

**STATE OF NEW MEXICO  
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT  
FORESTRY DIVISION**

**PROPOSED AMENDMENT OF 19.21.2 NMAC, ENDANGERED PLANT SPECIES LIST AND COLLECTION  
PERMITS**

**Written Testimony of Daniela Roth**

My name is Daniela Roth and I am the coordinator of the Endangered Plant Program within the Forestry Division of the Energy, Minerals, and Natural Resources Department (EMNRD). Responsibilities of the Program include researching the status of rare and endangered plants to ensure that no species is going extinct in New Mexico. I have been managing the Program since 2012. I have a Bachelor of Science degree in Botany and Wildlife and a Master of Science degree in Plant Ecology. I have worked with rare and endangered plants since 1988 and specifically with rare and endangered plants of the Southwest since 1997. For details of my work experience with the subject matter please see the attached resume.

EMNRD has statutory authority to administer and enforce the New Mexico endangered plant species statute NMSA 1978, Section 75-6-1 and its implementing rule, 19.21.2 NMAC. Pursuant to NMSA 1978, Section 75-6-1, the Energy, Minerals and Natural Resources Department was required to establish a program for the conservation of listed endangered plant species which includes research, law enforcement, habitat maintenance, propagation, and transplantation. It is also required to maintain a list of endangered plant species in New Mexico. EMNRD last modified this list in 2019 and 2006. Based on new information obtained through research by the Endangered Plant Program and information provided by knowledgeable people, including agency botanists and biologists and the New Mexico Rare Plant Technical Council, the EMNRD, Forestry Division supports changes to the list of endangered plant species, including removing species from the list, adding species to the list, and changing names of species on the list for the reasons described below. EMNRD also proposes to add definitions of "department" and "state forester" in 19.21.2.7 NMAC; revise 19.21.2.2 NMAC, Scope, 19.21.2.3 NMAC, Statutory Authority, 19.21.2.6 NMAC, Objective, and 19.21.2.15, Protection and Penalties to better reflect NMSA 1978, Section 75-6-1; and make style changes in 19.21.2.8 NMAC and 19.21.2.10 through 19.21.2.14 NMAC.

EMNRD does not expect any adverse effects to small businesses from the proposed action.

My testimony, resume, associated documentation, including references and Notices, as well as comments received to date are located on file within the Forestry Division and are available online via the Forestry Division website. In addition, all relevant files are located on the shared EMNRD L drive in the appropriate folder (L: Resource Management Bureau/Botany Program/2020 Rule Change/Final). All this information will also be available through the Sunshine Portal.

## **REMOVE FROM NEW MEXICO LIST OF ENDANGERED PLANT SPECIES:**

### ***Mammillaria wrightii* var. *wilcoxii* (Wilcox nipple cactus)**

*Mammillaria wrightii* var. *wilcoxii* has been documented in New Mexico from Hidalgo, Doña Ana, Grant, and Luna counties (SEINet 2019). It also occurs in Arizona in Cochise, Santa Cruz, and Graham counties, and is known from the Mexican state of Sonora (and possibly Chihuahua). NatureServe ranks *Mammillaria wrightii* var. *wilcoxii* globally secure and secure in AZ (G4/T4, S4). Although the New Mexico rank is S2 (imperiled), this rank is outdated and does not reflect current knowledge (last updated in 1988). *Mammillaria wrightii* var. *wilcoxii* is not considered a United States Department of the Interior, Bureau of Land Management (BLM) or United States Department of Agriculture, Forest Service (Forest Service) Sensitive Species in Arizona or New Mexico. The New Mexico Rare Plant Technical Council removed the species from consideration as a rare plant because it was considered too common and widespread (NMRPTC 1999). The New Mexico Rare Plant Conservation Strategy ranks the overall conservation status of *Mammillaria wrightii* var. *wilcoxii* as 'moderately conserved' based on limited distribution data and no information on documented threats (EMNRD-Forestry Division 2017). All varieties of *Mammillaria wrightii* were listed State Endangered in 1985 over concerns that illegal collection may endanger the continued existence of the taxon in New Mexico. Only the variety *wilcoxii* was retained as State Endangered in 1995 (New Mexico Register/Vol.VI, No. 16/Aug 31, 1995). At that time, it was only known from one county of New Mexico (Hidalgo County). Although population trends are unknown, threats are limited and *Mammillaria wrightii* var. *wilcoxii* is more common and widespread than documented at the time of listing. Illegal collections may still occur but have not been documented.

## **ADD TO NEW MEXICO LIST OF ENDANGERED PLANT SPECIES:**

### ***Townsendia gypsophila* (Gypsum Townsend's aster)**

*Townsendia gypsophila* is endemic to the Todilto and Summerville gypsum strata in the Ojito/White Mesa region of Sandoval County in New Mexico. The entire world-wide range is less than 20 miles of discontinuous gypsum outcrops in the White Mesa region near San Ysidro. *Townsendia gypsophila* is a BLM Sensitive Species and has a NatureServe rank of G2/S2 (imperiled) due to its limited range and known threats. The New Mexico Rare Plant Conservation Strategy gives the species an overall conservation rank of 'moderately conserved' based on low to high threat scores and a limited distribution (EMNRD- Forestry Division 2017). Populations occur on BLM, New Mexico state trust lands, and Zia Pueblo lands. The majority of populations and habitat occur on Zia Pueblo lands. Recent surveys found an apparent significant decline from 1994 counts in most sites reported on BLM lands and some on Zia Pueblo lands (Roth 2015; Roth & Sivinski 2015). Possible causes for the decline include long-term drought impacts, grazing, recreational biking, and off-road vehicle traffic. In addition, large portions of the habitat (1,040 acre lease area) are actively mined for gypsum on Zia Pueblo lands. Significantly fewer plants were found in the vicinity of actively mined areas in 2015 over 1994 values. No plants were found in disturbed sites. The White Mesa gypsum mine is the largest gypsum mining operation in the state and enabled New Mexico to rank seventh among the 20 gypsum producing U.S. states in the year 2000. Mining operations are expected to expand in the near future.

The Zia Pueblo does not have any specific laws or policies guiding the protection of rare plants or their habitat. *Townsendia gypsophila* is a BLM Species of Concern and some protections are afforded to the species through BLM Manual 6840. On BLM lands *T. gypsophila* populations occur within the Ojito Wilderness and the Ojito Area of Critical Environmental Concern (ACEC). However, this status does not protect plants from grazing or mineral entry. In addition, the primary impacts to the Ojito ACEC populations are from popular biking trails. There is no management plan or conservation plan to provide management guidance within the ACEC.

### ***Sclerocactus cloverae* (Clover's cactus)**

*Sclerocactus cloverae* is a regional endemic cactus with a worldwide range extending from southwestern Colorado to just north of Cuba, New Mexico, a linear distance of approximately 76 miles long and approximately 26 miles wide (IAE 2020). More than 99% of the known occurrences are in New Mexico. Six meta-populations were identified in 2016 which constitute the major population centers for the species (Muldavin et al. 2016). There are several population centers where the cactus maybe locally common (Lybrook, Kutz-Angel Peak), but 70% of occupied sites surveyed contained less than 50 cacti, scattered in small clusters. These small sites are ranked to have poor viability. The species occurs primarily on the Nacimiento Formation but has also been documented from adjacent formations (Porter and Clifford 2018). It is estimated that only about 10% of suitable habitat is occupied by the species (Muldavin et al. 2016). *Sclerocactus cloverae* is a BLM Sensitive Species and was recently listed threatened on the Navajo Nation Endangered Species List (NESL 2020). NatureServe ranks *S. cloverae* G3/S3 (vulnerable). Even though *S. cloverae* receives some level of protection on BLM and Navajo Nation lands, the New Mexico Rare Plant Conservation Strategy gives the species (both subspecies) the lowest conservation rank (under-conserved) due to moderate to high threat scores throughout the range of the species (EMNRD-Forestry Division 2017).

Significant portions of *S. cloverae* were listed as endangered as *S. cloverae* ssp. *brackii* by the State of New Mexico until 2019 (19.21.2.9 NMAC, Amendment 1/15/2019). EMNRD removed the ssp. *brackii* from the New Mexico List of Endangered Plants because DNA analysis found it to not be taxonomically different from *S. cloverae* ssp. *cloverae* and therefore is considered an invalid subspecies (Porter and Clifford 2018). Although our knowledge of the distribution range of *S. cloverae* ssp. *brackii* has increased significantly since the taxon was originally state listed and the combination of the two subspecies expands the range of the species somewhat, the overall range of the combined subspecies and available habitat in New Mexico remains limited to San Juan, Rio Arriba, and Sandoval counties. Combining *S. cloverae* ssp. *cloverae* and *S. cloverae* ssp. *brackii* adds less than 2% to our current knowledge of mapped locations.

Oil and gas development remains the most significant current and active threat to most populations of the species, and especially to the largest population, which occurs in the vicinity of Lybrook (Muldavin et al. 2016). The majority of known occupied sites and habitat occurs within areas of active oil and gas leases on BLM lands (80%). Some sites are also known from Navajo Nation, private, and state trust lands, which are also open to oil and gas leasing and development. The entire range of the species was

identified to have a very high potential for oil and gas development, with the highest development potential in the Lybrook area (Crocker and Glover 2018). A total of 37,307 wells have been drilled within the Mancos-Gallup RMPA Planning Area of the Farmington Field Office, which encompasses the Nacimiento Formation (IAE 2020). The Reasonable Foreseeable Development Scenario for Oil and Gas Activities projects 3,200 new oil and gas wells by 2037 (Crocker and Glover 2018). Although *Sclerocactus cloverae* is a BLM Sensitive Species, protections afforded to the species through BLM Manual 6840 and the 2017 IM Guidance (BLM 2017) are significantly less than they were in 2014, making conservation measures primarily a voluntary opportunity provided to the project proponent. Although a conservation strategy for the BLM is currently being drafted, it has not been adopted by district managers and proposed conservation strategies are voluntary (IAE 2020). There is no conservation strategy in place on State or tribal lands. There are no conservation areas set aside for the protection of these plants or their habitat on BLM, State, or tribal lands, nor are there any plans to designate conservation areas for the cactus in the revised draft BLM Resource Management Plan Amendment (2020). The majority of abundance and locational information comes from survey reports for biological clearances related to oil and gas development projects. Cactus populations found within project footprints have been avoided only to a very limited degree in the past. In general, cacti found within the footprint of oil and gas developments were either transplanted or they were destroyed. Survey statistics provided by the BLM indicate that of 10,451 individuals found during project clearance surveys, 3,346 were transplanted, 33 individuals were documented avoided, and 7,047 were considered “lost” (BLM 2019). Transplanting is not considered a viable conservation measure and survival rates have been mixed, depending on year of transplant and location (avg. 24% over 2 - 5 years, ranging from 0 to 69% in 26 study plots, 2,525 transplanted cacti)(Roth 2018). Hence the majority of cacti reported in survey reports are not likely extant. Other documented significant threats include prolonged drought, insect and rodent/rabbit predation, grazing, illegal collection, and off-road vehicle traffic (Muldavin et al. 2016). Predation by rabbits was identified as a primary cause of mortality in monitoring plots during the winter of 2014 – 2015 (Greenlee 2015; Roth 2015). Predation by rabbits may be amplified in the highly fragmented and noisy landscapes associated with oil and gas development due to decreased densities of predators, including coyotes, bobcats, owls, hawks, and eagles. In addition, increased predator control in an easily accessible landscape may be reducing densities of coyotes and bobcats in a fragmented landscape. The impacts of habitat fragmentation and dust deposition on pollinators and pollination success has not been assessed but may be significant. A recent surge of illegal cactus collections throughout the United States resulted in the listing of *S. cloverae* by CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) in Appendix I (threatened with extinction; CITES 2019). Unauthorized collection of this plant could further exacerbate the existing threats to this species. Population trend monitoring of transplanted and naturally occurring cacti demonstrated significant mortalities (74% and 62% respectively) over a 2- to 5-year monitoring period. Recruitment does not appear to offset documented mortalities.

#### ***Agalinis calycina* (Leoncita false-foxglove)**

*Agalinis calycina* is an annual herb restricted to alkaline wetland habitats called ciénegas. It is known from only two populations in the world, one from Texas (Pecos County), and one from New Mexico, at the Bitter Lake National Wildlife Refuge (NWR) in Chavez County. *Agalinis calycina* often grows in association with two other rare and endangered wetland plant species, the federally threatened Pecos

sunflower, *Helianthus paradoxus*, and the New Mexico State Endangered Wright's marsh thistle, *Cirsium wrightii* (currently under evaluation for listing under the federal Endangered Species Act). Although the number of plants at the Bitter Lake NWR was estimated over 300,000 individuals in 2018, the total area of ciénega habitat occupied by *A. calycina* at Bitter Lake NWR was only about 3.6 acres (Roth 2019). Occupied habitat encompassed 2.58 acres at the Diamond Y Spring Preserve in Texas in 2019, containing between 4,400 and 7,400 individuals. Even though *A. calycina* receives some level of protection at the Bitter Lake NWR, the New Mexico Rare Plant Conservation Strategy considers the species 'weakly conserved' due to a high to moderate threat score and an extremely limited distribution (EMNRD - Forestry Division 2017). NatureServe has assigned a global and state rank of G1/S1, critically imperiled, due to extreme rarity. *Agalinis calycina* is a federal Species of Concern and is currently under evaluation for Federal listing under the Endangered Species Act.

The most significant threat to *A. calycina* is alteration of the hydrology of rare aridland springs (Sivinski 2011). Aquifer depletion for agriculture and urban use have dried-up several large historic springs in the distributional range of *A. calycina* and continue to threaten some of the few remaining spring flows in Trans-Pecos Texas (Sivinski and Tonne 2011). Although the Texas population is located on a Nature Conservancy Preserve, oil and gas development occurs on the Preserve and the habitat is impacted by feral pigs (Roth 2020 in prep.). The New Mexico State Engineer's Office hydrologist believes that under current pumping levels the spring flows at Bitter Lake NWR would be threatened only under extreme drought conditions exceeding those historically observed (NMDGF 2005). The last decade has been the warmest on record for the state, with increasing trends in both extremely hot days and warm nights (NOAA National Centers for Environmental Information 2019). Historically unprecedented future warming is projected and drought intensity is expected to increase in the foreseeable future. In addition, the habitat of *A. calycina* may also be impacted by land use or modification of the natural plant community. In New Mexico the Bitter Lake NWR has historically been managed for wildlife, especially waterfowl, and only started considering rare plant species in its management activities in 1995 when the Pecos sunflower was proposed for federally listing as a threatened species (Sivinski 2011). Before that time, numerous dikes, water impoundments, drains, and water conveyance ditches were constructed for fish and wildlife habitat without consideration for the ciénega ecosystem, which has been severely impacted by refuge operations. The extensive water management systems at Bitter Lake NWR have significantly reduced and fragmented the natural ciénegas on the refuge and only very small portion of the remnant ciénega is currently suitable for, and occupied by, *A. calycina*. Other significant threats include the proliferation of the invasive species, specifically common reed (*Phragmites australis*) on the refuge, and the control of invasives (Sivinski 2011). Density and extent of *P. australis* have been noticeably increasing at Bitter Lake NWR, possibly in response to changes in temperature and drought intensity. This tall perennial grass forms dense rhizomatous patches that can shade and crowd-out other shorter and less robust species of plants, such as the annual *A. calycina*. Significant increases in *P. australis* density could render some parts of the already small habitat areas occupied by *A. calycina* at Bitter Lake unsuitable.

Although *A. calycina* is a Species of Concern for the State and the United States Department of the Interior, Fish and Wildlife Service (USFWS), plant Species of Concern rarely receive adequate governmental attention or funding towards their conservation needs. Therefore, the current status of *A. calycina* as a Species of Concern is inadequate to protect the species and begin the recovery of this

species which is more rare and more imperiled than other species within its habitat that are already federally and state listed as threatened and endangered. Most of the similar ciénega habitats in both Trans-Pecos Texas and southeastern New Mexico have either been destroyed or surveyed by botanists without finding additional populations (Sivinski and Tonne 2011).

#### ***Hexalectris colemanii* (Coleman's coral-root)**

*Hexalectris colemanii* is a recently described terrestrial, mycoheterotrophic orchid only known from the sky islands of southwestern New Mexico (Hidalgo County) and adjacent southeastern Arizona (Baker 2012). In New Mexico it is known from only one location, in the Peloncillo Mountains of Hidalgo County. It is listed as a Forest Service Sensitive Species. It is considered 'weakly conserved' by the New Mexico Rare Plant Conservation Strategy due to the very restricted range in New Mexico and the limited information available on threats and abundance within the state (EMNRD-Forestry Division 2017). NatureServe gives *H. colemanii* a global rank of G2 (imperiled) and a New Mexico state rank of S1 (critically imperiled). Although not specifically listed on the IUCN Red List of Threatened Species by CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora), essentially all wild orchids are considered protected by CITES under Appendix II (CITES 2019). CITES Appendix II lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled. Two other species of *Hexalectris*, *H. nitida* and *H. spicata* are already on the Endangered Plant list for the State of New Mexico (19.21.2.9 NMAC). Primary threats throughout its range include mining, grazing, illegal collecting, invasive species, and climate change.

#### ***Scrophularia macrantha* (Mimbres figwort)**

*Scrophularia macrantha* is a perennial herb only known to occur in Grant and Luna counties of New Mexico, where it grows on steep, rocky, usually north-facing igneous cliffs and talus slopes, and occasionally in canyon bottoms along streams in piñon-juniper woodlands and lower montane coniferous forests between 6,500 and 8,200 ft (NMRPTC 1999). *Scrophularia macrantha* is a BLM and a Forest Service Sensitive Species. NatureServe gives *S. macrantha* a global and state rank of G2/S2 (imperiled). The New Mexico Rare Plant Conservation Strategy gives an overall conservation score for the species of 'weakly conserved' due to the high levels of documented threats and the very limited distribution (EMNRD - Forestry Division 2017).

The majority of documented sites occur in the Black Range of the Gila National Forest. Two sites are known from BLM lands, from the Kneeling Nun at the Chino Mine in Grant County and Cooke's Peak in Luna County. Populations on BLM lands were last documented in 1997 (SEINet 2019). A total of 15 of the 22 documented sites in the Black Range were searched for in 2014, inside and outside the 2013 Silver Fire perimeter, which burned a significant portion of the known sites (Roth 2016). Only three of these 15 sites were relocated with extant plants. In 2014 fewer than 400 plants were documented from areas inside the fire perimeter and only 10 plants were found outside the fire perimeter. Except for one site, plants were largely scattered in small groupings of 25 or fewer plants per site. No documentation on the abundance of plants prior to the fire was available. In addition to fire severity impacts and canopy removal, much of the stream bank habitat of *S. macrantha* was significantly impacted by post-fire erosion, including stream bank scouring and incision, debris flows and large volumes of debris

deposition. Concerns over the long-term post-fire persistence of the species in severely altered habitats prompted additional surveys by the Forestry Division in 2018 (Roth 2018). Approximately 100 plants were documented during the 2018 surveys, 65 of which were found in burned areas. In 2014, there were between 170 and 270 individual plants documented from burned areas. The survey documented a distinct downward trend, especially at the site with the largest documented population which declined from 100 – 200 plants in 2014 to only 6 plants in 2018. In addition to wildfire, documented threats include mining, collections, and road maintenance activities. A recent proposal to expand the Chino Mine in Grant County included the known sites of *S. macrantha* on BLM lands. The current status of the species on the mine is unknown. *Scrophularia macrantha* was introduced to the native plant nursery trade in 1996 under the common name of Red Birds in a Tree. Seeds and plants of the species are widely available and can be purchased from several native plant nurseries and online. The degree to which plants and seeds are collected from the wild is unknown. One of the extant sites for *S. macrantha* occurs in the immediate vicinity of Highway 152. Until 2014 the site was thought to be extirpated, likely as a result of road maintenance activities, including herbicide use and mowing. Plants were found extant in 2014 and 2018, but the site remains vulnerable to vegetation treatments.

#### ***Castilleja ornata* (Swale paintbrush)**

*Castilleja ornata* is an annual herb in the figwort family (Scrophulariaceae). It is known from only one location in the United States, in extreme southwestern Hidalgo County, New Mexico. NatureServe ranks *C. ornata* as critically imperiled, globally and in the state of New Mexico (G1/S1). The New Mexico Rare Plant Conservation Strategy gives the species an overall conservation rank of ‘weakly conserved’ based on extreme rarity and documented threats (EMNRD-Forestry Division 2017). Searches for a few historical collection sites in Chihuahua have failed to locate a single extant population and it is presumed extinct in Mexico (NMRPTC 1999). In New Mexico, *Castilleja ornata* is only known from private lands. The species was originally documented in the United States from a single location, containing hundreds of plants in 1994 (McIntosh 1994; Egger 1994). A 2017 status survey of the known location and surrounding suitable habitat in Hidalgo County found only 2 plants (Roth 2017). Declines may have been caused by prolonged periods of drought since 1994 in combination with significant habitat alterations at the known site. Based on current knowledge, *C. ornata* is the rarest native plant in the state of New Mexico and might be functionally extinct. The USFWS determined in 2009 that listing the species as threatened or endangered may be warranted due to the present or threatened destruction, modification, or curtailment of its habitat or range resulting from improper grazing, or conversion to cultivated cropland (74 FR 66866). The species is currently under review for federal listing under the Endangered Species Act.

#### ***Castilleja tomentosa* (Tomentose paintbrush)**

*Castilleja tomentosa* is a hemiparasitic perennial herb in the figwort family (Scrophulariaceae). It is restricted to one general location (seven sub-populations) in the United States, in extreme southwestern Hidalgo County, New Mexico. It was originally described from adjacent Sonora, Mexico, and identified from the United States in 2012 (Egger 2012). In the United States plants are primarily found in open, relatively flat Chihuahuan Desert grasslands between 4,500 and 5,400 ft (NMRPTC 1999). NatureServe ranks *C. tomentosa* as critically imperiled, globally and in the state of New Mexico (G1/S1). The New

Mexico Rare Plant Conservation Strategy gives the species an overall conservation rank of ‘weakly conserved’ based on rarity and potential threats (EMNRD-Forestry Division 2017). *Castilleja tomentosa* is primarily known from private lands. One population has been documented from Coronado National Forest lands. Management of *Castilleja tomentosa* outside of private lands is solely the responsibility of the Coronado National Forest. Despite the fact that there is only one location known from public lands in the United States, it is not a Forest Service Sensitive Species and therefore does not receive special management considerations. In addition to the inadequacy of regulatory mechanisms, potential threats include climate change and associated ecological impacts, large scale herbicide treatments, and grazing. At least one of the seven known sub-populations is located in the immediate vicinity of the border and could be impacted by the construction of a border wall, access road, and related traffic. Most of the seven sub-populations contain a few to 100 plants, with two locations numbering as many as 1,000 plants (Roth 2017). Population trends are unknown.

#### ***Penstemon metcalfei* (Metcalf’s beardtongue)**

*Penstemon metcalfei* is a perennial herb in the plantain family (Plantaginaceae). It is restricted to a few sites in the Black Range of the Gila National Forest in Sierra County. It occurs on cliffs or steep, north-facing slopes and drainage bottoms in lower and upper montane coniferous forest between 6,600 and 9,500 ft (NMRPTC 1999). It is a Forest Service Sensitive species. NatureServe considers *P. metcalfei* critically imperiled, globally and statewide (G1/S1). The New Mexico Rare Plant Conservation Strategy gives *P. metcalfei* a conservation rank of ‘weakly conserved’ due to high scores of documented threats and a very limited distribution (EMNRD-Forestry Division 2017).

Prior to the 2013 Silver Fire *P. metcalfei* was known from five sites, all of which burned (Roth 2016). Post-fire searches in 2014 found plants in three of the five known locations, totaling 138 plants in all sites. No plants were found at or near the type locality in Trujillo Canyon, where thousands of plants were previously reported. This site had severely burned and experienced extreme flooding and debris deposition on the drainage floor following the 2013 fire. The majority of the occupied habitat of *P. metcalfei* burned moderately to severely in the Silver Fire. In addition to fire severity impacts and canopy removal, much of the stream bank habitat of Metcalfe’s penstemon was significantly impacted by post-fire erosion, including stream bank scouring and incision, debris flows and large volumes of debris deposition. The current status of the species is unknown but suspected in decline due to significant alterations to the habitat caused by the fire. Although all known locations are in remote areas, threats include wildfires, fire suppression activities, post-fire restoration activities, trail maintenance, and habitat alterations caused by climate change and wildfires.

#### ***Linum allredii* (Allred’s flax)**

*Linum allredii* is a long-lived suffrutescent perennial plant in the flax family (Linaceae). It is only known from one population in southern Eddy County, New Mexico, and one in adjacent Culberson County, Texas. It is restricted to the Permian Castile Formation in the Chihuahuan Desert ecoregion southwest of Carlsbad Caverns/Whites City, at about 3,900 ft (NMRPTC 1999). All known occurrences of *L. allredii* are within the Yeso Hills portion of the Castile Fm/Gypsum Plain (Howard 2019). The majority known sites in New Mexico occur on BLM lands (86%) with the remainder located on state trust lands (EMNRD-



Forestry Division 2017). It is estimated that suitable habitats comprise no more than 10-15 percent of the Yeso Hills (Howard 2019). *Linum allredii* is a BLM Sensitive Species. NatureServe gives *L. allredii* a global and state rank of G1/G2 S1/S2 (critically imperiled/imperiled). The New Mexico Rare Plant Conservation Strategy gives an overall conservation score for the species of 'weakly conserved' due to documented and potential threats, and a very limited distribution (EMNRD-Forestry Division 2017).

Potential habitat in Texas appears to be extensive. Limited surveys of the Gypsum Plain in Texas dating from the 1960s to 2018 have not documented new locations of *L. allredii* other than the known location associated with the Yeso Hills on Texas Ranch Road 652 (Howard 2019). However, further survey and documentation of *L. allredii* in Texas may never occur due to severe limitations for access to private lands. Because of this, New Mexico has primary responsibility for the conservation of *L. allredii*.

The plant can be common within occupied habitat, but occupied habitat is quite limited (Howard 2019). The known population of *L. allredii* occurs within a five by eight mile area totaling approximately 10,000 ac. (but includes large areas of non-habitat) and is located primarily in New Mexico. The population comprises two general population segments or patches containing 400 discrete observation or collection sites and 3.3 miles of occupied linear habitat. Habitat for *L. allredii* was modelled by the BLM for use in NEPA analyses. Total area of the model predicted habitat was 23,221 acres, of which 19,526 acres is on BLM surface lands. Total known occupied habitat is estimated to be 1,250 acres. Little additional survey and study has been completed for this species since description in 2011 (Sivinski and Howard 2011). There is no data on population trends.

Threats to *L. allredii* include oil and gas development, herbicide treatments, mining, grazing, and recreation. Climate change and associated ecological impacts may be an additional threat impacting the entire range of the species (EMNRD-Forestry Division 2017). Because the majority of occupied habitat occurs on public land, the primary conservation responsibility resides with the BLM. Conservation of sensitive species is largely guided by BLM policy under BLM Manual 6840 Special Status Species Management and by Resource Management Plans (RMP). Currently the BLM, Carlsbad Field Office is preparing to finalize a revision of its RMP. A number of alternative natural resource conservation measures have been proposed in the RMP that could be of some benefit to the Yeso Hills area. However, it is expected that many, if not all, of these measures will be foregone in support of minerals development (Howard 2019). Even if enacted it appears that virtually all of the conservation measures proposed would have minimal ability to conserve sensitive resources. For example, many of the proposed ACEC management decisions include withdrawal from the mining laws. Such withdrawals are expensive and technically complicated and require either Secretarial or Congressional approval. In practice, such withdrawals are rarely completed.

Ability to protect natural resources from oil and gas development is extremely limited, as leasing conveys a property right to develop with policies severely limiting the ability of the agency to deny or move activities or facilities more than 200 meters unless specific protective stipulations are incorporated into the lease when the lease is issued. The conservation of rare plant resources may come down to the ability of the local staff and managers to work with companies on a project by project basis. Oil and gas development is a significant threat to *L. allredii* due to the ongoing intensive exploration and development of newly documented significant oil and gas reserves in the Permian Basin

(including the Delaware Basin in New Mexico and Texas). BLM data indicates 88% of modelled habitat is leased for oil and gas development (Howard 2019). State trust land minerals development usually follows a pattern similar to BLM. Approximately 14% of known occurrences are on lands owned and managed by the State Land Office (EMNRD-Forestry Division 2017). Development of wells continues to occur within modelled habitat. Exploratory work includes the conduct of seismic exploration using large off-road vehicles in extensive gridded patterns. Infrastructure supporting oil and gas production can be extensive and includes roads, powerlines, pipelines, work, and storage areas. Some other effects noted in oil and gas areas include dust emissions from roads covering plant resources within a few hundred feet of active roadways. Also, survey crews that survey new facility locations (such as well pads) typically drive off road (even in closed areas), thus creating some resource disturbance and also potential for unintended establishment of new roads later used by recreationists. Currently BLM is proposing to establish dedicated 300 ft wide right-of-way corridors supporting oil and gas development within the modelled habitat of *L. allredii* extending more than 24 miles and causing approximately 414 acres of total disturbance. Portions of the proposed corridors cross occupied and potential habitat. If constructed, the corridor will significantly disturb the type locality of *L. allredii*.

Landscape scale herbicide treatments have potential to cause mortality of shrubs and subshrub plants over large areas if not avoided. At least one herbicide treatment has occurred in vicinity of modelled habitat.

Grazing is pervasive across the landscape and has many direct and indirect effects to plants and their habitat. The most severe impacts from grazing occur near watering and corral facilities, of which several occur within and near *L. allredii* habitat. One instance of heavy grazing use of *L. allredii* plants has been noted.

Mining in the Castile Fma. is currently targeted to develop economically viable deposits of gypsum and sulfur. There is one small, apparently inactive, gypsum mine within modelled habitat. Sulfur mining in the Castile Fma. currently occurs only in Texas. However, discovery of commercial deposits gypsum, sulfur, or unexpected other minerals could rapidly change the threat level. It is expected that mining for gypsum and sulfur would be guided by regulations under the Mining Laws of 1872, which are treated minimally under NEPA (and include non-discretionary approval for small activities less than five acres in size).

Protective designations for *L. allredii* are limited to listing as a BLM Sensitive Species with policy protections in BLM Manual 6840. A portion of the *L. allredii* Hay Hollow population occurs in the Yeso Hills Research Natural Area (RNA). However, the RNA designation is proposed to be dropped with completion of the RMP; none of the RMP decisions for the RNA (including No Surface Occupancy stipulations) were ever implemented. The existing Chosa Draw Cave ACEC on the northern extent of the Yeso Hills, which contains potential but not modelled habitat, would continue to be designated; though management of the area could vary depending on the final decision. Two new ACECs in the potential habitat are under consideration in the RMP, but actual designation of either is considered unlikely. Even if designated, the likelihood of adding planning decisions that actually protect the values for which the area was nominated is even more unlikely. No other protective areas exist or are expected to be designated in the foreseeable future.

Recreation impacts have been increasing within the modelled habitat. Activities are primarily camping (usually along existing roads) and hunting. Hunting includes camping impacts, but can lead to off road vehicle impacts when new roads are established through illicit hunting from vehicles or off-road retrieval of downed game (precluded by state rules where OHV use is closed by the landowner or manager). Camping impacts may also be related to the proximity of two national parks and the ability for visitors to camp on public land free and with little control.

Current activities, as summarized above, constitute a threat to the continued existence of *L. allredii*. This species is rare in terms of distribution and although populations may large, it is believed that unregulated disturbances of the limited habitat could adversely impact it and potentially jeopardize the species' survival. State listing as endangered would support long term protection of the species through cooperative focus on avoiding taking and potential impacts, and expanded ability to survey and monitor the population.

### ***Cymopterus spellenbergii* (Spellenberg's springparsley)**

*Cymopterus spellenbergii* is a perennial herb in the carrot family (Apiaceae). It is endemic to north-central New Mexico where it is known from three centers of distribution on the Taos Plateau in Rio Arriba and Taos counties (NMRPTC 1999). The northern occurrence consists of four sites in central Taos County within an area of six square miles. The southern occurrence consists of six sites between southwest Taos County and southeast Rio Arriba County within an area of 60 square miles. The western occurrence consists of one site in south-central Rio Arriba County 35 miles northwest of the of the southern occurrence. *Cymopterus spellenbergii* is typically found growing on basalt of the Servilleta Formation. It can also occur in sandy draws below volcanic caprock along adjacent canyon rims. Areas with suitable habitat on public lands between the two centers of distribution and immediately adjacent to the Rio Grande have been unsuccessfully searched for additional populations.

*Cymopterus spellenbergii* occurs on BLM, Forest Service, and private lands. It is a BLM Sensitive Species. NatureServe gives *C. spellenbergii* a global and state rank of G2/S2 (imperiled). The New Mexico Rare Plant Conservation Strategy gives an overall conservation score for the species of 'under conserved' due to potential threats and a very limited distribution (EMNRD-Forestry Division 2017).

Although *C. spellenbergii* can be locally common, the main threats to the species are grazing, vegetation treatments (e.g. forest thinning, landscape wide herbicide application), and fire, including fire suppression activities and post-fire reclamation (NMRPTC 1999). These threats have the potential of impacting the entire range of the species and can therefore have a significant impact in the absence of meaningful protection measures. The species has not been studied extensively, warranting close monitoring for the impacts of management actions on this species. Although BLM Manual 6470 provides some protections for BLM Sensitive Species, management actions providing protection for the species for recent vegetation treatment projects on the BLM managed lands of the Rio Grande del Norte National Monument have been limited and may have impacted the species significantly (Sivinski 2017). The Forest Service does not recognize the species as a Sensitive Species. Therefore, no protections are provided for management actions implemented by the Forest Service. In addition to the inadequacy of

regulatory mechanisms, other potential threats include climate change and associated ecological impacts such as increased fire frequency and fire severity and increased competition for invasive species.

**NAME CHANGES:**

The following will remain listed as a state endangered plants, but the names should be changed in accordance with current taxonomy.

*Coryphantha robustispina* ssp. *scheeri* replaces *Coryphantha scheeri* var. *scheeri* (Zimmerman and Parfitt 2004)

*Argemone pinnatisecta* replaces *Argemone pleiacantha* ssp. *pinnatisecta* (Cervantes et al. 2010)

*Hexalectris arizonica* replaces *Hexalectris spicata* (Kennedy and Watson 2010)

  
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Daniela Roth

  
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Date

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