower is an annual species (plants germinate, grow, reproduce, and die in one growing season) (Beardsley 1997, p. 4) that grows from July to September. The monkeyflower exhibits a highly unique form of asexual reproduction that no other species within the *Mimulus* genus, or any other Holarctic species, exhibits (Weber 1972, p. 6, Beardsley 1997 in Beatty 2003, p. 19). Monkeyflower plants produce propagules comprised of “bulbils” (or “gemmae” [Weber 1972, p. 7]) within deep sacs developed from the petioles of all leaves, except the first pair of preformed leaves (Beatty 2003, p. 19). The bulbils have all the components needed to develop into a new plant, including a shoot axis and rudimentary leaves and roots (Beatty 2003, p. 19). The bulbil is technically not an embryo, but it is morphologically and functionally analogous to one (Beatty 2003, p. 19). When the adult plant senesces in early July to early August, the leaf blades wither and the petiole abscises at the stem to disperse the propagules, which consist of the petiolar sac with the bulbil inside (Beatty 2003, p. 19). When the adult plant is brushed by a passing object or blown by the wind, propagules are “catapulted” by the dry, springy stem up to 30 cm or more (Beardsley 1997, Mark Beardsley pers. comm. 2003 in Beatty 2003, p, 22). Because there is a hollow space around the bulbil within the sac, the propagule is relatively light in density and therefore buoyant (Beatty 2003, p. 22). Animals may also play a role in propagule dispersal because propagules are small and light with rough surfaces that easily attach to the fur of an animal (Beardsley 1997 in Beatty 2003, p. 22).

The bulbils, much like sexually produced seeds, overwinter and germinate in the spring to grow into new adult plants (Weber 1972, p. 7; Beardsley 1997 in Beatty 2003, p. 19). In natural habitats, bulbils are typically exposed to cold temperatures and dry conditions (Beatty 2003, p. 22). According to Beardsley’s (1997) greenhouse experiments, propagules are fairly resistant to desiccation with their protective petiolar coat; exposed bulbils, those that lack a petiolar coat, are more susceptible to drying out (Beatty 2003, p. 22). In experimental conditions, germination was affected by water availability, temperature, substrate characteristics (e.g., depth, water holding capacity), size of the bulbil, and presence of the petiolar coat (Beardsley

1997 in Beatty 2003, P. 22).

An adult ramet can start producing offspring from a young age/stage and can continue to produce offspring throughout its life (Beatty 2003, p. 20). Ramet is the term we use to refer to a physiologically distinct monkeyflower plant that results from asexual reproduction and thus may be genetically identical to other individuals. Based on the vegetation strategies described by Grime (1979), the monkeyflower may be considered a ruderal, or r-selected, species (Beatty 2003, p. 20). Ruderal species can exploit low stress, high disturbance environments by minimizing vegetative growth and maximizing reproductive output (Grime 1979, Barbour et al. 1987 in Beatty 2003, p. 20). The monkeyflower has the potential to maximize reproductive output by asexually developing bulbils concurrent with leaf development (Beatty 2003, p. 20).

The monkeyflower infrequently flowers in nature (Weber 1972, p. 7; CNHP 2003 in Beatty 2003, p. 19). However, previous surveys show that some populations flower more frequently than others (Beardsley 2020, pers. comm.). The yellow flowers, if produced, occur in July (CNHP 2003 in Beatty 2003, p. 19). Several authors (Weber 1972; O’Kane 1988; Colorado Native Plant Society 1989) suggested that the monkeyflower is incapable of reproducing by seeds because the pollen is sterile, thus making this species an obligate asexual annual species (Beatty 2003, pp. 19-20). However, researchers (Paul Beardsley 2003 pers. comm in Beatty 2003) stained pollen from this species and discovered that greater than 95 percent of the pollen grains were viable (Beatty 2003, p. 20). In addition, researchers (Mark Beardsley 1997) grew monkeyflower plants in the greenhouse, cross-pollinated flowers, collected seeds, germinated the seeds, and produced a new generation of adult plants, discovering that each plant was capable of producing flowers and seeds (Beatty 2003, p. 20). However, the exact environmental conditions necessary to induce flowering in natural populations are unknown (Beatty 2003, p. 20). The appearance of flowers in natural populations is so infrequent that pollination biology and specific pollination mechanisms for this species have not been studied (Beatty 2003, p. 20). Pollination is not required for the asexual production of bulbils (Beatty 2003, p. 20).

#### Historical Range/Distribution

The historical range of the monkeyflower, prior to the plant’s discovery in Rocky Mountain National Park in 1950, is unknown. In 1972, this species was only known from three element occurrences in Rocky Mountain National Park near Estes Park, Colorado (Beatty 2003, p. 13); an element occurrence represents a location at which a monkeyflower plant was present. Between 1992 and 2015, more survey effort led to the discovery of additional element occurrences; in 2015, there were approximately nine known element occurrences containing 41 known patches (patches are groups of plants closely associated with each other but separated from other patches by approximately three meters or more) on USFS and CPW lands (CNHP 2003 in Beatty 2003, p. 13; Steingraeber and Beardsley 2005, pp. 2, 7; Beardsley and Steingraeber 2013, pp. 3, 9; Beardsley 2017, p. 11). In 2016, scientists discovered another approximately 126 native patches during an assisted migration project, which was funded by Colorado Natural Areas Program (CNAP) and the Service, with support from USFS (Beardsley

2017, p. 11). In 2017, the assisted migration project “established” 46 new patches by planting bulbils that were collected from native patches and grown in a greenhouse (Beardsley 2017, pp. 1, 11). These additional discoveries and plantings in 2016 and 2017 added 15 new known element occurrences to the nine we knew of in 2015.

#### Current Range/Distribution

The monkeyflower is endemic to Colorado and currently occurs in Boulder, Clear Creek, Grand, Jefferson, and Larimer Counties. All known occurrences are on public land. The monkeyflower occupies approximately 60 acres (ac) (24.28 hectares (ha)) on public lands managed by the USFS, NPS, and CPW; specifically, we know the monkeyflower occupies approximately 7 ac in Staunton State Park, approximately 25 ac in Rocky Mountain National Park, and approximately 28 ac in Pike-San Isabel National Forest and Arapahoe-Roosevelt National Forest (see Figure 2).

# Rocky Mountain Monkeyflower Distribution Map

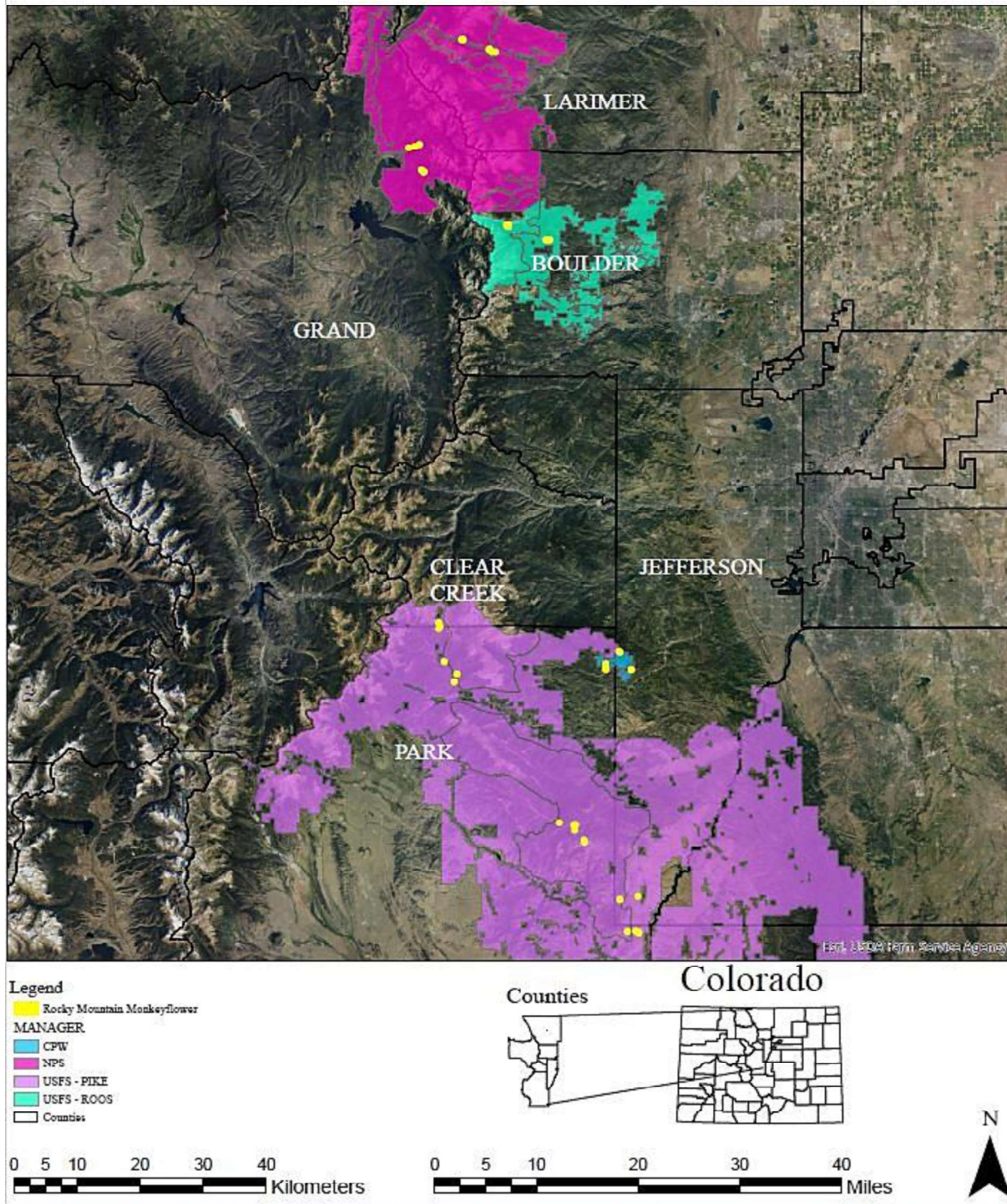


Figure 2. Overall range of the monkeyflower with land ownership. The overall range of the species is shown as yellow dots which represent each population.

Population Estimates/Status

Currently, there are 19 populations that contain all of the known element occurrences and patches of monkeyflowers; patches are found near Saint Vrain, Peaceful Valley, Guanella Pass, Geneva Basin, Burning Bear, Threemile, Black Mountain, Elk Creek, Mason Creek, Lost Park, Lost Creek, Hankins Gulch, Rainy Day Rocky, Corral Creek, Corral Dome, Old Fall River Road (historical), Horseshoe Park, Cascade Falls, and Devil’s Staircase (see Figure 2 and Table 1).

We do not have precise data pertaining to total population size for this species; however, a summary from recent site visits indicates that there are around 165 native patches and 43 established patches consisting of approximately 14,634,300 ramets (13,275,000 native, 1,359,300 established) within the 15 populations for which there is data (we do not have monitoring data from the four populations on NPS lands) (see Table 1).

*Table 1. Population summary for the monkeyflower; this table excludes the four populations on NPS managed lands for which we have no data. Data for this summary table was taken from Beardsley (2017), pp. 14-145).*

Population Name	Patches			Ramets		
	Native	Planted	Total	Native	Planted	Total
Saint Vrain	20	0	20	1,000,000	0	1,000,000
Peaceful Valley	6	9	15	200,000	0	200,000
Guanella Pass	19	5	24	1,200,000	1,200,000	2,400,000
Geneva Basin	6	0	6	35,000	0	35,000
Burning Bear	0	0	0	0	0	0
Threemile Creek	0	5	5	0	4,000	4,000
Black Mountain	2	4	6	100,000	4,500	104,500
Elk Creek	1	2	3	100,000	3,200	103,200
Mason Creek	0	3	3	0	500	500
Lost Park	0	1	1	0	100	100
Lost Creek	0	7	7	0	100,000	100,000
Hankins Gulch	3	0	3	320,000	0	320,000
Rainy Day Rock	0	1	1	0	1,000	1,000
Corral Dome	100	0	100	10,000,000		10,000,000
Corral Creek	8	6	14	320,000	46,000	366,000
<b>Total</b>	<b>165</b>	<b>43</b>	<b>208</b>	<b>13,275,000</b>	<b>1,359,300</b>	<b>14,634,300</b>

Researchers conducting demographic monitoring of the monkeyflower currently count the number of bulbils pre-germination to estimate population size because bulbils are the persistent overwintering stage of the monkeyflower (Beardsley 2017, p. 3). In Table 1, and in

the SSA, we use this pre-germination number of bulbils as a proxy for the number of ramets post-germination in a population. Since not all bulbils likely survive to germinate, using pre-germination numbers of bulbils is likely an overestimation of the number of ramets. However we do not have sufficient information on the survival rate of bulbils from pre-germination to post germination to correct this count.

#### SUMMARY OF BIOLOGICAL INFORMATION

The monkeyflower, also known as the budding monkeyflower, is a small, narrow endemic plant found in north-central Colorado. It inhabits montane to subalpine habitats at elevations of 2,400 - 3,400 m (7,874 - 11,154 ft) and is found under overhangs of south-facing cliffs or boulders (Beardsley 1997, p.6). Given the monkeyflowers' dependence on its habitat for all stages of its lifecycle, we consider the presence of relatively stable, undisturbed habitat to be necessary to support the resiliency of the populations. However, little information exists about the specific ecological factors that affect growth and establishment of the monkeyflower in nature (Beatty 2003, p. 24). Beardsley (1997) found that the survival of propagules, in the greenhouse, was strongly influenced by moisture, temperature, and substrate type (Beatty 2003, p. 24). A number of patterns are apparent in studies on habitat parameters; all of the previous studies and species descriptions suggest that periods of very moist or saturated soil are important, but it appears that too much water can be problematic for this species (Beardsley 2014, p. 21). The optimal hydrological conditions appear to be sites that are periodically saturated or, at most, consistently moist with no long periods of standing water (Beardsley 2014, p. 21). Similarly, successful sites appeared to have very shallow soil, typically fewer than two centimeters deep (Beardsley 2014, p. 21).

To assess the viability of the monkeyflower, we used the three conservation biology principles of resiliency, redundancy, and representation (together, the 3Rs) (Service 2016, entire). Specifically, we identified the species' ecological requirements for survival and reproduction at the individual, population, and species levels, and described the factors, both positive and negative, influencing monkeyflower viability. We evaluated the species' current levels of resiliency, redundancy, and representation, and forecasted changes into the future. The monkeyflower needs multiple resilient populations distributed across its range to maintain populations over time and to reduce the likelihood of extinction. Resilient populations have a sufficient number of ramets, sufficient levels of recruitment, and sufficient levels of reproduction and dispersal (which may include periodic sexual reproduction to add new genetic combinations to the population); in addition, resilient populations have the correct moisture regime (i.e., periods of very moist soils are important, but too much water is a detriment). Resilient populations should be distributed across the three analysis units identified in the SSA; this distributional pattern will provide for the needed redundancy and representation to increase the probability that the species will withstand future catastrophic events and maintain future adaptive capacity in terms of genetic and ecological diversity.

SIGNIFICANT PORTION OF THE RANGE (SPR): See analysis in *FINDING* below.

## THREATS

We define “threat” as any action or condition that is known to or is reasonably likely to negatively affect individuals of a species. This includes those 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 mere identification of “threats” is not sufficient to compel a finding that listing is warranted. Describing the negative effects of the action or condition (i.e., “threats”) in light of the exposure, timing, and scale at the individual, population, and species levels provides a clear basis upon which to make our determination. In determining whether a species meets the definition of an “endangered species” or a “threatened species,” we have considered the factors under section 4(a)(1) of the Act and assessed the cumulative effect that the threats identified within the factors—as ameliorated or exacerbated by any existing regulatory mechanisms or conservation efforts—will have on the species now and in the foreseeable future.

In the 2012 90-day finding, the Service found that the information provided in the petition regarding potential threats from recreation, and associated trampling, was substantial; we noted that the inherent rarity of the species and its inconspicuous appearance could exacerbate the threat from recreation-associated trampling (77 FR 52293, August 29, 2012). While we did not find the petition to provide substantial information on threats from herbivore grazing, changes in natural regimes (e.g., wildfire, drought, erosion), and climate change, we indicated that we would more thoroughly evaluate these factors during the status review. Thus, the SSA examined potential stressors to the monkeyflower including recreation (and associated roads and trails), livestock and herbivore grazing, changes in natural regimes, climate change, and biologically vulnerable small population sizes. We evaluated the impacts of these stressors by overlaying Geographic Information System (GIS) shapefiles for different types of disturbances with a shapefile of the monkeyflower’s known overall range, to analyze the spatial extent of these disturbances. Our analysis identified that most of these stressors may cause a local or low-level impact to monkeyflower ramets or habitat because individual ramets may be exposed; however, we determined that they do not result in a species-level impact. We are aware of other potential stressors such as forest clearing or thinning, pollution, non-native plant invasion, and fragmentation; however, we do not have data to suggest that these issues are currently impacting monkeyflower ramets, populations, or the species. While the 90-day finding indicated the petition provided substantial information regarding the potential threat of recreation, recent information regarding monkeyflower occurrences suggests the spatial extent of this stressor would not cause a species-level impact.

Through this analysis, we found only climate change and biologically vulnerable small population sizes to be potential species-level threats, especially considering that the species is only known to occur on Federal or State protected lands. However, the Service does not consider small population sizes by themselves to be a threat. The monkeyflower has existed

with small populations throughout its life history. Additionally, demographic monitoring efforts have increased our awareness of the monkeyflower across its range, from records of approximately 125,733 ramets in 2005 (77 FR 52293, August 29, 2012) to approximately 14,634,300 ramets in 2017 (Beardsley 2017, pp. 14-145). Therefore, our analysis focuses primarily on the potential impacts of climate change in the future. However, some stressors that are not currently causing a species-level impact, such as recreation, roads and trails, or herbivory, have the potential to impact the species on a greater scale in the future if conditions change. Therefore, we also include these stressors in our evaluation of future conditions. We also recognize that this species' unique mechanism for reproduction and its restricted range can increase the monkeyflower's vulnerability to extinction in the presence of other threats or stressors.

Climate change refers to the change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persist for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2014, p. 120). Climate change can impact the monkeyflower by altering several factors, such as temperature, precipitation, or wildfire. Long-term observational records (since late 19th century) show that temperatures in the Pike-San Isabel and Arapahoe-Roosevelt National Forests have increased by 2°F; the largest portion of warming has occurred since the 1990s (Rangwala 2019, p. 2). Since 1994, only one year (2008) has been cooler than the long-term average, albeit only marginally (Rangwala 2019, p. 2). The period since 2001 has been 1.5°F warmer than the 20th century (Rangwala 2019, p. 2). Recent decades have been slightly on the wetter side despite severe droughts in the early 2000s, 2012, and 2018 (Rangwala 2019, p. 2). Similar extreme and even longer lasting droughts (e.g., 1930s Dust Bowl era) have occurred in the past; however, when examining different drought metrics, there are indications that the intensities of recent droughts (e.g., 2002) have been higher (Rangwala 2019, p. 2). We specifically explored the potential impacts of climate change on the monkeyflower when we examined future condition in the SSA.

In addition to these stressors, there are activities that may be positively influencing the species' condition. While the 90-day finding indicated the petition provided substantial information regarding the potential threat of recreation, managers have taken action to reduce these potential impacts. Specifically, Federal and State land managers have taken action to provide protections for monkeyflower habitat. For instance, in 2010, the USFS relocated a portion of the trail near the Hankins Gulch population to minimize impacts to the plant. In 2015, the CNAP designated the Staunton Natural Area within Staunton State Park. The Staunton Natural Area encompasses two parcels within Staunton State Park: Black Mountain and Elk Falls; these parcels contain monkeyflower populations. The Colorado Natural Areas Program provides protection and monitoring for areas that "typif[y] native vegetation and associated biological and geological features or provide habitat for rare or endangered animal or plant species" (CRS 33-33-103; CRS 33-33-104).

The Service and its partners have also embarked on recent efforts to supplement wild population of monkeyflowers. In 2015 and 2016, CNAP, the USFS, and the Service completed a cooperative project to propagate monkeyflower plants and find locations for out-planting ramets to increase the number of known populations (Bearsdley 2017, entire). This effort has had some success in increasing the number of known ramets in the wild and also led to the discovery of new native populations. In addition, in 2017, researchers conducted a cold storage experiment on monkeyflower propagules, which was funded by the USFS; *ex situ* propagation from field-collected monkeyflower propagules can provide large quantities of plant material for active conservation and helps reduce the risk of species extinction.

### *Current Condition*

For the purposes of our analysis, we divided the range of the monkeyflower into three analysis units (Units 1, 2, and 3) based on the geographic distance between each unit. We analyzed each element occurrence to determine the current condition of each analysis unit. We describe the resiliency of the monkeyflower in terms of demographic, habitat, and environmental conditions for each population and analysis unit. We analyzed these conditions for each element occurrence, and subsequently each analysis unit, by looking at the number of patches, the number of ramets, and the hydrological regime within each population. These categories were selected as metrics because they are considered to be some of the most important habitat and demographic factors that contribute to the resiliency of the monkeyflower at the population level, and that we also have sufficient data to analyze. Overall, we determined that populations with good resiliency have at least 300,000 ramets and at least six patches with a dependable water supply and moist soil for most of the growing season. These metrics, and how we selected them and used them to evaluate resiliency, are described in additional detail in the SSA Report (Service 2020, pp. 23-26). In terms of current resiliency, we found that two analysis units are in moderate condition and one analysis unit is in good condition, based on the metrics described above. We consider the Saint Vrain, Guanella Pass, Corral Dome, and Corral Creek populations to be the most resilient populations because they each have six or more patches, more than 300,000 ramets, and the site hydrology is sufficient to maintain these populations throughout the growing season. Collectively, these populations contain over 94 percent of known monkeyflower ramets.

We also considered the species' current levels of redundancy and representation. There are 105 small sites (mapped locations submitted to CNHP) that make up 19 populations that are distributed across three analysis units, which may provide some ability to withstand catastrophic events, such as increased periods of prolonged drought. Like many narrow endemic species, the redundancy of the monkeyflower is, and has likely always been, inherently low as a result of its limited geographic range.

The monkeyflower also currently displays some levels of genetic, morphological, and ecological diversity that could contribute to representation, even given its limited range. Although there

are numerous studies that indicate that asexually reproducing species exhibit low levels of genetic diversity, a 2004 study found that the monkeyflower exhibits a considerable amount of genetic diversity (Beardsley et al 2004, pg. 34). Because the monkeyflower primarily reproduces asexually, it would be logical to assume that the populations have low levels of genetic diversity within them and that there is more genetic diversity between populations (Beardsley et al 2004, pg. 35). However, the majority of the genetic diversity was found within populations and less so between the populations (Beardsley et al 2004, pg. 35). The monkeyflower can also exhibit morphological or phenotypic differences that may provide adaptive capacity. For example, genetically identical adult monkeyflower plants grow in different environmental conditions (light or nutrient deficient) (Beardsley 1997). In the greenhouse, monkeyflower plants can also produce bulbils with a variety of morphologies (Beatty 2003, p. 23). Herbarium specimens of this species also reflect a wide variation in flower markings, palatal fold, and pubescence (Beatty 2003, p. 23); although it is unknown if plants could produce these different flower varieties in the wild, the variations would theoretically be able to attract different pollinator species, lending enhanced ability for the species to adapt to changing environmental conditions. The plant's ability to reproduce asexually, in addition to sexual reproduction, could represent another type of phenotypic plasticity that could contribute to representation as well as resiliency. Asexual reproduction, as opposed to sexual reproduction, could be a way to increase fitness despite limited resources and may increase the plant's long-term viability in harsh or variable conditions (Beardsley 1997 in Beatty 2003, p. 23). However, we do not have enough information about what drives asexual reproduction in wild populations, and whether sexual reproduction could occur, to know whether this is a potential type of plasticity. Finally, monkeyflower plants occupy different habitat types, which may also contribute to the species' ability to adapt over time; for example, the northern analysis unit differs in some ecological attributes, especially geology, from the other two units (Olson 2020, pers. comm.).

### *Future Condition*

Future changes in climate are the primary factor expected to influence the future condition of the monkeyflower, but there is uncertainty on how climate factors, such as temperature and precipitation, may change, and what their effects on the species will be. Secondary drivers influencing future condition include changes in land management and associated impacts from herbivory. The Cooperative Institute for Research in Environmental Sciences (CIRES) and the North Central Climate Adaptation Science Center (NCCASC), University of Colorado, Boulder developed a downscaled climate change analysis for the Pike-San Isabel and Arapaho-Roosevelt National Forests. From their projections, we selected four plausible future climate scenarios, which summarize projected changes in climatic variables by 2050 (2035-2065) relative to the 1985-2015 time period (Rangwala 2019, p. 1): Very Hot and Dry, Very Hot and Wet, Hot, and Warm and Wet; we describe these future climate scenarios in detail in the SSA Report (Service 2020, pp. 32-35). Given our uncertainties regarding the future effects of climate change, as well as uncertainties regarding the potential future stressors for this species, we have evaluated

the future condition of the monkeyflower under four plausible future scenarios; these scenarios were designed to capture the uncertainties regarding temperature, precipitation trends, and other factors that influence the monkeyflower (such as management activities and development) to include a range of plausible future conditions. The scenarios that we evaluated are described in greater detail in the SSA report (Service 2020, pp. 36-37).

For each scenario, we evaluated the anticipated condition of each analysis unit in 2050 using the same metrics as our evaluation of current condition, namely number of patches, number of ramets, and hydrology. Overall, we found that analysis units 1 and 3 (which contain the majority of ramets) were in good to moderate condition in every future scenario. In Scenario 1, the resiliency ratings presented an improvement over the current condition. However, analysis unit 2 decreased to poor condition in two of the future scenarios (the scenarios that projected a drier climate). Overall, while resiliency may decrease in some future scenarios, we anticipate that each analysis unit will continue to be occupied (though some smaller populations may lose all ramets).

Based on our analysis in all of the future scenarios, we expect that the redundancy and representation of the species will remain unchanged from the current condition; though, current levels of redundancy and representation are relatively low, typical for a narrow endemic species. Specifically, we expect that the species will retain any morphological, phenotypical, or ecological differences that may be important for future adaptive capacity. Since we do not anticipate the extirpation of any analysis unit, we also expect the species to retain multiple populations distributed across its range, maintaining some ability to withstand catastrophic events, even if the resiliency of several populations decreases. Additionally, the monkeyflower exhibits asexual reproduction, which may provide a defense against the impacts from severe drought conditions, since asexual reproduction is less energy-intensive than sexual reproduction; however, some populations may not be able to withstand an increase in the frequency of prolonged drought conditions.

#### SUMMARY OF THREATS

Currently, the monkeyflower is known from 24 element occurrences that constitute 19 populations. We have information to evaluate current levels of resiliency for 20 of these element occurrences. Overall, 8 of these 20 element occurrences are currently in good condition, 8 are currently in moderate condition, and 4 are currently in poor condition. Three populations contain over 90 percent of the known ramets: Saint Vrain, Guanella Pass, and Corral Dome. We consider these populations to currently have the highest levels of resiliency: Saint Vrain is in good condition, the native element occurrence in the Guanella Pass population is in good condition, the planted element occurrence in the Guanella Pass population is in moderate condition, and the Corral Dome population is in good condition. Thus, the monkeyflower currently has multiple, resilient populations distributed across its range, encompassing various ecological conditions and some genetic variation. While the monkeyflower is a narrow endemic plant and thus inherently has low population sizes and a

limited range, this limitation does not seem to be currently compromising the species' resiliency, redundancy, and representation, given the relatively large numbers of ramets in multiple populations, the low risk of inbreeding depression due to the plants' asexual reproduction, and relatively high levels of genetic diversity for an asexual species. Moreover, recent efforts to survey for the species and propagate the plant in the wild have resulted in the discovery of thousands of new ramets as well as the establishment of new element occurrences. Finally, the species is only known to occur on Federal and State public lands, which minimizes many threats such that there are no stressors currently providing species-level impacts.

In the future, we anticipate that climate change could influence population dynamics, through its projected changes in temperature and precipitation patterns. However, when we project the resiliency of the element occurrences into the future (2050), we anticipate that each analysis unit will continue to be occupied, even though resiliency may decrease for some populations in some future scenarios. Moreover, in all future scenarios, the three populations containing over 90 percent of monkeyflower ramets would be in good or moderate condition; specifically, the Corral Dome population, which contains 68 percent of known ramets, would be in good condition in all but one scenario, in which it would be in moderate condition. Because there are only three analysis units that are comprised of relatively small and scattered populations, this species likely has always been at some risk of catastrophic events. However, based on our analyses, we anticipate that the monkeyflower will continue to have multiple, resilient populations distributed across its narrow range, providing some ability to withstand catastrophic events and adapt to environmental change into the future (i.e., redundancy and representation).

## FINDING

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 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.

In our finding, we correlate the threats acting on the species to the factors in section 4(a)(1) of the Act. In the SSA for the monkeyflower, we examine a wide range of possible stressors on the species including: livestock and herbivore grazing (Factor A and Factor C); recreation, trails, and roads (Factor A); changes in natural regimes (e.g., drought, erosion) (Factor A); climate change (Factor E); biologically vulnerable small population size (Factor E); and wildfire (Factor A). There is no evidence to suggest any overutilization of the monkeyflower for commercial, recreational, scientific, or educational purposes (Factor B). Using GIS tools, we compared the spatial extent of these potential disturbances with the known range of the monkeyflower.

After evaluating these potential threats to the species and assessing cumulative effects of the threats under the section 4(a)(1) factors, we found only climate change (Factor E) and biologically vulnerable small population sizes (Factor E) to be potential species-level threats, especially considering that the species is only known to occur on Federal or State protected lands (Service 2020, pp. 20-21). However, the Service does not consider small population sizes by themselves to be a threat. The monkeyflower has existed with small populations throughout its life history. Additionally, because this species primarily exhibits asexual reproduction, it is unlikely that inbreeding depression will negatively affect the population dynamics of this species. Therefore, our analysis focuses primarily on the potential impacts of climate change in the future; this is the primary stressor affecting the monkeyflower's biological status. In particular, given this species' reliance on moist habitats, the potential of a drier climate in the future, with more frequent drought, could negatively influence the species. Additionally, some stressors that are not currently causing a species-level impact, such as recreation, roads and trails, or herbivory, have the potential to impact the species on a greater scale in the future if conditions change. Therefore, we also considered these stressors in our evaluation of future conditions. However, there is still considerable uncertainty regarding species needs and how various stressors may influence monkeyflower populations.

Since we did not find any of the stressors evaluated above to be threats that are impacting the viability of the species such that listing is warranted, an evaluation of the adequacy of regulatory mechanisms to address those threats (Factor D) is not required.

To make the determination whether the monkeyflower warrants protection as an endangered or threatened species under the Act, we evaluated the current condition and the species' potential future viability, given projections of stressors into the future. As described in the determinations below, we first evaluate whether the monkeyflower is in danger of extinction throughout its range now. We then evaluate whether the species is likely to become in danger of extinction throughout its range in the foreseeable future. We finally consider whether the monkeyflower is an endangered or threatened species in a significant portion of its range (SPR).

*Does the species meet the definition of endangered throughout all of its range?*

Under the Act, an endangered species is any species that is "in danger of extinction throughout

all or a significant portion of its range.” Currently, the monkeyflower is known from 24 element occurrences making up 19 populations. We have information to evaluate current levels of resiliency for 20 of these element occurrences. Based on our SSA analysis (Service 2020, pp. 23-29), eight of these 20 element occurrences are currently in good condition, eight are in moderate condition, and four are in poor condition. Three populations contain over 90 percent of the known ramets: Saint Vrain, Guanella Pass, and Corral Dome. These important populations currently have the highest levels of resiliency: Saint Vrain is in good condition, the native element occurrence in the Guanella Pass population is in good condition, the planted element occurrence in the Guanella Pass population is in moderate condition, and the Corral Dome population is in good condition. Thus, the monkeyflower currently has multiple, resilient populations distributed across its range, encompassing various ecological conditions and some genetic variation. While Rocky Mountain monkeyflower is a narrow endemic plant and thus inherently has low population sizes and a limited range, this limitation does not seem to be currently compromising the species’ resiliency, redundancy, and representation, given the relatively large numbers of ramets in multiple populations, the low risk of inbreeding depression due to the plants’ asexual reproduction, and relatively high levels of genetic diversity for an asexual species (Beardsley et al. 2004, pg. 34). The plants’ unique asexual reproduction strategy also contributes to the species’ resiliency; this less energy-intensive method of reproduction allows the species to reproduce in relatively harsh conditions.

Additionally, the species’ is only known to occur on Federal and State public lands, which minimizes many threats such that there are no stressors currently providing species-level impacts. These public lands have even adjusted their management to benefit the monkeyflower. For example, in 2010, the USFS relocated a portion of the trail near the Hankins Gulch population to minimize impacts from recreation. In 2015, the CNAP designated the Staunton Natural Area within Staunton State Park, which contains monkeyflower populations; the Colorado Natural Areas Program provides protection and monitoring for areas that “typif[y] native vegetation and associated biological and geological features or provide habitat for rare or endangered animal or plant species” (CRS 33-33-103; CRS 33-33-104). Additionally, a partnership between State and Federal agencies facilitated an assisted migration project in 2015 and 2016 to propagate monkeyflower plants in new areas (Beardsley 2017, entire). This assisted migration project has had some success in increasing the number of known ramets in the wild and also led to the discovery of new native populations. Therefore, we conclude that the current risk of extinction is low, such that the monkeyflower is not in danger of extinction throughout all of its range.

Having found that the monkeyflower is not in danger of extinction throughout its range, we next evaluate whether the species is likely to become an endangered species within the foreseeable future throughout its range.

*Does the species meet the definition of threatened throughout all of its range?*

Under the Act, a threatened species is any species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” 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. The term “foreseeable future” extends only so far into the future as the Services can reasonably determine that both the future threats and the species’ responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species’ likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species’ biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

The primary stressor that could impact the monkeyflower in the future is climate change; climate change can impact the monkeyflower by altering several factors, such as temperature, precipitation, or wildfire. Specifically, climate change could impact the hydrological regime in the monkeyflower’s range; since this species relies on moist habitats, this could affect species’ viability. For the purpose of this finding, we generally define viability as the ability of the species to sustain a population in the wild over a biologically meaningful timeframe, which in this case is up to approximately 2050. We chose this timeframe because it corresponds to the information available in climate models provided by CIRES and the NCCASC for the Pike-San Isabel and Arapaho-Roosevelt National Forests (Rangwala 2019, entire). Since the monkeyflower is an annual plant, the 2050 timeframe should be sufficient to project the effect climate change on the condition of the species through many generations; 2050 is also a timeframe in which we can reasonably rely on projections about the future.

We forecasted the future condition of the monkeyflower in the SSA under four plausible future scenarios. These scenarios were designed to capture the uncertainties regarding temperature, precipitation trends, and other factors that influence the monkeyflower (such as management activities and development) to include a range of plausible future conditions. We evaluated each of these scenarios in terms of how they might impact resiliency, redundancy, and representation of the species in the foreseeable future. While resiliency may decrease in some future scenarios, we anticipate that all three analysis units will continue to be occupied. Moreover, in all future scenarios, the three populations containing over 90 percent of monkeyflower ramets would be in good or moderate condition; specifically, the Corral Dome population, which contains 68 percent of known ramets, would be in good condition for all but

one scenario, in which it would be in moderate condition.

Because there are only three analysis units, which are comprised of relatively small and scattered populations, this species likely has always been at some risk of catastrophic events. However, based on our analyses, we anticipate that the monkeyflower will continue to have multiple, resilient populations distributed across its narrow range into the future. This distribution of populations across different drainages, elevations, and latitudes, which may have different weather patterns in the future, provides some buffer against catastrophic events. Thus, this likely continued occupancy in all three analytical units across the monkeyflower range provides for limited but sufficient redundancy and representation necessary to withstand catastrophic events and adapt to environmental change into the future; we believe there will thus be enough occupied and resilient populations of monkeyflower such that the monkeyflower will not be in danger of extinction in the foreseeable future. Additionally, the plants' asexual reproduction strategy will continue to confer resiliency in the foreseeable future since this less energy-intensive method of reproduction allows the species to reproduce in relatively harsh conditions.

We expect the species to retain sufficient adaptive capacity and ability to withstand catastrophic events in the future, due to this continued occupancy and resiliency. Therefore, after assessing the best available information, we determine that the monkeyflower is not in danger of extinction now, nor is it likely to become so in the foreseeable future, throughout all of its range.

*What is the species' 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 Rocky Mountain monkeyflower is not in danger of extinction or likely to become so in the foreseeable future throughout all of its range, we now consider whether it may be in danger of extinction or likely to become so in the foreseeable future in 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 in 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 monkeyflower, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is

endangered or threatened.

For the monkeyflower, we considered whether the threats are geographically concentrated in any portion of the species' range at a biologically meaningful scale. We examined the stressor that is the primary driver of the species' status, climate change, and cumulative effects. The monkeyflower is a narrow endemic species that occupies a very small area (only 60 acres in Colorado). Since climate change is projected to produce changes in precipitation, temperature, and other variables at regional scales larger than the monkeyflower's range, we expect this threat to be uniform throughout the species' narrow range. We found no concentration of threats in any portion of the monkeyflower's range at a biologically meaningful scale. Therefore, no portion of the species' range can provide a basis for determining that the species is in danger of extinction now or likely to become so in the foreseeable future in a significant portion of its range, and we find the species is not in danger of extinction now or likely to become so in the foreseeable future in any significant portion of its range. This is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d , 946, 959 (D. Ariz. 2017).

Our review of the best available scientific and commercial information indicates that the monkeyflower 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 monkeyflower is not warranted at this time.

#### BATCHED NOTICE LANGUAGE

##### *Previous Federal Actions*

WildEarth Guardians petitioned the Service to list the Rocky Mountain monkeyflower (hereafter, monkeyflower) on October 4, 2011. We published a 90-day finding in the *Federal Register* in response to this petition on August 29, 2012; it found that the petition presented substantial information that listing may be warranted. This notice constitutes the 12-month finding on the October 4, 2011 petition to list the monkeyflower under the Act.

##### *Summary of Finding*

The Rocky Mountain monkeyflower, also known as the budding monkeyflower, is a small, narrow endemic plant found in north-central Colorado. Uniquely, this plant exhibits an asexual reproduction strategy not seen within the *Mimulus* genus or in any other Holarctic species (Weber 1972, p. 6, Beardsley 1997 in Beatty 2003, p. 19); the plant produces propagules which contain "bulbils," which have all of the components needed to develop into a new plant, including a shoot axis and rudimentary leaves and roots (Beatty 2003, p. 19). The monkeyflower occupies approximately 60 acres (ac) (24.28 hectares (ha)) on State or Federal

lands managed by the U.S. Forest Service, the National Park Service, and the Colorado Parks and Wildlife in Boulder, Clear Creek, Grand, Jefferson, and Larimer Counties in Colorado. Currently, we know of 24 element occurrences of the monkeyflower that constitute 19 populations; surveyors have observed over 14 million ramets (ramets are individuals that result from asexual reproduction and thus may be genetically identical).

The monkeyflower inhabits montane to subalpine habitats at elevations of 2,400 - 3,400 m (7,874 - 11,154 ft) and is found under overhangs of south-facing cliffs or boulders (Beardsley 1997, p. 6). Little information exists about the ecological factors that affect growth and establishment of the monkeyflower in nature (Beatty 2003, p. 24). Beardsley (1997) found that the survival of propagules, in the greenhouse, was strongly influenced by moisture, temperature, and substrate type (Beatty 2003, p. 24). A number of patterns are apparent in the few available studies on habitat parameters; all of the previous studies and species descriptions suggest that periods of very moist or saturated soil are important, but it appears that too much water can be problematic for this species (Beardsley 2014, p. 21). The optimal hydrological conditions appear to be sites that are periodically saturated or, at most, consistently moist with no long periods of standing water (Beardsley 2014, p. 21). Similarly, successful sites appeared to have very shallow soil, typically fewer than two centimeters deep (Beardsley 2014, p. 21).

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the monkeyflower, and we evaluated all relevant stressors under the five listing factors, including any regulatory mechanisms and conservation measures addressing these stressors. We identified climate change (Factor E) as the primary stressor affecting the monkeyflower's biological status. Currently, the monkeyflower has multiple, resilient populations distributed across its range, encompassing various ecological conditions and some genetic variation. While the monkeyflower is a narrow endemic plant and thus inherently has low population sizes and a limited range, this limitation does not seem to be currently compromising the species' resiliency, redundancy, and representation, given the relatively large numbers of ramets in multiple populations, the low risk of inbreeding depression due to the plants' asexual reproduction, good or moderate hydrological conditions in most populations, and relatively high levels of genetic diversity for an asexual species (Beardsley et al. 2004, pg. 34). The species is only known to occur on Federal and State public lands, which minimizes many threats such that there are no stressors currently providing species-level impacts. In the future, while we may lose some small monkeyflower populations, we project that each analysis unit will likely remain occupied. Moreover, in all future scenarios, the three populations containing over 90 percent of monkeyflower ramets will be in good or moderate condition. Furthermore, the plants' asexual reproduction strategy confers, and likely would continue to confer, additional resiliency since this less energy-intensive method of reproduction allows the species to reproduce in relatively harsh conditions. Thus, based on our analyses, we anticipate that the monkeyflower will continue to have multiple, resilient populations distributed across its narrow range, providing for limited but sufficient redundancy

and representation necessary to withstand catastrophic events and adapt to environmental change into the future.

Therefore, we find that listing the Rocky Mountain monkeyflower as an endangered species or threatened species under the Act is not warranted. A detailed discussion of the basis for this finding can be found in the Rocky Mountain monkeyflower species assessment and other supporting documents (see **ADDRESSES**, above).

#### RECOMMENDED CONSERVATION MEASURES

None.

#### COORDINATION WITH STATES

The Service coordinated and collaborated with the Colorado Parks and Wildlife's Natural Areas Program for the development of the SSA. We sent the SSA to the Colorado Natural Areas Program to give them the opportunity to provide feedback.

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APPROVAL/CONCURRENCE:

Approve: MATTHEW HOGAN Digitally signed by MATTHEW HOGAN  
Date: 2020.06.08 13:25:12 -06'00'

Regional Director, Fish and Wildlife Service

Date

Concur: \_\_\_\_\_  
Director, Fish and Wildlife Service

Date

Do not concur: \_\_\_\_\_  
Director, Fish and Wildlife Service

Date

Director's Remarks:

Date of annual review:  
Conducted by: