DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R2–ES–2013–0127; 4500030113]

Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Coleman’s Coralroot as an Endangered or Threatened Species

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list *Hexalectris colemanii* (Coleman’s coralroot) as an endangered or threatened species and to designate critical habitat under the Endangered Species Act of 1973, as amended (Act). After review of all available scientific and commercial information, we find that listing Coleman’s coralroot is not warranted at this time. However, we ask the public to submit to us any new information that becomes available concerning the threats to the species or its habitat at any time.

DATES: The finding announced in this document was made on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at Docket Number FWS–R2–ES–2013–0127. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021. Please submit any new information, materials, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: Steve Spangle, Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021; telephone 602–242–0210; facsimile 602–242–2513; email *incomingazcorr@fws.gov*. If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

In this document we refer to *Hexalectris colemanii* as Coleman's coralroot.

Section 4(b)(3)(A) of the Act (16 U.S.C. 1531 *et seq*.) requires that, for any petition to revise the Federal Lists of Threatened and Endangered Wildlife and Plants that contains substantial scientific or commercial information that listing a species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding, we determine whether the petitioned action is: (a) not warranted, (b) warranted, or (c) warranted, but immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are threatened or endangered, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

Previous Federal Actions

On June 25, 2007, we received a formal petition dated June 18, 2007, from Forest

Guardians (now WildEarth Guardians), requesting that we list 475 southwest species, including *Hexalectris revoluta* (Chisos coralroot), under the Act as either endangered or threatened with critical habitat. We sent a letter to the petitioner dated July 11, 2007, acknowledging receipt of the petition and stating that the petition was under review by staff in our Southwest Regional Office.

On December 16, 2009 (74 FR 66866), we determined that we had substantial information to indicate that listing the Chisos coralroot as endangered or threatened may be warranted. At that time, we believed the Chisos coralroot included the entity now known as Coleman's coralroot. On September 8, 2010, we received a petition dated the same day from The Center for Biological Diversity requesting that Coleman's coralroot be listed separately from Chisos coralroot as an endangered or threatened species under the Act and critical habitat be designated. We acknowledged receipt of the petition via electronic mail to The Center for Biological Diversity on September 8, 2010. On December 1, 2011, we sent another letter to The Center for Biological Diversity acknowledging that Coleman's coralroot was considered a separate species from the Chisos coralroot as of 2010. In the 2011 letter, we stated that because the Coleman's coralroot was considered to be a form of Chisos coralroot in 2009 when we made a substantial 90-day finding for the Chisos coralroot, we already consider a substantial 90-day finding to be in place for the Coleman's coralroot, and that we would further address the petition when workload and funding allow.

On January 30, 2013, we notified interested parties and agencies that we would be conducting a status review of Coleman’s coralroot and requested information. We received one response letter from Pima County, AZ. We also informally reached out via e-mail and telephone to staff at the Coronado National Forest (Coronado NF), WestLand Resources, Tohono O’odham Nation, and other experts. In addition, on February 14, 2013, the Service entered into a stipulated settlement agreement with The Center for Biological Diversity to review the status of the Coleman’s coralroot and submit to the **Federal Register** a 12-month finding as to whether listing of the species as an endangered or threatened species is (a) not warranted; (b) warranted; or (c) warranted but precluded by other pending proposals, pursuant to 16 U.S.C. 1533(b)(3)(B) by December 31, 2013. This **Federal Register** document constitutes our 12-month finding on the September 8, 2010, petition to list the Coleman’s coralroot as an endangered or threatened species and to designate critical habitat, based on our 2009 positive 90-day finding. This document also fulfills the obligations of the Service from the February 14, 2013, settlement agreement.

Species Information

Description and Taxonomy

A member of the orchid family (Orchidaceae), Coleman’s coralroot is a perennial herb that forms a short, segmented, vertical rhizome or spike. The species has pinkish-cream stems that measure 46 to 55 centimeters (cm) (18 to 22 inches (in)); inflorescences (flowering part of plant) measure 20 to 23 cm (8 to 9 in) with sepals and petals whitish or creamy-pink to very pale brown at the tips and partly with noticeable bands of magenta or maroon (Catling 2004, pp. 14–15). The species has a chasmogamous flower (one that opens to allow for pollination) with a well-developed rostellum (structure that prevents self-pollination) (Kennedy and Watson 2010, p. 74). Coleman's coralroot is identifiable by the sepals and lateral petals, which are rolled back along the outer third of their length by more than 360 degrees forming a tight coil (Coleman 2002, p. 99).

Coleman's coralroot was originally identified as *Hexalectris spicata* from specimens collected by Toolin and Reichenbacher in 1981 and by McLauglin in 1986 (Coleman 1999, pp. 312–14; Coleman 2000 entire; Coleman 2001, p. 96). These specimens were later treated as *H. revoluta* by Coleman (1999, pp. 314–315). Using morphological characteristics (the physical form or structure of an organism or any of its parts), Catling (2004, pp. 14–16) described *H. revoluta* var. *colemanii* as a variety of *H. revoluta*. Utilizing phylogenetic analyses (the assessment of the genetic relatedness of organisms), as well as morphological characters, Kennedy and Watson (2010, pp. 65, 73–74) concluded that *H. revoluta* var. *colemanii* should be recognized at the species rank as *H. colemanii*.

In September of 2010, we solicited independent peer review of the suggested classification of *Hexalectris colemanii* by Kennedy and Watson (2010) as a separate species. Three reviewers opined that Kennedy and Watson (2010) properly treated *H. colemanii* as a separate and distinct species (Jenkins 2010, pers. comm.; Sharma 2010, pers. comm.; Liggio 2010, pers. comm.), while two reviewers opined that, although *H.*

revoluta var. *colemanii* is a distinct taxonomic entity at the rank of variety, it does not merit treatment as a separate species (Goldman 2010, pers. comm.; Freudenstein 2010, pers. comm.). In plant classification, the use of the term "variety" is generally synonymous with the term "subspecies".

Jenkins (2010, pers. comm.) offered that the methods and testing in Kennedy and Watson (2010) were good and certainly would survive any criticism from a reviewer who is acquainted with these methods, and their work showed good evidence that *Hexalectris colemanii* and *H. arizonicus* were reliably different from the other species sampled. Sharma (2010, pers. comm.) offered that the markers analyzed were appropriate for the question with regard to whether the different taxa represent individual taxonomic units or whether they should be considered single taxonomic units, and it is evident that *H. colemanii* stands out as a separate taxonomic unit, i.e., a species, especially when considered along with the morphological differences that separate it from its close relatives. Liggio (2010, pers. comm) offered that Kennedy and Watson (2010) present phylogenetic evidence that *H. colemanii* is a distinct taxon, as well as morphological characters that distinguish it from other members of the *Hexalectris spicata* complex, *H. revoluta*, the western clade of *H. spicata* and *H. arizonica*. Goldman (2010, pers. comm.) offered that Kennedy and Watson (2010) support its distinction from *H. revoluta* var. *revoluta*, but it seems to have different relationships with various species based upon which phylogeny is examined (with possible hybridization inferred), and one could also suspect that it is part of the other new species described in that 2010 paper, *H. arizonica*, merely as a variety of *H. arizonica* (or vice-versa). Freudenstein (2010, pers. comm.)

offered that the real contribution of Kennedy and Watson (2010) has been the addition of molecular data, but the tree obtained from nuclear locus suggests the two varieties of *H. revoluta* are not very distinct from each other.

In conclusion, even though two of our five peer reviewers felt that Coleman's coralroot should not be treated as a separate species, they still believe it is a distinct taxonomic entity (i.e., variety). Furthermore, three reviewers agreed with Kennedy and Watson (2010) that Coleman's coralroot is a separate and distinct species. Additionally, the Kennedy and Watson (2010) study that denoted Coleman's coralroot as a separate species was published in Systematic Botany, which is a peer-reviewed and widely accepted scientific journal. Based on the morphological and phylogenetic analysis conducted by Kennedy and Watson (2010, entire), the fact that this study was published in a peer-reviewed scientific journal, and because the scientific community has generally accepted Kennedy and Watson's 2010 determination that the Coleman's coralroot is a distinct taxonomic entity as noted by our own peer reviewers, we conclude that the Coleman's coralroot should be recognized as a separate species. Therefore, based on the best scientific information available, we recognize Coleman's coralroot (*Hexalectris colemanii*) as a distinct species.

Habitat and Life History

Orchids, such as Coleman's coralroot, may be found either as individual plants or as part of a colony. The determination of what constitutes a colony, or cluster, is largely based on subjective professional expertise, taking into consideration factors such as local geography and relative distance between plants. A colony or cluster can range from a relatively small number of individual orchids to many hundred individual plants. A colony or cluster can also span across areas of varying size and may be primarily interconnected below the ground level, though this not known with a level of certainty.

Coleman's coralroot grows in moderate shade in oak (*Quercus* spp.) woodland canyons, hills, and drainages at elevations between 1,315 to 1,826 meters (m) (4,315 to 5,990 feet (ft)) in southeastern Arizona and southwestern New Mexico (Coleman 1999, p. 315; 2002, pp. 100–101; Catling 2004, pp. 15–16 Baker 2012a, p. 9; WestLand Resources 2012a, pp. 5–7; 2012b, p. 10; 2012c, p. 5; 2012d, pp. 8–10). Though dominated by oaks, and primarily by white oak (*Q. grisea*), these woodlands also include juniper (*Juniperus* spp.), mesquite (*Prosopis* spp.), Arizona black walnut (*Juglans major*), acacia (*Acacia* spp.), desert willow (*Chilopsis linearis*), and Wright sycamore (*Platanus wrightii*). Individual and orchid colonies establish themselves in soil, duff, humus, and heavy leaf litter under trees such as oak and mesquite, or among rock outcrops or the edges of rocky cliffs (Coleman 1999, p. 315; Coleman 2002, p. 101). In a study of general habitat characteristics, WestLand Resources (2012a, pp. 5–6) found that study sites with Coleman's coralroot and *Hexalectris arizonica* (Arizona crested coralroot) were predominantly characterized by sandy loam or sandy clay loam soils, had an average 44 percent canopy cover, and slopes ranging from 1 to 60 percent. This observation is similar to the findings of Collins *et al*. (2005, pp. 1,886–1,888), who found that *Hexalectris* orchid locations in Texas where statistically correlated with loamy carbonatic soils and sites with less than 60 percent canopy cover. Microhabitat parameters appear to vary considerably across known sites (WestLand Resources 2012d, pp. 9–10), making it difficult to identify specific conditions needed by the species.

Plants of the family Orchidaceae are predisposed to mycoheterotrophy (Kennedy *et al.* 2011, p. 1,303), meaning they do not use photosynthesis to make food, but rather obtain food via relationships with root fungi that have colonized the roots of trees (Leake 1994, pp. 171–172; Taylor *et al.* 2003, pp. 1,168–1,169), and members of the genus *Hexalectris* are fully mycoheterotrophic (Coleman 2002, p. 91). This mutualism between photosynthetic plants and root fungi, whereby plants and fungi acquire carbon from one another, is referred to as mycorrhizal symbiosis. However, mycoheterotrophy in *Hexalectris* orchids is entirely one-sided in favor of the orchid, and they have often been described as parasites. Because Coleman's coralroot occur predominantly in well-developed white oak woodlands, it seems likely that the preferred fungus grows on the roots of white oak, or perhaps in the duff and humus layer near oaks. *Hexalectris* orchids exhibit a high degree of mychorrhizal specificity, meaning they have a very restricted range of fungal associates, and the morphology of *Hexalectris* orchids suggests they depend heavily on specific fungi (Kennedy *et al.* 2011, pp. 1,309–1,313; Taylor *et al.* 2003, pp. 1,175–1,177). Members of the fungal group Sebacinaceae have been identified as the sole fungal associate of Coleman's coralroot (Kennedy *et al.* 2011, pp. 1,307–1,313). Although we have no specific information on the distribution of Sebacinaceae in Arizona, it is reasonable to infer a wide geographic distribution because Coleman's coralroot associates with sebacinaceous fungi of widely distant subclades or groups that have been identified from western Mexico to the eastern United States (Kennedy *et al.* 2011, p. 1,313).

Relatively little is known about the reproductive biology of Coleman's coralroot or other orchids within the genus *Hexalectris*. Autogamy (self-pollination) is reported for other members of this genus, though Coleman's coralroot is considered to be an obligate outbreeding taxon (relies on cross pollination) with a distinct rostellum (flower structure that prevents self-pollination) (Argue 2012, p. 144). Argue (2012, p. 144) suggests insects play a role in pollination of *Hexalectris* orchids. Hill (2007, p. 15) suggests *H. spicata* may require insect pollination because the flowers are "medium-sized and showy" and reports observation of a bumblebee (*Bombus impatiens*) visiting the flowers of an individual plant in Indiana. Buchman *et al.* (2010, pp. 4, 39) suggests that large bees, such as *Bombus* and *Xylocopa*, are likely pollinators of *H. warnockii*. Klooster and Culley (2009, pp. 1,340–1,343) found that *Bombus* spp. were the most reliable floral visitors and the primary pollen dispersal agents for two mycoheterotrophic orchids in the subfamily Monotropoideae. Several species of *Bombus* have been reported from the mountains of southern Arizona (Schmidt and Jacobson 2005, pp. 128–129), and Coleman's coralroot may be pollinated by a member of this genus. Additionally, the presence of beetles and ants on the flowers of *Hexalectris*, including Coleman's coralroot, has been documented (Sharma 2013, pers. comm.). It is not clear if Coleman's coralroot produces nectar in any significant amount, or if the species could attract potential pollinators merely through floral scent.

To what degree these orchid colonies exchange genetic material is unknown, but tiny wind-blown seeds can travel thousands of kilometers (Jersáková and Malinová 2007, p. 238). Additionally, the potential for a *Bombus* pollinator provides some context to evaluate orchid colony relationships. Although we were unable to locate information for local *Bombus*, Carvell *et al.* (2012, p. 738) reported 2,317 m (7,602 ft) as the maximum foraging distance for *B. pascuorum*, a species from Britain, suggesting that colonies within this distance from one another may exchange genetic material through a shared pollinator. However, this situation has not been documented for Coleman's coralroot.

Like most mycoheterotrophs, Coleman's coralroot is almost exclusively subterranean and survives mostly as an underground tuber or rhizome (Leake 1994, p. 172; WestLand Resources 2012d, p. 2). For mycoheterotrophic orchids to reach reproductive maturity may take 10 to 20 years (Hill 2007, p. 16; WestLand Resources 2012c, p. 3), though Coleman's coralroot likely takes 4 to 10 years (Coleman 2013, pers. comm.). Researchers suspect that a plant blooms only once then dies, because rhizomes have been observed to bloom more than once on only a few occasions (Coleman 2013, pers. comm.). For plants that do bloom more than once, the period of vegetative dormancy between flowering can be several years (WestLand Resources 2012c, p. 4). Due to the uncertainty surrounding maturation and blooming, how long an individual plant can live is currently unknown.

The total number of blooming individuals fluctuates widely from year to year and the species is considered an erratic, unreliable bloomer in successive years (Coleman

2001, p. 96; 2005, p. 250; 2013, p. 16). Coleman (2002, p. 101) noted that in some years all plants that send up spikes will put on a good display of flowers, while in other years none of the plants that sprout will bloom. When individual plants do bloom, the inflorescence (flowering part of the plant) emerges in April and flowers bloom between early May and mid-June (Coleman 2002, p. 101; Catling 2004, p. 15; WestLand Resources 2010, p. 3). The species sets capsules (seed-bearing structures) very infrequently (Coleman 2013, p. 18), which may be related to the biology of the pollinator. Orchids that do successfully set capsules can produce millions of microscopic seeds that are dispersed by the wind over long distances and are reliant upon fungi for germination (WestLand Resources 2012c, pp. 2–3; Hill 2007, p. 17; Leake 1994, p. 172). Because of the small seed size, individual seeds likely have low nutrient reserves and seedbanks are likely short-lived.

The quality and quantity of blooming plants in the genus *Hexalectris* appears to be influenced by rainfall patterns (Coleman 2002, p. 101; Argue 2012, p. 145). For instance, Collins *et al.* (2005, p. 1,888) reported a large number of *Hexalectris* blooms in Texas following late spring rains. Engel (2013, p. 2) also reported a correlation between blooming for *H. nitida* in Texas and late spring rains over a 7-year period. For Coleman's coralroot, Coleman (2005, pp. 249–250) found that the number of blooming plants at two sites in Arizona correlated very closely with winter rains (October to May) from 1996 to 2003. WestLand Resources (2012c, pp. 10–11) demonstrated that flowering for Coleman's coralroot is highly correlated with October to March rainfall totals, and hypothesized that flowering may be positively correlated with cold wintertime temperatures because wintertime temperatures from 2008 to 2012 were exceptionally low.

Range and Distribution

Coleman’s coralroot occurs within oak woodland communities across southeastern Arizona and southwestern New Mexico. When Coleman’s coralroot was recognized as a separate species in 2010, it was known only from three sites in the Santa Rita and Dragoon Mountains of southern Arizona (Center for Biological Diversity 2010, pp. 4–7). Since that time, extensive surveys have been conducted for the species in numerous mountain ranges across southeastern Arizona (WestLand Resources 2010, 2012b, 2012d, 2103, entire). In 2012 alone, WestLand Resources (2012b, p. 50) surveyed 181 canyons in 16 mountain ranges. As of July 2013, the species has been positively identified in 22 confirmed extant colonies across seven mountain ranges, including the Santa Rita, Whetstone, Dragoon, Chiricahua, Patagonia, Peloncillo, and Baboquivari Mountains in southeastern Arizona and southwestern New Mexico (Coleman 2001, p. 96; Catling 2004, p. 15; Coleman 2010, pp. 1–2; WestLand Resources 2010, pp. 9–14; 2012b, pp. 3–5; 2012d, pp. 4–8; 2013, pp. 5–6). All confirmed extant sites are located on Coronado NF lands managed by the U.S. Forest Service (USFS) or Tribal lands owned by the Tohono O’odham Nation.

Population Trends and Abundance

Identifying discrete populations of Coleman's coralroot is challenging due to the species' life history, particularly its cryptic nature, the unpredictability of emergence and inflorescence, and the variability of habitat conditions (e.g., slope, aspect, cover). Furthermore, we do not have much information on population trends because most populations were not discovered until after 2010, when the Coleman's coralroot was recognized as a distinct species. Also, without specific knowledge of pollinators and gene exchange, making biological correlations regarding populations is difficult (Baker 2013, pers. comm.). However, orchids typically occur in patchy distributions where clusters of plants, or colonies, exhibit some spatial separation (Tremblay *et al.* 2006, p. 71; Winkler *et al*. 2009, p. 995).

Based on our review of the available information, we have identified 22 confirmed extant colonies (i.e., sites) of Coleman's coralroot (19 on Coronado NF and 3 on Tohono O'odham Nation). This includes five colonies in the Santa Rita Mountains in the upper, middle, and lower McCleary Canyon, Wasp Canyon, and Sawmill Canyon; three colonies in the Dragoon Mountains including West Cochise Stronghold, East Cochise Stronghold, and Middlemarch Canyons; four colonies in the Peloncillo Mountains including Cottonwood Creek in Arizona, Cottonwood Creek in New Mexico, Miller Spring, and Skeleton Canyons; two colonies in the Whetstone Mountains including French Joe and Dry Canyons; four colonies in the Chiricahua Mountains including upper Tex Canyon, Tex Canyon, and two tributaries to Tex Canyon; one colony in the Patagonia Mountains in Hermosa Canyon; and three colonies in the Baboquivari Mountains.

Additionally, four colonies have been identified as to the coralroot genus *Hexalectris*, but the actual species were not identified. These plants had already flowered when they were found during surveys, so the infloresence had already dried and shriveled. Without the flower intact, the plants could only be identified to genus and not to species. However, these findings could potentially be Coleman's coralroot sites. These include Jordan Canyon in the Santa Rita Mountains, Paige Creek in the Rincon Mountains, Harshaw Canyon in the Patagonia Mountains, and Alamo Canyon in the Canelo Hills. If these are Coleman's coralroot sites, the spatially separated clusters of plants rise to 26 sites or colonies.

The life history of Coleman's coralroot makes the determination of population sizes extremely challenging, particularly because individual plants spend most of their lives underground where they are difficult to count. It is difficult to estimate population size or trends for subterranean orchids because the correlation between the number of rhizomes living underground and the number of spikes that emerge in any given year is unknown.

To date, monitoring rangewide has been irregular. Prior to 2010 only three Coleman's coralroot colonies had been monitored with regularity, including McCleary and Sawmill Canyons in the Santa Rita Mountains, and West Stronghold Canyon in the Dragoon Mountains. These three sites have been surveyed to varying degrees since 1996 (Coleman 1999, 2000, 2001, 2002, 2005, 2010 entire), and have exhibited significant fluctuations in the number of orchids emerging year to year, from zero to dozens of inflorescences. More extensive survey effort occurred from 2010 through 2013 (WestLand Resources 2013, p. 6), dramatically increasing the number of known and potential colonies of Coleman's coralroot. Count data collected for each colony since 2010, excluding those located on the Tohono O'odham Nation, is presented in Table 1 (Coleman 2010, p. 4; Baker 2012a, pp. 25–27; WestLand Resources 2010, pp. 9–14; 2012b, pp. 51–55; 2012c, p. 8; 2013, p. 5; Cerasale 2013, pers. comm.).

Table 1.—Summary of total counts of inflorescence of Coleman's coralroot by colony, 2010–2013.

Mountain Range	Canyon	Year			
		2010	2011	2012	2013
Santa Rita	Upper McCleary	95	6	46	18
	Middle McCleary	15	0	2	6
	Lower McCleary	10	0	2	2
	Wasp	4	0	1	0
	Sawmill	25	6	23	41 (+3*)
	Jordan	--	--	4*	0
Dragoon	West Stronghold	140	1	31	13
	East Stronghold	--	--	--	1
	Middlemarch	--	--	4	0
Peloncillo	Cottonwood Creek (AZ)	--	--	5	0
	Cottonwood Creek (NM)	--	--	2	--
	Miller Spring	--	--	2	5
	Skeleton	--	--	1	0
Whetstone	French Joe	--	--	29	26
	Dry	--	--	1	0
Chiricahua	Upper Tex	--	--	--	2
	Tex	--	--	2*	4
	Tex west tributary	--	--	--	6
	Tex north tributary	--	--	--	12
Patagonia	Hermosa	--	--	--	1
	Paige Creek	--	--	--	16*
Rincon	Alamo	--	--	--	2*

Canelo Hills	Harshaw	--	--	--	1*

*Reported as *Hexalectris* spp.

Summary of Information Pertaining to the Five Factors

Section 4 of the Act (16 U.S.C. 1533) and implementing regulations (50 CFR part 424) set forth procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(a)(1) of the Act, a species may be determined to be endangered or threatened based on any of the following five factors:

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

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

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

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

In making this finding, information pertaining to the Coleman's coralroot in relation to the five factors provided in section 4(a)(1) of the Act is discussed below. In considering what factors might constitute threats, we must look beyond the mere exposure of the species to the factor to determine whether the species responds to the factor in a way that causes actual impacts to the species. If there is exposure to a factor, but no response, or only a positive response, that factor is not a threat. If there is exposure and the species responds negatively, the factor may be a threat and we then attempt to determine how significant a threat it is. If the threat is significant, it may drive or contribute to the risk of extinction of the species such that the species warrants listing as threatened or endangered as those terms are defined by the Act. This does not necessarily require empirical proof of a threat. The combination of exposure and some corroborating evidence of how the species is likely impacted could suffice. The mere identification of factors that could impact a species negatively is not sufficient to compel a finding that listing is appropriate; we require evidence that these factors are operative threats that act on the species to the point that the species meets the definition of threatened or endangered under the Act.

In making our 12-month finding on the petition we considered and evaluated the best available scientific and commercial information.

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

We have identified mining, livestock grazing, nonnative invasive plants species, wildfire, drought, and climate change as potential threats to the habitat or range of the Coleman's coralroot.

Mining

Mining is a significant component of the history and economy of the American

Southwest, particularly Arizona, and there are numerous claims across the southeastern portion of the State. The Coronado NF, in particular, has a number of mining proposals in various stages of planning (Sandwell-Weiss 2012, pers. comm.). Mining and mineral exploration could detrimentally affect orchids and their habitats through land clearing, construction of facilities, rock blasting, groundwater pumping, storm water management, toxic chemical use, and other mine operations. These activities could directly or indirectly contribute to: direct fatality of individual orchids; the loss and alteration of microhabitat sites necessary for orchid survival; direct fatality of pollinators; and the loss and alteration of microhabitat sites necessary for pollinator survival. Of the 22 extant populations, 7 Coleman's coralroot colonies occur within, or adjacent to, mineral claims on public lands, which include McCleary (3 colonies), Wasp (1 colony), and Sawmill (1 colony) Canyons in the Santa Rita Mountains, Middlemarch Canyon (1 colony) in the Dragoon Mountains, and Hermosa Canyon (1 colony) in the Patagonia Mountains (USFS 2011, pp. 374, 393; Fonseca 2012, pp. 4–5; WestLand Resources 2012c, pp. 1, 17; USFS 2013, p. 6). We are aware of two mining projects that have developed plans of operation; the Rosemont Copper Mine in the Santa Rita Mountains, which may affect colonies in McCleary and Wasp Canyons, and the Hermosa Drilling Project in the Patagonia Mountains, which may affect a colony in Hermosa Canyon.

Rosemont Copper Mine—The Rosemont Copper Company has submitted a mine plan of operation to the Coronado NF for development of the Rosemont ore deposit. The proposed mine site is located on the east side of the Santa Rita Mountains of the Nogales Ranger District, approximately 48 kilometers (km) (30 miles (mi)) south of Tucson, Arizona. The proposed project would result in the direct disturbance of approximately 2,839 hectares (ha) (7,016 acres (ac)) of land, including 513 ha (1,267 ac) of private land, 2,287 ha (5,651 ac) administered by the Coronado NF, 1.2 ha (3 ac) administered by the BLM, and 38 ha (95 ac) of Arizona State Land Department land administered as a State Trust (SWCA 2012, p. 22). How much of this area is suitable for occupation by Coleman's coralroot is unknown, largely because the distribution of the fungal symbiont is unknown. However, the proposed project area is occupied by two colonies in upper McCleary Canyon and Wasp Canyon.

Project planning is well under way, and the Coronado NF released a Draft Environmental Impact Statement (EIS) in September 2011. The Rosemont Copper Mine includes an open-pit copper mine, storage area for waste rock and tailings, and plant facilities. The mine life, including construction, operation, reclamation, and closure, is approximately 25 years. The full-scale project is expected to begin after a Final EIS and a Record of Decision is completed. Based on current scheduling and compliance, this may occur in late 2013, though the precise schedule for commencement of the project is not known and depends on the finalization of the Record of Decision. Construction and operation of the open pit would entail blasting ore-laden rock with ammonium nitrate and fuel oil explosive (WestLand Resources 2007, p. 12; USFS 2011, p. 24). Sulfide ore would be transported, via haul trucks, to a series of crushers and mills to produce finely ground ore, which will be taken to a flotation processing plant to extract copper concentrate that will then be loaded for shipment (WestLand Resources 2007, pp. 18–20; USFS 2011, p. 25). Waste rock and tailings will be placed in storage areas primarily on public lands (WestLand Resources 2007, p. 23; USFS 2011, p. 26).

The Draft EIS acknowledges effects to Coleman's coralroot from the proposed action, owing to the construction of the mine pit in Wasp Canyon and the placement of dry-stack tailings in McCleary Canyon (USFS 2011, pp. 393, 405). Based on our review of the available information, the entirety of two Coleman's coralroot colonies within upper McCleary and Wasp Canyons lie within the footprint of the preferred alternative (Barrel) of the proposed Rosemont Copper Mine (USFS 2011, pp. 57–58; Fonseca 2012, p. 2; WestLand Resources 2012c, p. 21; 2007, p. 2.6). We anticipate that any and all individual orchids, and their underground rhizomes, within the direct footprint of the pit, roads, or structures will be crushed and killed during vegetation clearing, the ore extraction process (i.e., blasting and crushing), or other operational activities. Any habitat blasted and transported to the crusher would no longer remain suitable for orchids. Additionally, we anticipate that any pollinator nests and hives within the direct footprint of these facilities would be destroyed. The loss of nearby orchids and pollinators within the mine footprint could affect the fitness of orchids remaining on the mine perimeter through a potential reduction in the exchange of genetic material. However, this effect cannot be quantified because we cannot predict how many Coleman's coralroot will be on the mine's perimeter in any given season.

Two orchid colonies, one within middle McCleary Canyon and one within lower McCleary Canyon, are located just outside the direct footprint of mine facilities on the northern end of the project site. They appear to be directly on the edge, or within 305 m

(1,000 ft) of the edge, of the footprint of mine facilities (USFS 2011, p. 58; WestLand Resources 2012c, p. 21). Due to their proximity, these colonies could also experience: drying from denuded vegetation; increased potential for invasive species, which often favor disturbed habitats; increased edge effect to the oak stand and fungal communities; increased vulnerability to predation; alteration of surface and subsurface hydrology; and exposure to heavy metal contamination from seepage or fugitive dust. Native floristic quality can be negatively affected by exposure to heavy metals (Struckhoff *et al.* 2013, p. 27), and particulate pollution could lead to physiological stress of orchids and their habitats that remain on the mine perimeter. Of particular concern is particle matter that can contain acids, organic chemicals, metals, and soil or dust particles (USFS 2011, p. 170), because these compounds could potentially be toxic to orchids.

Because fugitive dust from the tailings pile is expected to generally consist of coarse particles that settle out rapidly (SWCA 2012, p. 20), we do not anticipate exposure to particulates will be significant. Also, the dust control plan for the mine may include the application of chemical dust suppressants, such as petroleum resins and acrylic cement (SWCA 2012, p. 19), which might ameliorate effects to the two colonies adjacent to the mine. Additionally, the plan of operation will seek to minimize fugitive dust through implementation of a variety of controls (e.g., application of binder materials or use of water spray) (USFS 2011, pp. 196–200). Although the potential for exposure exists, there is uncertainty regarding the magnitude of these potential stressors on the two Coleman’s coralroot colonies and habitats located just outside the mine footprint. The level of exposure cannot be predicted and the specific vulnerability of the species to these stressors requires further investigation. Furthermore, because only 4 of the 22 known colonies would be affected by this stressor, we do not anticipate rangewide impacts to the overall status of the species. The Coleman's coralroot is known to occur across seven mountain ranges in southeastern Arizona and southwestern New Mexico, and we have no information indicating that the remaining colonies are subject to impacts from mining.

Hermosa Drilling Project—Arizona Minerals, Inc. (AMI) has submitted a request for approval of a plan of operation to the Coronado NF to implement the Hermosa Drilling Project. The project area is located about 9.6 km (6 mi) east of the town of Patagonia, Arizona, on the Sierra Vista Ranger District, and approximately 80 km (50 mi) southeast of Tucson, Arizona. The proposed action would extend the current Hermosa mineral deposit exploration program from AMI patented mining claims to unpatented claims on Coronado NF lands (AMI 2013, p. 1). Site characterization activities, including mineral exploration drilling, hydrogeologic drilling and testing, geotechnical drilling and sampling, and construction and improvement of access roads would disturb 3.7 ha (9.2 ac) of Coronado NF lands (AMI 2013, p. 9). The Coronado NF is planning to prepare an Environmental Assessment. The precise schedule for commencement of the project is not known, though operations may begin as soon as 2018.

The project area for the Hermosa drilling project overlaps the occurrence of one individual Coleman's coralroot in Hermosa Canyon and one individual *Hexalectris* spp. located near Harshaw Canyon. We assume this finding represents at least one colony, but we do not have sufficient information to determine how much land is occupied or if an entire colony would be affected. However, we anticipate that any orchids and rhizomes within the direct footprint of exploration activities would be crushed and killed during vegetation clearing, drilling, or other operational activities. Additionally, any habitat modified would no longer maintain suitability for orchids, and any pollinators within the direct footprint of these activities would be destroyed. Based on this information, a high level of certainty exists that at least one individual Coleman's coralroot may be destroyed.

Other Claims—Additional mining claims exist within the known range of the species. For instance, Coleman's coralroot colonies in the Dragoon Mountains are located near mining claims. However, we have no information on whether these lands are closed to new mining claims, if the Coronado NF will require a plan of operations and an environmental assessment or environmental impact statement before new disturbance occurs, or what kind of mining activities can occur prior to Coronado NF oversight. Thus, we have no specific information regarding other mining operations that would impact Coleman's coralroot colonies.

In conclusion of mining concerns and based on our review of the best available information, 7 of the 22 Coleman's coralroot colonies occur within, or adjacent to, mineral claims on public lands, which include McCleary (3 colonies), Wasp (1 colony), and Sawmill (1 colony) Canyons in the Santa Rita Mountains, Middlemarch Canyon (1 colony) in the Dragoon Mountains, and Hermosa Canyon (1 colony) in the Patagonia

Mountains (USFS 2011, pp. 374, 393; Fonseca 2012, pp. 4–5; WestLand Resources 2012c, pp. 1, 17; USFS 2013, p. 6). Two Coleman's coralroot colonies within upper McCleary and Wasp Canyons are likely to be extirpated by anticipated effects from construction and operation of the Rosemont Copper Mine, but the five additional colonies are not expected to be lost. Of these five additional colonies, two colonies in lower and middle McCleary Canyon are likely to be affected by mining operations, but we have a high level of uncertainty regarding effects to the viability of those colonies because the effect of adjacent mining (e.g., fugitive dust) on individual orchids is unknown. Some of the uncertainty is because a colony may persist underground without flowering parts emerging. In addition, while at least one and perhaps two individual orchids within Hermosa and Harshaw Canyons are likely to be destroyed, we do not know how the viability of a colony or colonies in those canyons will be affected because we do not know the distribution of orchids there. Further, other localities of Coleman's coralroot in the Dragoon Mountains are located near mining claims, but we have no specific information regarding ongoing or proposed mining operations in that area or other areas. The existence of a mining claim does not ensure a mineral deposit will be subject to a plan of operation or active mining. Therefore, the best available information indicates that mining does not pose a threat to the Coleman's coralroot now or in the future.

Livestock Grazing

Cattle grazing in Arizona began in 1696, but ranching did not proliferate to any extent until the 1870's (Clemensen 1987, p. 1). The Coronado NF has been managing livestock grazing on its lands since the early 1900's (Allen 1989, pp. 14–17). Nineteen of the 22 confirmed extant Coleman's coralroot colonies occur on the Coronado NF within USFS grazing allotments. Although the Coleman's coralroot is currently a USFS sensitive species, we do not have any information indicating that these allotments contain stipulations that protect the species. Livestock grazing is cited as a contributing factor in the extirpation of the species from Baboquivari Canyon on BLM lands (Center for Biological Diversity 2010, p. 10, Coleman 2010, pers. comm.), though specific evidence is not provided. *Hexalectris* orchids are palatable to ungulates, and hoof action could contribute to soil compaction that may be detrimental to the fungus or the roots of either the *Hexalectris* or the oak trees. Livestock grazing has been demonstrated to reduce seed production and detrimentally impact survival of other orchid species (Alexander *et al.* 2010, pp. 47–48). Hágsater and Dumont (1996, p. 17) note that heavy grazing and trampling has been shown to eliminate other species of orchids, reduce plant diversity, and lead to soil erosion; though they also note that grazing may simulate natural disturbance regimes, reduce competition, and promote certain rare species.

In the Whetstone Mountains, French Joe and Dry Canyons that are occupied by two colonies of Coleman's coralroot are located in the 7,111-ha (17,572-ac) Mescal Allotment, which consists of 4,036 ha (9,972 ac) capable of supporting grazing. The allotment is permitted for 800 cattle, or 4,800 Animal Unit Months (AUM), from November 1 to April 30 of each year (USFS 2010, p. 1; Kraft, 2013, pers. comm.). Typically, a single herd enters the allotment on November 1, on the west side and is moved east as feed and water diminish. Cattle travel to French Joe Canyon on the east side of the allotment at the end of the grazing season in April.

In the Peloncillo Mountains, one Coleman's coralroot colony occurs in Skeleton Canyon, which overlaps the 1,594-ha (3,939-ac) Fairchild Allotment and the 1,882-ha (4,651-ac) Skeleton Allotment which are together permitted for 272 cattle (1,496 AUM) from October 1 to March 15 of each year (Service 2009, pp. 22, 27; USFS 2008, pp. 2, 21). Cattle are pushed into upper elevations of the Fairchild Allotment at the beginning of the grazing season and allowed to drift down to the north as the season progresses. A lack of reliable water and fencing makes it difficult to maintain proper distribution, resulting in heavier use in lower Skeleton Canyon (USFS 2008, p. 273).

In the Dragoon Mountains, the West Cochise Stronghold Canyon, which is occupied by one colony of Colemen's coralroot, is located within the 4,700-ha (11,616-ac) Slavin Allotment, which consists of 2,030 ha (5,017 ac) capable of supporting grazing. The allotment is permitted for 130 cattle (780 AUM) from December 1 to May 31 of each year (Service 1999, p. 20).

In the Santa Rita Mountains, the 3,931-ha (9,714-ac) Rosemont Allotment consists of 3,671 ha (9,072 ac) capable of supporting grazing. The allotment is permitted for 325 cattle from March 1 to 31, for 325 cattle from September 1 to October 31, and for 150 cattle from November 1 to February 28 (1,575 AUM) (Service 1999, p. 74).

In the Chiricahua Mountains, the 7,420-ha (18,336-ac) Tex Canyon Allotment consists of 6,713 ha (16,589 ac) capable of supporting grazing. The allotment is permitted for 600 cattle from November 1 to February 28, and 150 cattle from December 1 to February 28 (3,399 AUM) (Service 1999, p. 66).

As of 2012, the best available information indicates that livestock grazing occurs within or near all 19 Coleman's coralroot colonies that exist on Coronado NF lands. Whether livestock grazing occurs near the three colonies on Tohono O'odham Nation is uncertain, although information in our files indicates that no cattle activity occurs in the immediate area of reported plants. However, the presence of livestock grazing within landscapes where Coleman's coralroot occurs potentially makes the species vulnerable to direct grazing, trampling, and compaction of soils. When individual plants do bloom, the inflorescence (flowering part of plant) emerges in April and flowers bloom between early May and mid-June (Coleman 2002, p. 101; Catling 2004, p. 15; WestLand Resources 2010, p. 3). Livestock grazing in the Whetstone and Dragoon Mountains overlaps the emergence season, providing the opportunity for cattle to eat or trample individual flowering orchids, or compact soils. Because relevant allotments are grazed outside the emergence season, cattle have no opportunity to eat or trample individual flowering orchids in the Peloncillo, Santa Rita, or Chiricahua Mountains. However, the presence of livestock at other times does provide the opportunity for cattle to compact soils.

Although cattle are present on the landscape, two key factors likely contribute to minimization of the effects of grazing on Coleman's coralroot. First, the Coronado NF has a drought policy that directs permittees to work with the Coronado NF when rainfall for the water year (beginning October 1) is less than 75 percent of normal by March 1 and the long-range forecast is for less than normal precipitation. This policy limits livestock presence during drought, which in turn lessens the likelihood that Coleman's coralroot would be detrimentally impacted by livestock grazing. Second, these allotments are relatively large allowing livestock to disperse over a large area, and we have no information to indicate that livestock congregate within orchid colonies or that they may be attracted to orchid localities.

Livestock grazing has occurred for at least the past 100 years in Coleman's coralroot habitat. Although livestock grazing has been shown to affect other species of orchids, Coleman's coralroot persists across a number of mountain ranges in Arizona and New Mexico despite the presence of livestock. Because Coleman's coralroots primarily occur in areas that are not likely to be heavily grazed, such as areas with thick cover and limited accessibility under oak and mesquite trees, among rock outcrops, and on the edges of rocky cliffs (Coleman 1999, p. 315; Coleman 2002, p. 101), it is unlikely that livestock grazing will substantially impact the orchid. Accordingly, based on the best available information, livestock grazing does not pose a threat to the Coleman's coralroot continued existence now or in the future.

Nonnative Invasive Plant Species

Invasive plants, specifically exotic annuals, can negatively affect native vegetation including rare plants. One of the most substantial effects is the change in vegetation fuel properties that, in turn, alter fire frequency, intensity, extent, type, and seasonality (Menakis *et al.* 2003, pp. 282–283; Brooks *et al*. 2004, p. 677; McKenzie *et al.* 2004, p. 898) (see Wildfire discussion). Invasive plants can also exclude native plants and alter pollinator behaviors (D'Antonio and Vitousek 1992, pp. 74–75; DiTomaso 2000, p. 257; Traveset and Richardson 2006, pp. 211–213; Cane 2011, pp. 27–28). Furthermore, invasive plants can out-compete native species for soil nutrients and water (Aguirre and Johnson 1991, pp. 352–353; Brooks 2000, p. 92), as well as modify the activity of pollinators by producing different nectar from native species (Levine *et al.* 2003, p. 776) or introducing nonnative pollinators (Traveset and Richardson 2006, pp. 208–209), leading to disruption of normal pollinator interactions.

Since its introduction in the 1940s, buffelgrass (*Pennisetum ciliare*) has become widespread in southeastern Arizona (Yetman 1994, pp. 1, 8; Van Devender and Reina 2005, p. 161; Cohn 2005, pp. 1–2; Stevens and Falk 2009, p. 417). Originally introduced as forage for livestock, as erosion control, or as an ornamental, buffelgrass is now considered invasive and a threat to native ecosystems (Búrquez-Montijo *et al.* 2002, entire). Researchers generally think that buffelgrass will continue to spread in the Sonoran Desert biome into the future, reducing native biodiversity through direct competition and alteration of nutrient and disturbance regimes (Ward *et al.* 2006, p. 724; Franklin and Molina-Freaner 2010, p. 1671). However, buffelgrass is usually limited to elevations less than 1,000 m (3,300 ft) because it is frost-intolerant (Perramond 2000, p. 5), though it has been documented up to 1,265 m (4,150 ft) (Arizona Sonora Desert

Museum 2012, p. 2). Coleman's coralroot colonies occur at elevations of 1,315 to 1,826 m (4,315 to 5,990 ft), which is higher than the limit of where buffelgrass occurs, suggesting the Coleman's coralroot is not impacted by buffelgrass invasion, though climatic warming trends may facilitate future invasion of buffelgrass at higher elevations (see Climate Change discussion).

Other nonnative plant species that may impact Coleman's coralroot's persistence include Lehman's lovegrass (*Eragrostis lehmanniana*) and rose natal grass (*Melinis repens*) (Baker 2012a, p. 14). However, specific research is lacking on the impacts of exotic species in general upon individual Coleman's coralroot and their habitats (Baker 2012a, p. 14). A review of the best available information does not indicate that Lehman's lovegrass or rose natal grass occurs within Coleman's coralroot colonies. Also, there is a high level of uncertainty regarding interactions between these nonnative invasive species and Coleman's coralroot. Therefore, our review of the best available information does not indicate that nonnative invasive species pose a threat to the continued existence of Coleman's coralroot now or in the future.

Wildfire

Fire frequency and intensity in southwestern forests are altered from historical conditions (Dahms and Geils 1997, p. 34; Danzer *et al.* 1997, pp. 1–2). Before the late 1800s, surface fires generally occurred at least once per decade in montane forests (Swetnam and Baisan 1996, p. 15). During the early 1900s, frequent widespread ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, such as grasses. Coupled with fire suppression, changes in fuel load began to alter forest structure and natural fire regime (Dahms and Geils 1997, p. 34). An absence of low-intensity ground fires allowed a buildup of woody fuels that resulted in infrequent, but very hot, stand-replacing fires (fires that kill all or most of above-ground parts of dominant vegetation) (Dahm and Geils 1997, p. 34; Danzer *et al.* 1997, p. 9). Additionally, when nonnative buffelgrass invades an area, the natural fire regime can change from infrequent, low-intensity, localized fires, to frequent, high-intensity, spreading fires because of the increased grassy fuel load (Van Devender and Reina 2005, p. 161; Stevens and Falk 2009, p. 418; Yetman 1994, pp. 8–9). Also, the introduced Lehmans lovegrass can form dense stands, increasing fine fuels and fire danger where it occurs (Anable *et al.* 1992, pp. 186–187), which could lead to increased fire hazard in nearby oak woodlands.

Information in our files indicates wildfires of varying intensity in the past few years have occurred upslope of Coleman's coralroot plants on Tohono O'odham Nation. These wildfires may have resulted in increased runoff from burned areas, which may cause soil erosion that could wash away Coleman's coralroot plants or bury them under sediment. However, the available information does not provide specific evidence that wildfire has directly affected any cluster or colony of Coleman's coralroot. Additionally, there has been no scientific study of the impacts of fire on the species (Baker 2012a, p. 13). We can speculate that native plants that have evolved with low-intensity, high-frequency wildfire may suffer decreased viability when exposed to a fire regime that is now dominated by high-intensity wildfire. Hot temperatures may be too extreme for living plants, existing seedbank, and the pollinator species; and a hot wildfire occurring during the flowering season could potentially kill individual orchids that are flowering, or kill oak trees that are host to the fungal symbiont.

Conversely, Coleman's coralroot life-history traits may provide for the continued survival of the species under these conditions. Perhaps the subterranean rhizome is protected from surface fire, allowing the species to survive and resprout after fire. As discussed above, buffelgrass and Coleman's coralroot currently occur at different elevations, reducing the potential for the species to be affected by fire regimes altered by buffelgrass. Also, the distribution of other invasive species within or near Coleman's coralroot colonies is uncertain. Additionally, oak woodlands can recover after hot fires as affected trees often resprout and grow vigorously, though it may take a few decades to return to former conditions (Baker 2012a, p. 16).

Overall, researchers have a high level of uncertainty regarding the effects of wildfire on Coleman's coralroot, and we have no site-specific information regarding the occurrence of wildfire within or near sites occupied by Coleman's coralroot. Therefore, our review of the best available information does not indicate that wildfire poses a threat to the Coleman's coralroot now or in the future.

Drought and Climate Change

Our analyses under the Act include consideration of ongoing and projected changes in climate. The terms climate and climate change are defined by the Intergovernmental Panel on Climate Change (IPCC). Climate refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007, p. 78). Thus, the term climate change refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007, p. 78). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative, and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007, pp. 8–14, 18–19). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Climate change will be particularly challenging for biodiversity because the interaction of additional stressors associated with climate change and current stressors may push species beyond their ability to survive (Lovejoy 2005, pp. 325–326). The synergistic implications of climate change and habitat fragmentation are the most threatening facet of climate change for biodiversity (Hannah *et al.* 2005, p. 4). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field *et al.* 1999, pp. 1–3; Hayhoe *et al.* 2004, p. 12422; Cayan *et al.* 2005, p. 6; Seager *et al*. 2007, p. 1181). Climate change may lead to increased frequency and duration of severe storms and droughts (Cook *et al.* 2004, p. 1,015; Golladay *et al.* 2004, p. 504; McLaughlin *et al.* 2002, pp. 6,072–6,074).

The current prognosis for climate change in the American Southwest includes fewer frost days; warmer temperatures; greater water demand by plants, animals, and people; and an increased frequency of extreme weather events (Weiss and Overpeck 2005, p. 2,074; Archer and Predick 2008, p. 24). Some models predict dramatic changes in southwestern vegetation communities (Weiss and Overpeck 2005, p. 2,074; Archer and Predick 2008, p. 24), especially as wildfires carried by nonnative plants (e.g., buffelgrass) potentially become more frequent, promoting the presence of invasive, exotic species over native ones (Weiss and Overpeck 2005, p. 2,075).

Climate change models predict that the southwestern United States will become drier in the twenty-first century and that the trend is already under way (Seager *et al.* 2007, pp. 1,181–1,184; Schwinning *et al.* 2008, p. 14–15). The current, multiyear drought in the southwestern United States is the most severe drought recorded since 1900 (Overpeck and Udall 2010, p. 1,642). Winter rainfall in southern Arizona has been declining steadily for the last 34 years, and most noticeably 1998 to the present (McPhee *et al.* 2004, p. 2). Projections predict annual precipitation in the Southwest will continue to decrease (Christensen *et al.* 2007, p. 888; Solomon *et al.* 2009, p. 1,707). Additionally, maximum summer temperatures in the Southwest are expected to increase over time (Christensen *et al.* 2007, p. 887). Weiss and Overpeck (2005, p. 2,075) examined low-temperature data over a 40-year timeframe from numerous weather stations in the Sonoran desert ecoregion and found: (1) widespread warming trends in winter and spring, (2) decreased frequency of freezing temperatures, (3) lengthening of the freeze-free season, and (4) increased minimum temperatures per winter year. The current trend in the Southwest of less frequent, but more intense, precipitation events leading to overall drier conditions is predicted to continue (Karl *et al.* 2009, p. 24). The levels of aridity of recent drought conditions, and perhaps those of the 1950s drought years, will become the new climatology for the southwestern United States (Seager *et al.* 2007, p. 1,181). Additionally, the timing of precipitation may be altered. Projected patterns of precipitation changes predict that winter precipitation in the Southwest may decline 10 to 20 percent, for the period 2090–2099 relative to 1980–1999, as a result of climate change (IPCC 2007, p. 20).

Arid environments can be especially sensitive to climate change because the biota that inhabit these areas are often near their physiological tolerances for temperature and water stress. Slight changes in temperature and rainfall, along with increases in the magnitude and frequency of extreme climatic events, can significantly alter species distributions and abundance (Archer and Predick 2008, p. 23). Nonnative plant species may respond positively, out-competing native vegetation (Smith *et al.* 2000, p. 79; Lioubimsteva and Adams 2004, p. 401), thereby increasing the risk of wildfire. Seasonal changes in rainfall may contribute to the spread of invasive species, which are often capable of explosive growth, and able to out-compete native species (Barrows *et a*l.

2009, p. 673).

As discussed above, flowering patterns are highly correlated with October to March rainfall totals, with higher numbers of flowering plants observed during years with more winter rainfall. A 10 to 20 percent decline in winter rainfall by the end of this century may have rangewide repercussions on flowering by Coleman's coralroot, though the magnitude of effect is uncertain. The irregular flowering patterns of Coleman's coralroot could already be indicative of effects from drought. For instance, in a study of the terrestrial orchid *Dactylorhiza majalis*, Pavel and Zuzana (1999, pp. 272–273) suggest that if both climatic and habitat conditions are good, irregular flowering regimes in orchids should not occur, and such patterns may be characteristic of sites with declining populations. On the other hand, flowering in *Hexalectris*, and Coleman's coralroot in particular, is known to be very erratic (Hill 2007, p. 16; Coleman 2013, p. 16), and may be an adaptation to cope with the extreme climatic conditions of arid environments.

It is difficult to determine how Coleman's coralroot colonies will fare with current and future drought conditions. The long-term trend for these colonies is unpredictable, and the inconsistent nature of historical count data makes it hard to assess trends (e.g., variation from year to year, unknown relationship to number of rhizomes, and lack of standardized data collection methodology). Despite past and ongoing drought conditions, the species continues to persist. While winter precipitation appears to be correlated with flowering, which influences seed production and germination, the effects of long-term drought on these life-history traits are uncertain. Currently, the extent of the cumulative effects of drought are undocumented, and we have no information to indicate if they independently or collectively have led to, or will lead to, the loss of Coleman's coralroot colonies.

It is also possible the Coleman's coralroot is adapted to arid conditions. Plants growing in high-stress landscapes are often adapted to stress, and drought-adapted species may experience lower mortality during severe droughts (Gitlin *et al.* 2006, pp. 1,477 and 1,484). The ability of Coleman's coralroot to remain dormant during dry periods, and regrow when rainfall is abundant, may be an adaptation for coping with aridity. This ability to remain dormant during dry periods may have been important in the Coleman's coralroot survival of the large-scale drought in the 1950s. However, we note that drought was 11 years and followed by a period of higher annual precipitation (Allen and Breschears 1998, p. 14,841; Fye *et al.* 2003, p. 907), and the current drought may not be comparable.

In summary, the best available information indicates a continuation of current drying trends, but it does not indicate that the rangewide status of Coleman's coralroot will be negatively affected. In fact, some information indicates that Coleman's coralroot is adapted to arid environmental conditions. Therefore, the best available information does not indicate that drought and climate change pose a threat to the Coleman's coralroot at a species-level across the range now or within the future.

Conservation Efforts To Reduce Habitat Destruction, Modification, or Curtailment of Its Range

We have no information regarding conservation efforts that are nonregulatory, such as habitat conservation plans, safe harbor agreements, habitat management plans, memorandums of understanding, or other voluntary actions that may be helping to ameliorate stressors to the species' habitat, but are not legally required.

Summary of Factor A

After assessing the best available science on the magnitude and extent of the effects of mining, livestock grazing, nonnative invasive plants species, wildfire, drought, and climate change, we find that the destruction, modification, and curtailment of Coleman's coralroot's habitat or range is not a threat to the species. Mining operations may affect a small percentage of the Coleman's coralroot habitat. Effects of livestock grazing, nonnative species, wildfire, and drought have not resulted in measurable population declines. However, a review of the limited available information does not indicate that these stressors alone or in combination rise to the level of effects that they would be considered a threat to the Coleman's coralroot.

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

Coleman's coralroot has been subject to minimal collection related to documentation of occurrence (i.e., voucher specimens) and scientific inquiry. Voucher specimens were collected from Baboquivari Canyon by Toolin in 1981 and from McCleary Canyon by McLaughlin in 1986 (Coleman 2000, p. 138; 2001, p. 96). Specimens were collected from Sawmill Canyon in 2003 and McCleary Canyon in 2005 for phylogenetic analysis (Baker 2012a, p. vi; Kennedy and Watson 2010, pp. 64–65; WestLand Resources 2010, pp. iv–v, 1–2). More recently, voucher specimens were collected from Cottonwood Creek and Miller Spring by Baker (2012a, p. vi). WestLand Resources (2012c, p. 5) also reports a collection from West Cochise Stronghold. These collections represent a small number of individuals, and there is no indication that large numbers of Coleman's coralroot have been collected for scientific purposes. In fact, Coleman (2010, p. 2), the principal authority on the species, reports that he refrained from collecting the species during his years of survey effort.

Removal of unsustainable levels of plants from wild populations for commercial trade is a major cause for the decline of many showy orchids (Hágsater and Dumont 1996, p. 9). Although many species of orchids are highly sought by collectors, we are not aware of any significant utilization of Coleman's coralroot for commercial or recreational purposes (i.e., reports or observations of collection or removal from the wild). Coleman's coralroot localities are relatively remote and access is challenging, minimizing potential collection by novices. Furthermore, collection for propagation seems unlikely because the conditions necessary for growth and survival appear to be very difficult to recreate in an artificial environment (i.e., successfully growing the fungus).

Conservation Efforts To Reduce Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

We have no information regarding conservation efforts that are nonregulatory, such as habitat conservation plans, safe harbor agreements, habitat management plans, memorandums of understanding, or other voluntary actions, that may be helping to ameliorate stressors due to overutilization for commercial, recreational, scientific, or educational purposes.

Summary of Factor B

Based on the best available information, the Coleman’s coralroot has been subject to minimal collection. We have no indication that collection is affecting the species now or will do so in the future. Therefore, we conclude that overutilization for commercial, recreational, scientific, or educational purposes, does not pose a threat to the Coleman’s coralroot.

Factor C. Disease or Predation.

Orchids like the Coleman’s coralroot are susceptible to herbivory by native browsers, such as insects, small mammals, or deer. Hill (2007, p. 19) identified herbivory by deer as a potential threat to *Hexalectris* orchids, while Baker (2012a, p. 13) offered that Coleman's coralroot may be vulnerable to predation or grazing by rodents, feral pigs, rabbits, and deer. Since 1996, evidence of herbivory of Coleman's coralroot has been observed (Coleman 2013, p. 16), including a report of a single plant damaged by insects from McCleary Canyon in 1996 (Coleman 1999, p. 314) and the reporting that spikes may be eaten (Coleman 2002, p. 101). With the dramatic increase in survey effort from 2010 to 2013, the incidence of observed herbivory also increased. For instance, in 2010 researchers found that 30 percent of spikes in West Cochise Stronghold Canyon were browsed by deer (WestLand Resources 2010, p. 12). From the Santa Rita Mountains, WestLand Resources (2012b, pp. 8, 53–54) reported one Coleman's coralroot inflorescence that showed signs of herbivory in McCleary Canyon, at least one inflorescence of *H. arizonica* that showed insect damage in Agua Caliente Canyon, and one *H. arizonica* inflorescence sheared off at the base due to small rodent or insect herbivory in Dutch John Canyon. WestLand Resources (2012b, pp. 5, 53) also reported four *Hexalectris* spp. in Jordan Canyon in the Dragoon Mountains that appeared to be clipped from insect herbivory. Baker (2012b, p. 1) also reported an individual Coleman's coralroot from the Peloncillo Mountains eaten at the base of the stalk.

In 2012, Coleman (2013, p. 16) marked and tracked eight Coleman's coralroot plants in Sawmill Canyon, in an effort to quantify the effects of herbivory. A site visit later that same year revealed four plants had been destroyed by digging, likely from a small rodent (Coleman 2013, p. 16). In 2013, all marked plants had either been dug by a small rodent, or had been eaten down below the lowest flower by either a rabbit or deer

(Coleman 2013, p. 17). Coleman (2013, p. 18) expressed concern that herbivory may preclude large numbers of plants from developing and setting capsules. Because the species appears to set capsules infrequently, herbivory could affect seed development and dispersal. Coleman (2013, p. 18) concludes that additional work is needed to identify the herbivores and to determine what proportion of plants that emerge in any given year are lost to herbivory.

As a matter of their life history, wild plants are susceptible to predation or herbivory. Although it has been demonstrated that Coleman's coralroot are subject to herbivory, the available information does not indicate that herbivory is occurring at levels different from historical conditions or if the species is experiencing population-level declines or a loss of colony viability as a result of herbivory. The most significant incident was the documentation of herbivory on 30 percent of spikes in West Cochise Stronghold Canyon in 2010 by WestLand Resources (2010, p. 12). In 2010, 140 inflorescences were counted in West Cochise Stronghold that year, the most counted in a single colony. However, we have no information indicating that herbivory affected capsule formation for the remaining orchids in West Cochise Stronghold, and we cannot determine if herbivory has affected the viability of the colony. Our review of the best available information does not indicate that herbivory, and resulting loss of individual plants, poses a threat to the Coleman's coralroot now or in the future.

We have no information regarding specific diseases affecting Coleman's coralroot, though oak trees can be vulnerable to several wood-rotting fungi. Oak wilt and oak leaf scorch can be a cause for concern, but the available information does not indicate that either occurs in Arizona (Olsen 2013, pers. comm.). Also, the pathogen *Nosema bombi* may be responsible for a decline in certain members of bumblebees in the genus *Bombus* across the United States. However, several species remain abundant, and it is unlikely that affected species have become fully extirpated (Cameron *et al.* 2010, p. 4). What this means for Coleman's coralroot is difficult to interpret because the specific pollinator has not been identified.

Conservation Efforts To Reduce Disease or Predation

We have no information regarding conservation efforts that are nonregulatory, such as habitat conservation plans, safe harbor agreements, habitat management plans, memorandums of understanding, or other voluntary actions, that may be helping to ameliorate stressors due to disease or predation.

Summary of Factor C

Overall, researchers have uncertainty regarding the effects that disease and predation have on Coleman's coralroot at the population and species levels. Accordingly, our review of the best available information does not indicate that disease or predation poses a threat to the Coleman's coralroot now or will do so in the future.

Factor D. The Inadequacy of Existing Regulatory Mechanisms.

Under this factor, we examine whether existing regulatory mechanisms are inadequate to address or alleviate the threats to the species discussed under the other factors. Section 4(b)(1)(A) of the Act requires the Service to take into account "those efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species…." In relation to Factor D under the Act, we interpret this language to require the Service to consider relevant Federal, State, and tribal laws, plans, regulations, and other such mechanisms that may minimize any of the threats we describe in threat analyses under the other four factors, or otherwise enhance conservation of the species. We give strongest weight to statutes and their implementing regulations and to management direction that stems from those laws and regulations. An example would be State governmental actions enforced under a State statute or constitution, or Federal action under statute. Having evaluated the significance of the threat as mitigated by any such conservation efforts, we analyze under Factor D the extent to which existing regulatory mechanisms are inadequate to address the specific threats to the species. Regulatory mechanisms, if they exist, may reduce or eliminate the impacts from one or more identified threats. In this section, we review existing Federal and State regulatory mechanisms to determine whether they effectively reduce or remove threats to Coleman's coralroot.

Federal Regulations

Nineteen of 22 known Coleman's coralroot colonies occur on lands managed by the USFS as part of the Coronado NF. Although the Coleman's coralroot is not covered under the Coronado NF's Land and Resource Management Plan at this time, it does receive indirect benefits from management strategies outlined in the plan. For instance, the Coronado NF's Land and Resource Management Plan has guidance to protect riparian areas, maintain or restore fire-adapted ecosystems through thinning or prescribed burning, and provide for invasive species management. Any of these management strategies would provide some ancillary benefit to the Coleman's coralroot. On the other hand, the species may be affected by program management activities like grazing, recreation, mining, invasive species management, and fire management. The Coronado NF's Land and Resource Management Plan is designed to minimize impacts to sensitive species from management activities, but actual ground-level conservation would be implemented during project-specific planning and implementation.

Also, numerous Federal statutes apply on these lands. Because we have identified the construction of the proposed Rosemont Copper Mine as potentially affecting four colonies, two statutes of particular interest are the Mining Law of 1872 (30 U.S.C. 21 *et seq*.) and the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq*.) (NEPA). The Mining Law was enacted to promote exploration and development of domestic mineral resources, as well as the settlement of the western United States. In addition, the USFS considers the effects of their actions on the viability of sensitive species through the NEPA process. As defined by USFS's own policy, actions should not result in loss of species viability or create significant trends toward the need for Federal listing. Coleman's coralroot is currently a USFS sensitive species and is being considered in the planning process for the Rosemont Copper Mine. At this state in the planning process, we are unaware of mitigating actions, if any, the USFS may require for Coleman's coralroot as part of the NEPA process. If the mining project proceeds as planned, two colonies in upper McCleary and Wasp Canyons will be lost to the construction and operation. However, other sites throughout the species' range do not appear to be facing mining or other threats now or in the future to which current Federal regulations would apply. Although Federal regulations will not protect the portion of the species' range in upper McCleary and Wasp Canyons from the detrimental effects of hard rock mining, we do not find existing regulatory mechanisms to be inadequate across the entire range of the species.

Tribal Regulations

We have no information regarding specific Tribal regulations designed to protect Coleman's coralroot. In October of 2009, the Tohono O'odham Nation issued a resolution opposing the Rosemont Copper Mine. However, the Tohono O'odham Nation has no regulatory authority to manage the effects from this mine, because it does not occur on their land. Although we are unaware of any Tribal regulations that would provide protection to the Coleman's coralroot, there are no threats on Tribal lands to which regulations would apply.

State Regulations

No State laws specifically protect Coleman’s coralroot habitat on State or private lands in Arizona. Also, the species is currently not on the list of native plants protected from collection by the Arizona Native Plant Act (Arizona Department of Agriculture 2013, entire). Although State of Arizona regulations provide no protection to the species, we do not find them to be inadequate because no threats exist to which State regulations would apply.

Summary of Factor D

Based on our review of the best available information, we do not believe that there are inadequate regulatory mechanisms posing a threat to the Coleman’s coralroot now or will do so in the future.

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

We have evaluated the best available scientific information, and we did not find any information indicating that recreation, activities associated with illegal immigration, development, or any other natural or manmade factors are threats to the Coleman’s coralroot. We found no indication that Coleman’s coralroot are trampled, crushed, or destroyed by off-road vehicles, illegal immigrants, Border Patrol operations, or housing construction. Additionally, the Coleman’s coralroot colonies may be somewhat protected from these activities because of the rugged terrain (e.g., steep slopes, thick brush, rock outcrops, the edges of rocky cliffs) in which they occur. Information in our files indicates signs of illegal immigration near Coleman’s coralroot colonies on Tohono O’odham Nation, but we have no information indicating that individual orchids have been destroyed or that the viability of any colony has been compromised.

We also considered whether small population size and overall rarity of Coleman’s coralroot were threats. We recognize that Coleman’s coralroot may be rare as indicated by the relatively small number of canyons where the species has been found compared to the large number of canyons that have been searched. But we did not find any indication that the rarity of the species, acting in concert with other stressors, is a threat to the species.

Conservation Efforts To Reduce Other Natural or Manmade Factors Affecting Its Continued Existence

We have no information regarding conservation efforts that are nonregulatory, such as habitat conservation plans, safe harbor agreements, habitat management plans, memorandums of understanding, or other voluntary actions, that may be helping to ameliorate stressors due to other natural or manmade factors affecting the Coleman’s coralroot’s continued existence.

Summary of Factor E

Based on the best available information, we have determined that other natural or manmade factors do not pose a threat to the Coleman's coralroot now or in the future.

Finding

As required by the Act, we conducted a review of the status of the species and considered the five factors in assessing whether the Coleman's coralroot is an endangered or threatened species throughout all or a significant portion of its range. We examined the best scientific and commercial information available regarding the past, present, and future threats faced by the species. We reviewed the petition, information available in our files, and other available published and unpublished information, and we consulted with appropriate experts and other Federal and local agencies. In considering which factors might constitute threats, we must look beyond the mere exposure of the species to the factor to determine whether the species responds to the factor in a way that causes actual impacts to the species. If the species has exposure to a factor, but no response, or only a positive response, that factor is not a threat. If the species has exposure and responds negatively, the factor may be a threat and we then attempt to determine how significant a threat it is. If the threat is significant, it may drive or contribute to the risk of extinction of the species such that the species warrants listing as an endangered or threatened species as those terms are defined by the Act. This situation does not necessarily require empirical proof of a threat. The combination of exposure and some corroborating evidence of how the species is likely impacted could suffice. The mere identification of factors that could impact a species negatively is not sufficient to compel a finding that listing is appropriate; we require evidence that these factors are operative threats that act on the species to the point that the species meets the definition of threatened or endangered under the Act.

Under the five-factor analysis above, we identified several potential stressors that will likely cause declines, such as mining operations, livestock grazing, wildfire, drought, and herbivory. However, we have no information to indicate that these stressors alone or in combination rise to the level of effects that they would be considered a threat to the species' continued existence. Based on anticipated mining operations, we expect that 2 of the 22 confirmed Coleman's coralroot colonies will be extirpated due to mining operations and that 3 additional colonies may be negatively impacted but not lost. The Coleman's coralroot is known to occur across seven mountain ranges in southeastern Arizona and southwestern New Mexico. Because the species is fairly wide ranging, we do not believe that mining operations, livestock grazing, wildfire, drought, and herbivory operate in a manner that results in cumulative synergistic negative effects at the species level. The best available information does not indicate that the remaining colonies are subject to operative threats or that the impacts from any of the stressors are contributing to the risk of extinction such that the species warrants listing as an endangered or threatened species. Therefore, based on our review of the best available scientific and commercial information pertaining to the five factors, we find that the stressors are not operating at a level that is resulting in a species-level impact to indicate that Coleman's coralroot is in danger of extinction (endangered), or likely to become endangered within the foreseeable future (threatened), throughout all of its range.

Significant Portion of the Range

Having determined that Coleman’s coralroot does not meet the definition of a threatened or endangered species, we must next consider whether there are any significant portions of the range where the Coleman’s coralroot is in danger of extinction or is likely to become endangered in the foreseeable future. A portion of a species’ range is significant if it is part of the current range of the species and it contributes substantially to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a decrease in the ability to conserve the species.

In determining whether a species is threatened or endangered in a significant portion of its range, we first identify any portions of the range of the species that warrant further consideration. The range of a species can theoretically be divided into portions an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be both (1) significant and (2) threatened or endangered. To identify only those portions that warrant further consideration, we determine whether substantial information indicates that: (1) The portions may be significant, and (2) the species may be in danger of extinction there or likely to become so within the foreseeable future. In practice, a key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are essentially uniform throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to portions of the species’ range that are not significant, such portions will not warrant further consideration.

If we identify portions that warrant further consideration, we then determine whether the species is threatened or endangered in these portions of its range. Depending on the biology of the species, its range, and the threats it faces, the Service may address either the significance question or the status question first. Thus, if the Service considers significance first and determines that a portion of the range is not significant, the Service need not determine whether the species is threatened or endangered there. Likewise, if the Service considers status first and determines that the species is not threatened or endangered in a portion of its range, the Service need not determine if that portion is significant. However, if the Service determines that both a portion of the range of a species is significant and the species is threatened or endangered there, the Service will specify that portion of the range as threatened or endangered under section 4(c)(1) of the Act.

In our analysis for this listing determination, we determined that the Coleman's coralroot does not meet the definition of an endangered or threatened species throughout its entire range. We found that there are geographically concentrated stressors. The effects from the proposed Rosemont Copper Mine (located on the east side of the Santa Rita Mountains) and Hermosa Drilling Project (located in the Patagonia Mountains) will be limited to 5 of 22 confirmed extant colonies of Coleman's coralroot, including 4 colonies located in McCleary and Wasp Canyons in the Santa Rita Mountains, and 1 located in Hermosa Canyon in the Patagonia Mountains. Two of these colonies are expected to be extirpated. Even if these 2 colonies are extirpated, the Coleman's coralroot will continue to remain in 20 other colonies across 7 mountain ranges. There is enough redundancy in the remaining populations spread over a wide geographic area that the species will continue to persist.

Furthermore, determining the effect of the potential loss of these individual plants on the rangewide status of the species is challenging because of the lack of information on population ecology and demographics. For instance, we have no information regarding the degree to which these populations exchange genetic material, if these two colonies represent a unique genetic diversity, or the degree to which they may behave as subpopulations within a metapopulation. There is no information regarding how the number of aboveground flowering plants correlates with the total number of orchids, including those living underground as a rhizome or tuber. Thus, it is very difficult to determine how resilient the species is to withstanding demographic and environmental variation. These information gaps and uncertainties make it difficult to extrapolate population sizes, to evaluate trends, or to make meaningful comparisons within and across years. Based on the best available information, we have no evidence to indicate that the two colonies we expect to be extirpated are a significant portion of the current range of the species or that they contribute substantially to the representation, resiliency, or redundancy of the species. Therefore, we have no information to indicate that the contribution of five colonies that will be impacted from mining are at a level such that their loss would result in a decrease in the ability to conserve the species.

Our review of the best available scientific and commercial information indicates that the Coleman's coralroot is not in danger of extinction now (endangered) nor likely to become endangered within the foreseeable future (threatened) throughout all or a significant portion of its range. Although we expect two colonies (upper McCleary and Wasp Canyons) to be severely compromised or lost, and three other colonies (lower and middle McCleary, and Hermosa Canyons) to be detrimentally affected, we have no information to indicate that these losses would have a negative impact on the overall species across its entire range. Accordingly, we do not find that threats to the portion of the species' range in McCleary, Wasp, and Hermosa Canyons would likely place the species in danger of extinction throughout its entire range. Because the portion of the Coleman's coralroot colonies in these canyons due to mining is not significant enough that their potential loss would render the species in danger of extinction now or in the foreseeable future, we conclude that these colonies do not constitute a significant portion of the species' range. Therefore, we find that listing the Coleman's coralroot as an endangered or threatened species under the Act is not warranted at this time.

We request that any new information concerning the status of, or threats to, Coleman's coralroot be submitted to our Arizona Ecological Services Field Office (see **ADDRESSES** section) whenever it becomes available. New information will help us monitor the species and encourage its conservation. If an emergency situation develops for Coleman's coralroot, or any other species, we will act to provide immediate protection.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Arizona Ecological Services Office (see **ADDRESSES** section).

Author(s)

The primary authors of this notice are the staff members of the Arizona Ecological Services Field Office.

Authority

The authority for this finding is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

Dated: December 2, 2013.

Rowan W. Gould,

Acting Director, Fish and Wildlife Service.

Billing Code 4310-55

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