

**BEFORE THE SECRETARY OF THE INTERIOR**



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**PETITION TO LIST  
COLEMAN'S CORAL-ROOT  
*HEXALECTRIS COLEMANII*  
AS THREATENED OR ENDANGERED  
UNDER THE ENDANGERED SPECIES ACT**



September 8, 2010

Mr. Ken Salazar  
Secretary of the Interior  
18th and "C" Street, N.W.  
Washington, D.C. 20240

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Dear Mr. Salazar:

Pursuant to Section 4(b) of the Endangered Species Act ("ESA"), 16 U.S.C. §1533(b), Section 553(3) of the Administrative Procedures Act, 5 U.S.C. § 553(e), and 50 C.F.R. §424.14(a), The Center for Biological Diversity, Tierra Curry, and Noah Greenwald hereby formally petition the Secretary of the Interior, through the United States Fish and Wildlife Service ("FWS", "the Service"), to list Coleman's coral-root, *Hexalectris colemanii*, as a threatened or endangered species and to designate critical habitat concurrent with listing.

U.S. Fish and Wildlife Service has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on FWS. Specifically, FWS must issue an initial finding as to whether the petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. §1533(b)(3)(A). FWS must make this initial finding "[t]o the maximum extent practicable, within 90 days after receiving the petition." *Id.* Petitioners need not demonstrate that listing *is* warranted, rather, petitioners must only present information demonstrating that such listing *may* be warranted. As such, FWS must promptly make an initial finding on the petition and commence a status review as required by 16 U.S.C. § 1533(b)(3)(B).

Coleman's coral-root is a rare orchid that is extant at only three sites in two mountain ranges in Arizona, and that is imminently threatened by a proposed open-pit copper mine, livestock grazing, recreational impacts, and other factors. One population of this rare and beautiful orchid has already been lost. *Hexalectris colemanii* clearly warrants protection under the Endangered Species Act.

**PETITIONER:**

**The Center for Biological Diversity** is a nonprofit conservation organization with 255,000 members and activists dedicated to the protection of endangered species and wild places. <http://www.biologicaldiversity.org>

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## EXECUTIVE SUMMARY

Coleman's coral-root, *Hexalectris colemanii*, is a critically imperiled orchid that occurs only in the Santa Rita and Dragoon mountains in Pima, Cochise, and Santa Cruz counties, Arizona. There was a population of this recently-described orchid in the Baboquivaris, but it is now extirpated. Coleman's coral-root was previously thought to be a form of Chisos coral-root, but was elevated to species level by Kennedy and Watson (2010) based on genetic and morphological distinctions. Due to immediate threats to its survival from a proposed open-pit copper mine in the Santa Ritas, and from livestock grazing, recreational impacts, and other factors rangewide, Coleman's coral-root qualifies for and is in dire need of Endangered Species Act protection.

## INTRODUCTION

The Sky Islands of Arizona host the only three populations of Coleman's coral-root in the world. The coral-root has an extremely restricted distribution and grows only in association with symbiotic fungi found on the roots of host trees and shrubs, making the flower vulnerable to extirpation from anything which disturbs the soil or disrupts the relationship between the orchid, the fungi, and the woody hosts. The orchid does not send up flowering stalks every year, and during drought conditions populations are reduced, making the orchid vulnerable to effects from global climate change. In any given year, there are far less than 200 flowers in all populations combined. When the flowers do appear, the populations are small and vulnerable to trampling, herbivory, and collection. Due to its small population size, specific substrate requirements, and restricted distribution, Coleman's coral-root is exceedingly vulnerable to being extirpated from the numerous threats it faces, and there are no regulatory mechanisms which adequately protect it. The population in the Baboquivaris was likely extirpated due to cattle grazing. One of the populations in the Santa Ritas is in the footprint of a proposed open-pit copper mine. The other two populations, one in the Santa Ritas and one in the Dragoons, are threatened by grazing, recreation, and other factors. Without Endangered Species Protection, this newly-described species is likely to be lost.

## NATURAL HISTORY AND ECOLOGY

### Taxonomy

The orchid now known as *Hexalectris colemanii* was first discovered by Toolin and Reichenbacher in 1981, but they mistakenly identified it as the closely related species *H. spicata* (Coleman 2010). The orchid was detected again, and misidentified again, by McLaughlin in 1986. In 1998 Coleman and Catling determined that these orchids were in fact *H. revoluta*, the first documented occurrence of *H. revoluta* in Arizona, and a significant range expansion from the nearest known population in Texas (Coleman 2000). Upon further study, Catling recognized the Arizona plants to be distinct from the Texas variety, and published a formal description naming the Arizona variety *H. revoluta* var. *colemanii*, in honor of the Arizona orchid expert Ron Coleman who first recognized the distinct characteristics of the Arizona orchid (Catling 2004). In 2010, *H. colemanii* was

elevated to the species level by Kennedy and Watson, based on genetic and morphological differences from *Hexalectris revoluta*.

Kennedy and Watson (2010) conducted phylogenetic analyses on six plastid markers and Internal Transcribed Spacers (ITS) from 43 accessions representing the eight currently recognized *Hexalectris* species to test species circumscriptions and determine interspecific relationships among the orchids. They conclude that *Hexalectris colemanii* is a distinct species stating:

“The incongruent positions of the western- *H. spicata* clade and *H. revoluta* var. *colemanii* in the ITS and plastid trees suggests that either these clades may be of hybrid origin or that the ITS or plastid trees do not reflect true species relationships due to ILS. If this incongruence is the result of ILS, then the plastid topologies should be preferred and each clade should be recognized at the species rank because each is strongly- supported as monophyletic, by at least PP, and is morphologically distinctive relative to its sister clade. Even if these clades are in fact of hybrid origin, their monophyly remains supported . . . The *H. revoluta* var. *colemanii* clade can be distinguished from the western-*H. spicata* clade by several characters including a shorter inflorescence that is cream to white in color vs. creamy dull purple to purple brown; larger flowers (longer perianth parts, wider sepals, longer column) that have a white to magenta background color vs. yellow to yellow brown; chasmogamous flowers with revolute sepals and lateral petals that always possess a well developed rostellum vs. cleistogamous flowers that are sometimes spreading and rarely revolute with a reduced or absent rostellum. **We therefore conclude that *H. revoluta* s. l. should not include *H. revoluta* var. *colemanii*, and that this latter taxon should be recognized at the species rank” (p. 73-74).**

*Hexalectris revoluta* received a positive 90-day finding from the Service on December 16, 2009 (74 FR 66866). Given that *H. colemanii* was at the time considered to be a form of *H. revoluta*, the positive 90-day finding should apply to *H. colemanii* as well as to *H. revoluta*.

## **Description**

The name *Hexalectris* comes from the Greek hex, meaning six, and alectryon, cock's-comb, which refers to the six longitudinal crests found on the orchid's floral lip. This name, however, is not always appropriate because flowers of the various species in the genus may have either five, six, or seven crests on the lip (Hill 2007).

Except for the flowering stem, orchids in the genus *Hexalectris* are subterranean and appear above ground only to flower and reproduce. Kennedy and Watson (2010) describe the appearance of their above-ground organs as “cryptic and ephemeral” and “inconspicuous and unpredictable.” The orchids are distinguished from one another by flower size and color, labellum size and shape, and the number and height of raised crests (lamellae) atop the midlobe of the labellum (Kennedy and Watson 2010).

Coleman's coral-root is leafless, and has a pinkish to cream stem. The flowers have a whitish to creamy-pink background suffused with purple, magenta, or maroon, and brownish-maroon or purple veins. *Hexalectris colemanii* has larger flowers than *H. revoluta* (Catling 2004). Catling (2004) provides the following formal description of Coleman's coral-root:

“Stems pinkish-cream, 46-55 cm, with 4-6 sheathing bracts. Inflorescences 20-23 cm, floral bracts lanceolate, 3-12 mm. Flowers 13-19, with pedicellate ovaries 12-14 mm; sepals and petals whitish- or creamy-pink to very pale brown at the tips and partly with a suffusion of magenta or maroon, the veins maroon or brownish-maroon; dorsal sepal 20-2.5 x 4.5-5 mm; lateral sepals 17-21 x 6.5-7.5 mm; petals obovate-falcate or lanceolate-falcate, 19-22 x 4-5 mm; lip whitish-cream with maroon to magenta veins, the tips of the lateral and terminal lobes maroon or white between the veins, 16-20 x 10.5-12 mm, with 5 central veins with keels 0.2-0.5 mm high, midvein keeled or not keeled in the midlobe, lateral lobes extending 1/5–1/4 length of midlobe; column white above, 14-15 mm, rostellum present” (p. 14-15).

### **Habitat**

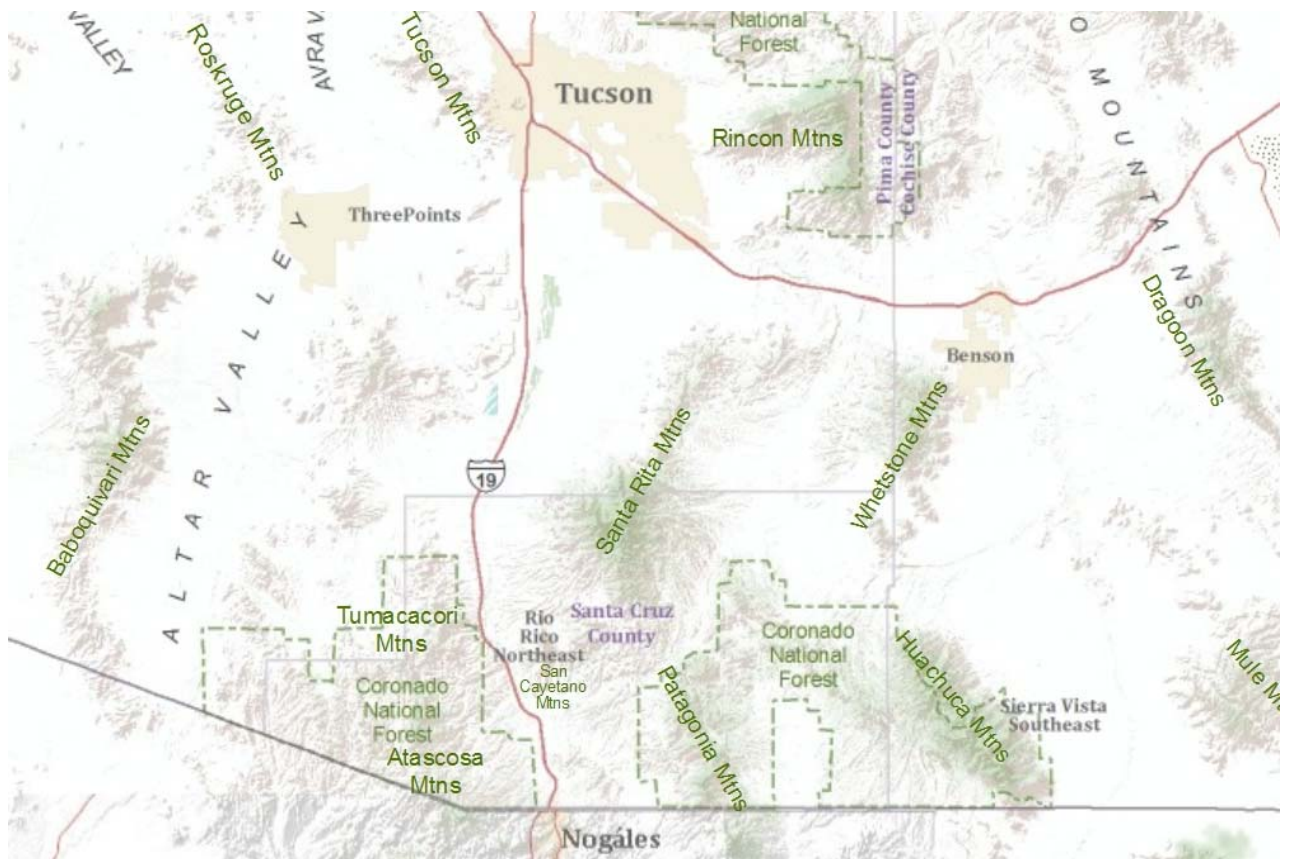
Coleman's coral-root occurs in scrub oak and oak-pine-juniper forests within Madrean evergreen woodland communities near the transition zone with semi-desert grassland communities (AGFD 2004). Trees and shrubs with which it may be associated include oak (*Quercus spp.*), juniper (*Juniperus*), mesquite (*Prosopis*), Arizona black walnut (*Juglans major*), acacia (*Acacia*), desert willow (*Chilopsis linearis*), and Wright sycamore (*Platanus wrightii*) (AGFD 2004). It occurs in canyon bottoms and on the sides of canyons between approximately 1300 and 1600 m elevation (Coleman 2001). It usually grows in partial to moderate shade (AGFD 2004). It has been found in areas with duff and heavy leaf litter, in sandy loam with leaf litter, and in very thin humus layers. In some areas, it is found among rock outcrops or on the edges of rocky cliffs (Coleman 2002).

### **Ecology**

Coleman's coral-root is a soft-fleshed perennial herb, often described as a saprophyte, though orchids are not true saprophytes. Orchids in the genus *Hexalectris* are myco-heterotrophs, meaning they do not use photosynthesis to make food, but rather, they obtain food via symbiotic relationships with photosynthetic community members, such as pines or oaks, via mycorrhizal fungi that have colonized the roots of the trees. *Hexalectris* orchids do not have chlorophyll, leaves, or roots (Hill 2007). The rhizome of the orchid lives in association with fungi, and the fungal hyphae act as roots by absorbing water and nutrients. Because the orchid is completely dependent on its hosts, it will likely die if transported. Similarly, any disturbance to the substrate which interferes with the relationship between the orchid rhizome, the fungi, and the host plant will likely kill the orchid.

## Range

*Hexalectris colemanii* has been positively identified at four disjunct locations in Pima, Cochise, and Santa Cruz counties, Arizona (Coleman 2010). It is known from two sites in the Santa Ritas (Pima and Santa Cruz counties), one site in the Dragoons (Cochise County), and one site in the Baboquivaris (Pima County), where it is likely extirpated (Coleman 2010). In the Santa Ritas, it occurs in McCleary Canyon and in Sawmill Canyon (Coleman 2010).



**Figure 1. Range of *Hexalectris colemanii*.** Coleman's coral-root is known from two sites in the Santa Rita Mountains south of Tucson, one site in the Dragoon Mountains southeast of Tucson, and occurred historically at one site in the Baboquivari Mountains southwest of Tucson.

## Life History

*Hexalectris colemanii* does not bloom or come up every year (Coleman 2001). It typically flowers in May and June. Flowering in *Hexalectris* is erratic, and may vary based on rainfall, temperature, nutrient availability, or a combination of these or other unknown factors (Hill 2007). At any given site, *Hexalectris colemanii* can produce as many as 40 plants in one year and zero plants the following year (Coleman 2001, 2005).

## STATUS

Coleman's coral-root is exceedingly rare and is known from only four total sites, but is extant at only three of them. In the Baboquivari Mountains, the orchid is likely extirpated as it has not been relocated there since its original discovery in 1981, despite repeated searches (Coleman 2001, 2010). The remaining locations support small populations, and the orchid does not send up a flowering stalk every year. In the Dragoons, the orchid is known only from a single location where from zero to 75 flower spikes per year have been recorded (Coleman 2010b). At the Sawmill Canyon site in the Santa Ritas, from zero to thirty flower stalks per year have been recorded (Coleman 2010b). At the original McCleary Canyon site in the Santa Ritas, from zero to forty stalks per year have been recorded (Ibid.). In 2010, the orchid was detected at other places in McCleary Canyon in addition to the originally known location (Ibid.).

As a newly described species, *Hexalectris colemanii* does not have any form of protective status. It was previously described as a form of *H. revoluta* (Catling 2004). *Hexalectris revoluta* is a Forest Service Region 3 and Bureau of Land Management Sensitive Species (AGFD 2004). In December 2009 *Hexalectris revoluta* received a positive 90-day finding indicating that it may warrant protection under the Endangered Species Act due to the threat of habitat loss to mining (FWS 2009, 74 FR 66866). Coleman (2001) states that *H. revoluta* should be considered for ESA listing due to its rarity (p. 96).

## THREATS

### ***A. Present or threatened destruction, modification, or curtailment of habitat or range***

Hexalectris orchids are particularly vulnerable to habitat loss and degradation because their distribution is naturally limited by specific substrate requirements (Hill 2007). Because of their dependence on symbiotic fungi, the orchids are sensitive to changes in substrate and are “not likely to withstand much alteration” (Hill 2007, p. 19). Hexalectris orchids are thus threatened by any factor that results in soil disturbance or compaction (Hill 2007). Within its extremely limited range, *H. colemanii* is threatened by habitat loss and degradation caused by mining, livestock grazing, recreation, development, and trampling by illegal immigrants and drug smugglers.

### **Mining**

There is no question that *H. colemanii* is threatened throughout a significant portion of its range by habitat loss and degradation due to mining. In 2009 when *H. colemanii* was still considered to be a form of *H. revoluta*, the Service determined that listing *H. revoluta* under the Act may be warranted due to the threat posed by mining, stating:

“[W]e have determined that the petition presents substantial information to indicate that listing *Hexalectris revoluta* may be warranted due to the present or



threatened destruction, modification, or curtailment of its habitat or range as a result of mining development” (74 FR 66903).

Numerous sources have identified mining as a threat to *H. revoluta*, and thus to *H. colemanii*, including Coleman (2001, p. 95), the Arizona Game and Fish Department (2004), the Forest Service (2007 Sensitive Species List), and Sky Island Alliance (2008a, 2008b).

In the Santa Ritas in McCleary Canyon, Coleman’s coral-root occurs in the footprint of the proposed Rosemont Copper Mine (Westland Resources 2007b, AGFD 2010) which would directly destroy at least 4,400 acres of habitat (Augusta Resource Corporation 2010). In 2010, 25 orchids were detected at the mine site, a significant portion of the total population of the species (Davis 2010). Because the orchid is completely dependent on its specific substrate, mining could eliminate the population entirely (Hill 2007, p. 19-20).

In addition to directly destroying orchids in the footprint of the mine, tailings piles, and associated structures, the proposed Rosemont mine threatens *H. revoluta* in several additional ways.

Dust and air pollution from numerous sources could have significant negative impacts on the orchid and its host trees, shrubs, and fungi both in the footprint and in adjacent areas (AGFD 2008, p. 5, Sky Island Alliance 2008b, p. 5-13). Dust and airborne pollutants will result from topsoil removal and replacement, construction of infrastructure, mining operations, tailings piles, road construction and maintenance, and traffic (e.g. Pima County Administrator 2009). The mine would require the construction and maintenance of numerous new roads. Mine haul and access roads are planned along the north, east, and south edges of the mine pits (SWCA 2009). A new two-lane, unpaved road is planned to allow access between SR 83 and the mine, and there are plans to widen SR 83. Several new roads are planned to reconnect the prior forest road system due to the closing of some existing roads to the public during mining activities (SWCA 2009). Increased traffic alone will inevitably result in dust pollution as a heavy truck is expected to leave the mine site every 15 minutes.

Contaminants from several sources threaten the orchid and its host fungi. Airborne contaminants from mining, waste rock, and tailings piles include uranium, sulfate, fluoride, and antimony (Pima County Administrator 2009). Herbicides used in conjunction with mining activities and road maintenance could be washed into the orchid’s habitat (e.g. AGFD 2003). Herbicide runoff and drift and direct herbicide application are serious threats to *Hexalectris* orchids due to their absolute dependence on symbiotic fungi (Hill 2007, p. 20). Chemicals used during the mining process could damage the orchids or the fungi upon which it relies, particularly in the event of accidental spills (Coleman cited in Davis 2010).

There is no question that the pumping of groundwater, diversion of streams, removal of more than 4,400 acres of vegetation, and excavation of a 6,500-ft across, 2,900-ft deep pit (SWCA 2009) will alter microhabitat conditions in the surrounding area. The resultant

changes in hydrology, reflection, wind, temperature, moisture, and nutrient input could cause microhabitat changes that would make it impossible for the orchid or its host fungi to survive. Hill (2007) identifies stream alteration, vegetation removal and the reduction of soil nutrient input, road building, and “any activity that results in increased erosion or chemical influx” as threats to *Hexalectris* orchids (p. 19-20).

The orchid is also threatened by the proposed post-mining land uses, which include cattle ranching and recreation, including ATV and motorcycle riding, and four-wheeling (SWCA 2009). The Rosemont property is part of an existing ranching facility with more than 15,000 acres of grazing lease, and cattle are expected to be present during and after the proposed mining (Ibid.).

Even if the mine currently proposed by Augusta Resource Corporation does not move forward, mining will remain a threat to Coleman’s coral-root at the Rosemont site. Mining has been a threat in the Rosemont area since at least the early 1900’s (Schrader 1915), and will continue to be a threat into the future. The Rosemont property has been sold numerous times, and if the current owner fails to develop the currently planned mine, the property is likely to be sold to yet another mining corporation.

Coleman’s coral-root may also be threatened by mining in the Dragoons. There has been a recent increase in interest in mineral withdrawal in the Dragoon Range, and there is a currently proposed alpha-calcite mine which could potentially threaten the orchid (Sky Island Alliance 2008a, p. 3-10).

### **Livestock Grazing**

*Hexalectris* orchids are edible to livestock and wildlife and are thus threatened by grazing or browsing pressure (Hill 2007, p. 19). If the flowering stalks are consumed by cattle or other animals, the orchid is unable to reproduce. Because *H. colemanii* does not emerge every year, and because when it does emerge few individual flower stalks are present, populations could easily be extirpated by herbivory or trampling, making livestock grazing a primary threat to the species.

Grazing threatens *H. colemanii* throughout its range. The extirpation of *H. colemanii* in the Baboquivaris may have resulted from overgrazing because the orchid is extremely susceptible to grazing and rare plants in the Baboquivari Range are known to be threatened by overgrazing (Toolin 1982, Gori et al. 1992, Roller 1998). The Dragoon Range is also extensively grazed ((FS 2008a, 2008b, Sky Island Alliance 2008, p. 3-3, 3-18). The orchid is not given any consideration or protection by the Forest Service in the grazing authorizations for the Dragoons (FS 2008a, 2008b). Grazing also threatens Coleman’s coral-root in the Santa Ritas (Sky Island Alliance 2008b, SWCA 2009).

## Recreation

*Hexalectris colemanii* is threatened throughout its range by recreational impacts. In addition to the risk of direct trampling of flower stalks, any recreational activity that results in soil disturbance threatens *Hexalectris* orchids (Hill 2007).

Off-road motorized recreation threatens *H. colemanii* via direct destruction and soil compaction (Hill 2007, p. 19-20). Portions of the Santa Ritas are being severely impacted by off-road motorized recreation. Concerning damage to the Santa Ritas from motorized recreation, Sky Island Alliance (2008b) state:

“Motorized recreation in the area is not effectively managed and is producing a growing network of illegal user-created roads that is rising to incredible concentrations. Threats include existing non-system roads and creation of new non-system roads, and lack of enforcement of the legal transportation system” (p. 5-13).

In the Santa Ritas, the threat posed to the orchid by mining at McCleary Canyon is magnified by the threat of recreation, as off-road recreation is a planned post-mining land use at the proposed Rosemont mine (SWCA 2009).

The impacts of off-highway motorized recreation are also severe in the Dragoons where numerous illegal roads and campsites have been created by off-road vehicles, including along steep slopes and wash sides (Sky Island Alliance 2008a, p. 3-23). Riders have vandalized signs, created roads in roadless areas, and left significant amounts of garbage (Ibid.).

Other recreational users also threaten the orchid in the Dragoon Range, which is very heavily used by rock-climbers, horse riders, mountain bikers, campers, hunters, and cultural and historical tourists, creating a “pattern of ecological damage and unmanaged visitor use” (Sky Island Alliance 2008a, p. 3-3). Sky Island Alliance (2008a) reports that recreational use of the Dragoons has increased exponentially and that use has become a “chaotic, unregulated free-for-all” (p. 3-16).

User-created campsites have proliferated in the range, including large pull-through sites created by trailers pulling horses or off-road vehicles. Group recreational programs have heavily impacted the landscape and turned single tent sites into “multi-acre networks of tent pads and trails” (Sky Island Alliance 2008a, p. 3-18). Recreationists have trampled vegetation, compacted soil, cut trees for firewood, and cleared slopes of wood, all of which directly threaten Coleman’s coral-root. Rock climbers in particular have created numerous negative impacts in the range as they have impacted steep areas unused by other recreationists (Ibid.).

The threat posed to Coleman’s coral-root by recreational impacts is exacerbated by the plant’s extremely limited range and small population size.

## **Illegal Immigration and Border Patrol**

*Hexalectris colemanii* is threatened by trampling and soil disturbance from illegal immigrants, drug smugglers, and Border Patrol agents. Illegal immigrant traffic through the Santa Ritas is significant and causes trampling of vegetation, particularly in steep terrain that tends to be avoided by other users (Sky Island Alliance 2008b, p. 5-13). Illegal travel along ridges and washes is also significant in the Dragoons (Sky Island Alliance 2008a, p. 3-23).

## **Development**

Increasing human population growth and resultant development threatens *H. colemanii* in the Dragoons and in the Santa Ritas. Growth of surrounding towns and cities has contributed to a drastic increase in visitation levels to the ranges (Sky Island Alliance 2008a, 2008b). Lands are being developed for housing and resorts along the western, northern, and eastern edge of the Dragoons (Sky Island Alliance 2008a, p. 3-3, 3-17). The population of Cochise County is expected to double in the next 25 years which will further increase unmanaged recreational impacts (p. 3-17). Developments are also being planned adjacent to the Santa Ritas (Sky Island Alliance 2008b, p. 5-12).

In sum, Coleman's coral-root is threatened throughout its range by habitat loss and degradation. The orchid is now extant only in the Santa Ritas and the Dragoons where it is known to be threatened by proposed mining activities, recreation, livestock grazing, development, and illegal immigration and Border Patrol activities.

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

Because of their beauty and rarity, orchids are often collected. Numerous sources cite collection as a threat to *Hexalectris revoluta* and thus to *H. colemanii* including Louie (1996), Forest Service (2007), and NatureServe (2010). Coleman's coral-root is exceedingly vulnerable to collection because of its limited range, small population size, and life history in which flowering shoots only emerge under certain conditions. Collection of even a single stalk could damage a small population of this flower. Coleman (2010) chose not to collect a voucher specimen of *H. colemanii* in Cochise County due to the small size of the population, stating:

“I never requested a permit to collect a voucher specimen from the Cochise County location because I believed based on my observations that there were too few plants to justify collecting one” (p. 2).

Coleman's coral-root may be more threatened by collection from recreationists or vandals than by orchid enthusiasts, because it is well known that mycotrophic orchids are extremely difficult to transplant and propagate (Hill 2007).

### ***C. Disease or predation***

Hexalectris orchids are edible and are subject to foraging by deer, rabbits, cattle, and other animals. The underground tubers may be vulnerable to consumption by feral pigs or rodents (Hill 2007). Livestock grazing is a primary threat to *H. colemanii* and may have caused the extirpation of the species in the Baboquivaris.

Disease is not known to be a threat to *H. colemanii*.

### ***D. Inadequacy of existing regulatory mechanisms***

There are no existing regulatory mechanisms which adequately protect Coleman's coral-root from the numerous threats it faces. The species occurs on the Coronado National Forest and potentially on the Tohono O'odham Nation (AGFD 2004). The orchid is a Forest Service Sensitive Species (2007) but protections afforded under this designation are discretionary, and the Forest Service has not taken any measures to protect the orchid from the threats it faces from cattle grazing, recreation, mining, etc. The orchid is not given any consideration or protection by the Forest Service in the grazing authorizations for the Dragoons (FS 2008a, 2008b). Existing regulations are failing to protect habitat from the impacts of recreation in the Santa Ritas and in the Dragoons (Sky Island Alliance 2008a, 2008b).

The proposed Rosemont open-pit copper mine would destroy at least 3,670 acres of National Forest land where mining waste would be dumped, and processing and support facilities erected (FS 2008c). The General Mining Act of 1872 confers a statutory right to enter upon public lands open to location in pursuit of locatable minerals, and under valid existing mining claims to conduct mining activities, in compliance with federal and state statutes and regulations. The Forest Service entered into a Memorandum of Understanding with Augusta Resource Corporation intended to allow the use of the National Forest for the dumping of mining waste (FS 2008c). The MOU provides no protection for the orchid. Augusta Resource Corporation has not established that they have valid existing rights on the Forest, and the Forest Service has not indicated that they will examine the validity of the claims, despite their responsibility to the public to do so.

The 1960 Multiple-Use Sustained-Yield Act (74 Stat. 215; 16 U.S.C. 528–531) requires that National Forest System lands be administered in a manner that includes consideration of the relative values of various resources as part of management decisions. The Federal Register notice for the mine stated that “The purpose of the proposed Forest Service action is to grant permission to the Company to use NFS land for certain activities related to operation of the Rosemont Mine.” Given the obligation of the Forest Service to consider the relative values of resources in decisions, the notice should have stated that the purpose of the proposed action was not to grant the company permission to use the land for the dumping of mining waste, but to consider whether granting permission to the company would negatively affect other National Forest resources, such as wildlife. The use of the National Forest for the dumping of waste rock and tailings is inconsistent with the Forest Plan, but the Forest Service has indicated that if necessary, it

will amend the Coronado National Forest Land and Resource Management Plan to allow the dumping of mine waste on the Forest (FS 2008d).

Multiple parties have identified numerous problems in the scoping process for the mine including Pima County (2009), the Arizona Game and Fish Department (2008), and members of Congress (Grijalva and Giffords 2008). The Arizona Game and Fish Department (2008) expressed strong concern about the failure of the Forest Service to safeguard wildlife habitat from the proposed mine stating:

“Is the Forest Service required to allow this one use if it permanently damages Forest lands and surrounding non-Forest lands forever? Pretending that this forest land will be returned to a functioning ecosystem in 20 years is fantasy” (p. 3).

Existing regulatory mechanisms are clearly not adequate to protect Coleman’s coral-root on National Forest lands.

There are no existing regulatory mechanisms which require the mining company to protect the orchid. The orchid is given no consideration in the Biological Resources Evaluation in the Mine Plan of Operations (Westland Resources 2007) or in the environmental assessment for the mine (SWCA 2009). Mining activity is expected to occur 24 hours a day, 365 days a year, for 19 years (SWCA 2009), and it is unlikely that mining activity could be curtailed, even if unintended impacts to orchids were detected.

The threat posed to the orchid by the proposed Rosemont mine is certain to be underestimated by the mining company and their consultants. The Arizona Game and Fish Department (2008) expressed complete disagreement with the biological evaluation in the Mine Plan of Operations, stating:

“We know that Pima County has recommended that the Forest should require peer review of scientific studies written to evaluate the impacts of the mine. We concur that this is a reasonable request, given that we disagree so completely with the report on biological resources” p. 2.

Should the mine move forward, the mitigation and reclamation plan is not adequate to protect the Forest and the orchid from negative impacts. Arizona Game and Fish Department (2008) expressed grave concerns about the inadequacy of mitigation and reclamation to protect habitat on the Forest stating:

“We have reviewed the Mine Plan of Operations. Our preliminary review indicates that despite any and all mitigation measures, this project will result in significant adverse impacts to wildlife, wildlife habitat, and wildlife recreation. We believe that the project will render the northern portion of the Santa Rita Mountains virtually worthless as wildlife habitat and as a functioning ecosystem . . . Furthermore, the project has great potential to impact wildlife and habitat off the forest” (p. 1).

[W]e believe that this mine will impact wildlife, wildlife habitat, and wildlife recreation in an area that is much larger than the footprint of the mine. If this mine is permitted, the entire northern portion of the Santa Rita Mountains will be virtually lost for wildlife values” (p. 4)

We also have a concern about failure of reclamation to occur or to be adequate for the needs of wildlife. Rosemont Copper Company tells us that mining operations can be completely rehabilitated. However, we have never seen this occur in Arizona’s dry habitats . . . One of the problems is the difficulty of establishing vegetation (at the level of a functioning ecosystem) in dry climates. The vegetative communities in the project area developed over hundreds of years. It is virtually impossible to establish that same vegetation in short time frame. Reclamation is not successful if the result is a low-seral state habitat (e.g. grasses and forbs) that lack mature habitat values” (p. 4).

Coleman’s coral-root is threatened on National Forest land by mining, recreation, and livestock grazing, and there are no existing regulatory mechanisms which adequately protect the orchid from these threats.

Coleman’s coral-root is not currently protected under Arizona state law, nor are there any regulatory mechanisms at the county level to protect the plant. Given that one population of this species has already been lost and that the two remaining populations are imminently threatened by numerous factors, Endangered Species Act protection for Coleman’s coral-root is warranted.

### ***E. Other natural or anthropogenic factors***

Several other factors threaten *H. colemanii* including extreme rarity, small population size, drought, and climate change.

Coleman’s coral-root now occurs at only three locations in two mountain ranges. The Forest Service (2007) cites “extreme rarity” as a threat to the coral-root. All known populations of the orchid are small, and small populations are more vulnerable to extirpation from stochastic genetic or environmental events or other habitat disturbing activities (Matthies et al. 2004). Louie (1996) cites inadvertent destruction through maintenance activities as a threat to *H. revoluta*.

Drought threatens the survival of *H. colemanii*. Annual precipitation in the Tucson region has been less than average since 1995, resulting in severe drought conditions locally and regionally (Westland Resources 2007, p. 3). Coleman (2001) cites decline in winter rainfall as the probable cause of a region-wide decline in population size of orchids in the southwest from 1997-2001 (p. 96).

Global climate change is expected to increase the frequency and intensity of droughts in the southwest and to create drier overall conditions (U.S. Global Change Research Program 2009), directly threatening the coral-root. Global climate change will also likely

reduce the population viability of rare plants like Coleman's coral-root (Maschinski et al. 2006).

## CONCLUSION

Coleman's coral-root survives at only three locations and without Endangered Species Act protection, this rare and beautiful orchid is likely to be driven to extinction by mining, livestock grazing, recreation, global climate change, and other threats. There are no existing regulatory mechanisms which adequately protect the coral-root from the imminent threats to its survival. *Hexalectris colemanii* is in dire need of and clearly qualifies for protection under the Act.

## REQUEST FOR CRITICAL HABITAT DESIGNATION

We request and strongly recommend that all known locations of Coleman's coral-root are designated as critical habitat concurrent with listing. As required by the Endangered Species Act, the Secretary shall designate critical habitat concurrent with determination that a species is endangered or threatened (16 U.S.C. 1533(a)(3A)). Critical habitat is defined by Section 3 of the ESA as: (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species. 16 U.S.C. §1532(5).

Because collection is a potential threat to *H. colemanii*, we recommend designation of large polygons of critical habitat that are sufficiently large so as not to reveal the locations of this rare plant.

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