BEFORE THE SECRETARY OF INTERIOR

PETITION TO LIST THE THICK-LEAF BLADDERPOD (*PHYSARIA PACHYPHYLLA*) AS A THREATENED OR ENDANGERED SPECIES UNDER THE ENDANGERED SPECIES ACT AND TO CONCURRENTLY DESIGNATE CRITICAL HABITAT

CENTER FOR BIOLOGICAL DIVERSITY

MARCH 11, 2021

NOTICE OF PETITION

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Pursuant to Section 4(b) of the Endangered Species Act (ESA), 16 U.S.C. § 1533(b); section 553(e) of the Administrative Procedure Act (APA), 5 U.S.C. § 553€; and 50 C.F.R. § 424.14(a), the Center for Biological Diversity, Montana Native Plant Society, and the Pryors Coalition hereby petitions the Secretary of the Interior, through the U.S. Fish and Wildlife Service (USFWS), to protect the thick-leaf bladder pod (*Physaria pachyphylla*) as a threatened or endangered species under the ESA.

This petition requests listing of the thick-leaf bladder pod based on the immediate threat of gypsum mine exploration and likely development in its limited range. Petitioner also requests that critical habitat be designated concurrently with the listing, pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12.

The USFWS has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on USFWS. USFWS 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). USFWS must make this initial finding "[t]o the maximum extent practicable, within 90 days after receiving the petition."

The Center for Biological Diversity ("Center") is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law, supported by more than 1.7 million members and online activists. The Center works to secure a future for all species, great or small, hovering on the brink of extinction. The Montana Native Plant Society is a non-profit organization dedicated to preserving, conserving, and studying Montana's native plants and plant communities, and educating the public about the values of our native flora and its habitats. The Pryors Coalition is a collaboration of organizations and concerned individuals with a strong desire to preserve and conserve the vulnerable natural and cultural resources of the Pryor Mountain landscape for future generations to enjoy.

We submit this petition on behalf of our staff and our members who hold an interest in protecting the thick-leaf bladderpod and its habitat.

Submitted this 11 day of March 2021

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EXECUTIVE SUMMARY

The thick-leaf bladderpod is a rare, tiny, yellow-flowered vascular plant. It is only found in one sub-basin of southern Montana's Pryor Desert, the northernmost extension of Bighorn Basin, at the base of the Pryor Mountains. There are nine subpopulations of the plant that are thought to interbreed. This perennial plant is endemic to a specific substrate of red, pink and white soil made of limestone, sandstone and diatomaceous earth. The thick-leaf bladderpod currently occupies a small region in an area recognized by the Bureau of Land Management (BLM) as an Area of Critical Environmental Concern (ACEC) for its community of globally rare plants.

Despite being found in a BLM protected area, the thick-leaf bladderpod is under imminent threat from gypsum mining development. The BLM has recently opened the ACEC for gypsum mining exploration amid the largest documented subpopulation of the plant, which would cause vegetation removal and soil degradation due to drilling, excavation, road building, and road traffic. A draft environmental assessment noted that uncontrolled mortality of the thick-leaf bladderpod as related to this project can lead to extinction, due to the plant's small ecological niche. The unique habitat and soil structure of the thick-leaf bladderpod does not respond well to outside disturbances. The thick-leaf bladderpod warrants listing as a threatened or endangered species as it is threatened by gypsum mining, including impending exploration for the proposed McKamy Gypsum Mine, as well as off-road vehicles and invasive plants.

I. INTRODUCTION

The thick-leaf bladderpod (*Physaria pachyphylla*) was first recognized as a novel species in July 1998 (Grady and O'Kane 2007, p. 187). With tiny, vibrant yellow flowers and thick basal leaves, the thick-leaf bladderpod is found at lower elevations in one sub-basin of the Pryor Desert (Grady and O'Kane 2007, p. 187), at the base of the Pryor Mountains, in reddish-pink desert soils derived from sandstone, limestone and diatomaceous earth (Holloway 2020, p. 2) (Cross 2010, p. 9). The Pryor Mountains of southern Montana are unique sub-alpine prairie plateaus formed by erosion of uplifted limestone, rising from the prairies that are deeply cut by rugged limestone canyons (Pryors Coalition 2020, p. 1). There are seven species of *Physaria* endemic to Montana (Cross 2010, p. 8) and all are restricted to sparsely vegetated rocky outcrops that are so unaccommodating that only a few plants can tolerate the difficult growing conditions (Clark 2013, p. 9-10; Fertig 1998, p. 15-16, 19; Grant et al 2012, p. 65; Lesica 2012, p. 217). Further, the thick-leaf bladderpod grows in a cryptobiotic soil crust which can only be found under extreme conditions: high and low temperatures, long-lasting dry periods, and excessive sun exposure (Büdel 2001, p. 141; Lange 2001, p. 217). Many *Physaria* species specialize in rare and harsh habitats with four other *Physaria* plants are already considered threatened or endangered in the United States (USFWS 2020, p. 69). Recognizing the large concentration of sensitive plant species and rare plant communities, in 2009 the Bureau of Land Management (BLM) designated 2,606 acres as an Area of Critical Environmental Concern (ACEC) known as the Pryor Foothills Research Natural Area (RNA) (Holloway 2020, p. 1).

Due to the thick-leaf bladderpod's small range and population size, BLM has designated it as a sensitive species and the Montana Natural Heritage Program has listed it as a species of

concern (USDOIa 2020, p. 16). The likelihood of new discoveries of additional populations is extremely low because of the unique substrate and specific habitat of the thick-leaf bladderpod. The loss of any plants could be detrimental to its success. This endemic and hardy species is under significant and immediate threat from gypsum mining and exploration, as well as the threat of invasive plants and off-road vehicles (ORVs). Vehicle activity and digging associated with gypsum exploration will lead to soil compaction and alteration, and likely direct removal of thick-leaf bladderpod plants. The exploration would also increase the threat of invasive plants and ORV activity due to improvements to existing roads. The Regional Management Plan approved by the BLM's Billings Field Office recommended in 2015 that the area be closed to mining due to its large concentration of sensitive plant species (USDOI 2015, p. 3-101). While the habitat is considered an ACEC in part to manage and protect seven sensitive bureau plant species including the thick-leaf bladderpod (Taylor et al 2009, p. 2), the thick-leaf bladderpod is still threatened as the recommendation has not been approved. To conserve this important plant, the Service should list the thick-leaf bladderpod as endangered and designate critical habitat for the species.

II. NATURAL HISTORY

A. Taxonomy, Description, and Life Cycle

i. Taxonomy

Physaria pachyphylla O'Kane and Grady, the thick-leaf bladderpod, is a vascular plant in the mustard family Brassicaceae and is considered a valid species by the Integrated Taxonomic Information System (ITIS 2020). The thick-leaf bladderpod had originally been collected in 1991 by Peter Lesica and identified as *Lesquerella alpina* var. *spatulata* and was later recognized as a novel taxon by O'Kane in 1998 (O'Kane & Grady 2007, p. 187). In 2002, all *Lesquerella* species were transferred to the genus *Physaria* based on molecular analysis of evolution histories (Grant et al 2012, p. 63; Cross 2010, p. 8). *Physaria* has the most endemic species of any plant genus in Montana and the various species can be differentiated by their basal leaves and fruits (Cross 2010, p. 8).

ii. Description

The thick-leaf bladderpod is named for its thick basal leaves and has small yellow flowers with four petals, four sepals and six stamens (Cross 2010, p. 8) that form a solitary inflorescence at the end of the stem. The bladderpod is a perennial, loosely mounded plant approximately 2-15 cm tall and 7-25 cm wide (Lesica 2012, p. 217) with a rosette-like growth form (Grady and O'Kane 2007, p. 187). The thick-leaf bladderpod's small yellow flowers have a solitary inflorescence at the end of the stem and bloom for a few weeks in June (Cross 2010, p. 8). The plant also has curved fruiting pedicels and somewhat cupped basal leaves nearly one mm thick, densely covered by trichomes, or fine hairs (Grady and O'Kane 2007, p.187; Cross 2010, p. 9) (Figure 1). The thick-leaf bladderpod resembles Lesica's bladderpod (*Physaria lesicii* (Rollins) O'Kane and Al Shehbaz), which grows in higher elevations in the Pryor Mountains, except that it has curved ascending fruiting pedicels with more robust basal leaves (Cross 2010, p. 9). Due to this similarity, it is more easily identified when it fruits in mid to late summer (USDOIa 2020, p. 13).

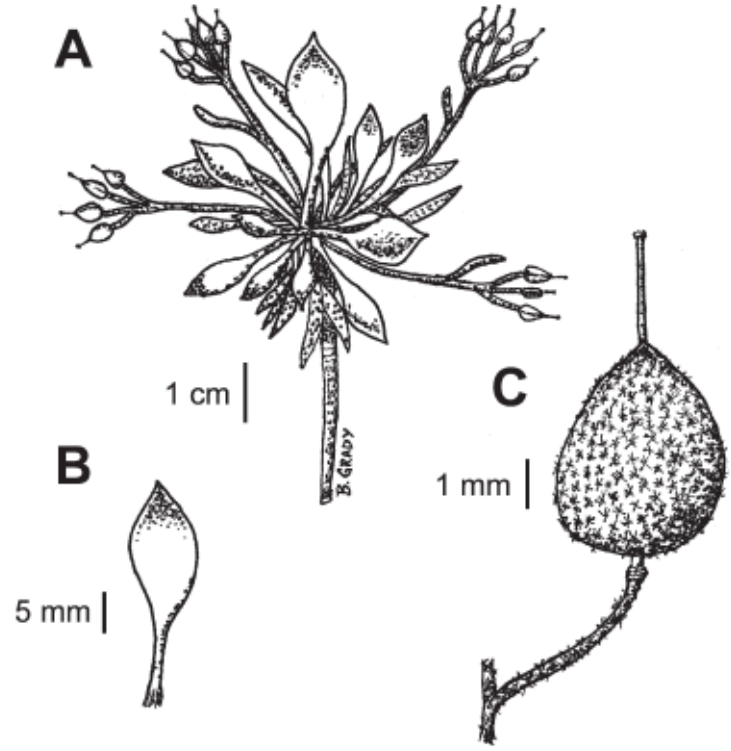

Figure 1: *Physaria pachyphylla*: (A) Plant, (B) Basal leaf, (C) Silicle and fruiting pedicel (Grady O'Kane 2007, p. 188)

iii. Life cycle

The reproduction of the thick-lead bladderpod has not specifically been studied, but information can be gleaned from other *Physaria* species. Many species within the family Brassicaceae require outcrossing by pollinators for successful reproduction (Clark 2013, p. 3, 12, 18) and most *Physaria* are cross-pollinated by insects (Cross 2010, p. 8). *Physaria* species tend to have high seed production, a high germination rate, and the seeds remain viable for multiple years (Grant 2012, p. 63, 64, 68- 70, 73). This high fruit set is likely an adaptive response to the unpredictable resources and dry conditions preferred by the species (Grant 2012, p. 71). *Physaria* species also tend to have limited mechanisms for seed dispersal and not all seeds emerge at the same time, which is likely due to the harsh and barren conditions of the habitat (Grant, 2012, p. 63, 67, 68-70, 73). Seed dormancy may even be adaptive, as it allows seeds to synchronize their germination with environmental conditions that will favor growth and reproduction while reducing germination during unfavorable conditions, such as is seen in *P. ludoviciana* and *P. fendleri* (Grant 2012, p. 64, 73).

B. Habitat

The thick-leaf bladderpod occurs in the Pryor Mountain Desert at the north end of Bighorn Basin in south-central Montana, on the border of Wyoming (DeVelice and Lesica 1993, p. 6). It is found at elevations between 4,265 – 5,250 feet above sea level on exposed slopes, ridges,

and valleys in barren areas of unusual red, pink, and white soils derived from limestone, sandstone, and diatomaceous earth (Grady & O'Kane 2007, p. 187; Cross 2010, p. 9; Lesica 2012, p. 217) (Figures 2a and 2b). The area receives only 8-12 inches of precipitation yearly (DeVelice and Lesica 1993, p. 7). The thick-leaf bladderpod grows in a globally rare plant community known as the *Atriplex-nuttallii/Artemisia spinescens* shrubland that occurs on broad alluvial plains dominated by low shrubs and sparse vegetation (DeVelice and Lesica 1993, p. 28, 39), leaving the bladderpod with minimal competition for light, water, nutrients, or physical space (Grant 2009, p. 3; Clark 2013, p. 9; Fertig 1998, p. 15,25).

Figures 2a and 2b: habitat of thick-leaf bladderpod in Pryor Foothills RNA (Holloway 2020)

The thick-leaf bladderpod grows in fine-textured soil of cryptogamic crusts, a brittle layer of cyanobacteria, lichen, algae, fungi, and moss formed over unvegetated areas between plants in undisturbed and semi-arid regions (DeVelice and Lesica 1993, p. 28; Fike 2019, p. 1). Cryptogamic crusts take decades to form and are considered soil builders: they absorb water, provide nitrogen and other nutrients to plants, protect the soil from erosion, and are important to the establishment and growth of the thick-leaf bladderpod (Fike 2019, p. 1). Further, the thick-leaf bladderpod grows in a soil subgroup called Typic Torriorthents (DeVelice and Lesica 1993, p. 28), which is very dry and highly susceptible to erosion (OALS 2001, p. 1).

C. Historical and Current Distribution and Abundance

Suitable habitat for the thick-leaf bladderpod is concentrated in a small, approximately 60 km² portion of the Pryor Mountain Desert and the Montana Natural Heritage Program has documented nine subpopulations since 1983 (Grady and O'Kane 2007, p. 187; Montana Field Guide 2020, p. 1). There is also a tenth potential subpopulation in the furthest western part of the thick-leaf bladderpod's proposed range, but experts have indicated this incidence likely represents another species, *P. spatulata*, since no specimen was collected and the habitat is different from the requirements of the thick-leaf bladderpod (Lesica and Mincemoyer personal comms, 2020). The number of individual plants has been estimated for one subpopulation found in the Pryor Foothills RNA/ACEC only and is 149 (Figure 3) (Montana Natural Heritage Program, 2020; Lesica 2012, p. 217).

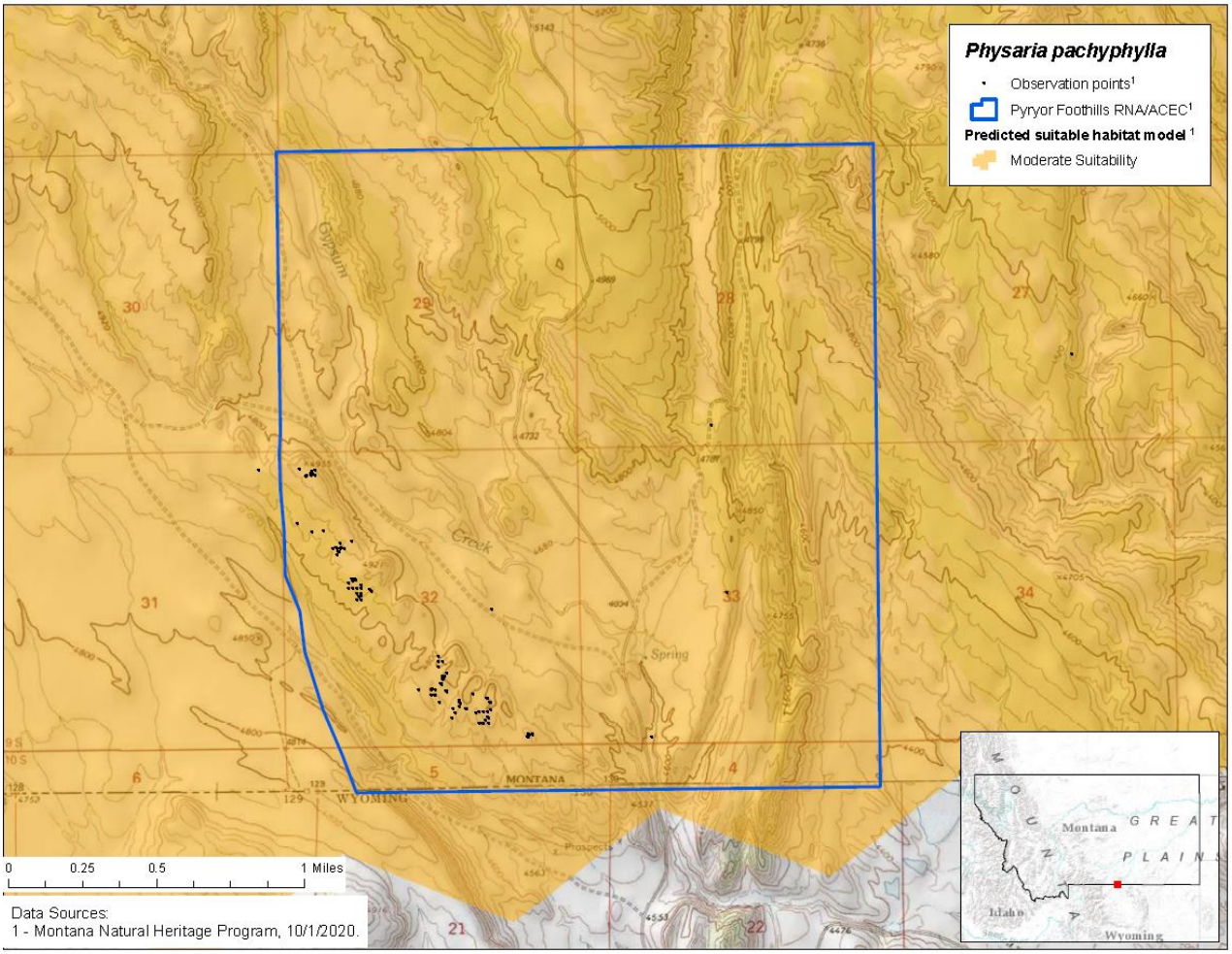

Figure 3: Only *Physaria pachyphylla* subpopulation with an estimated known number of plants, within the Pryor Foothills RNA/ACEC.

D. Conservation Status

NatureServe classifies the thick-leaf bladderpod as imperiled (G2S2), limited to just a few subpopulations (NatureServe 2020). NatureServe defines its G2 and S2 categories as “Imperiled – at high risk of extinction or collapse due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors” and “at high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors” (NatureServe 2020). The thick-leaf bladderpod is a BLM sensitive species and a Montana species of concern (Montana Field Guide, 2020, p. 1). This designation is for native species that are at-risk due to declining population trends, threats to their habitats, or restricted distribution and provides information that is meant to help resource managers make proactive decision regarding species conservation and data collection priorities (Montana Field Guide, 2020).

III. THREATS

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

i. Gypsum Mining

The McKamy Exploration Project will be developed in the Pryor Foothills RNA/ACEC where there is a concentrated amount of thick-leaved bladderpod individuals. The proposed project area is right in the middle of the largest documented subpopulation of the thick-leaf bladderpod (Figure 4) (USDOIa 2020, p. 20). BLM acknowledges that mining by the GCC-McKamy Mine is likely and foreseeable, with exploration considered for summer 2021 (USDOIa 2020, p. 20) with the goal of the exploration to determine the extent of gypsum deposit within the RNA/ACEC (Plan of Operations 2020, p. 2).

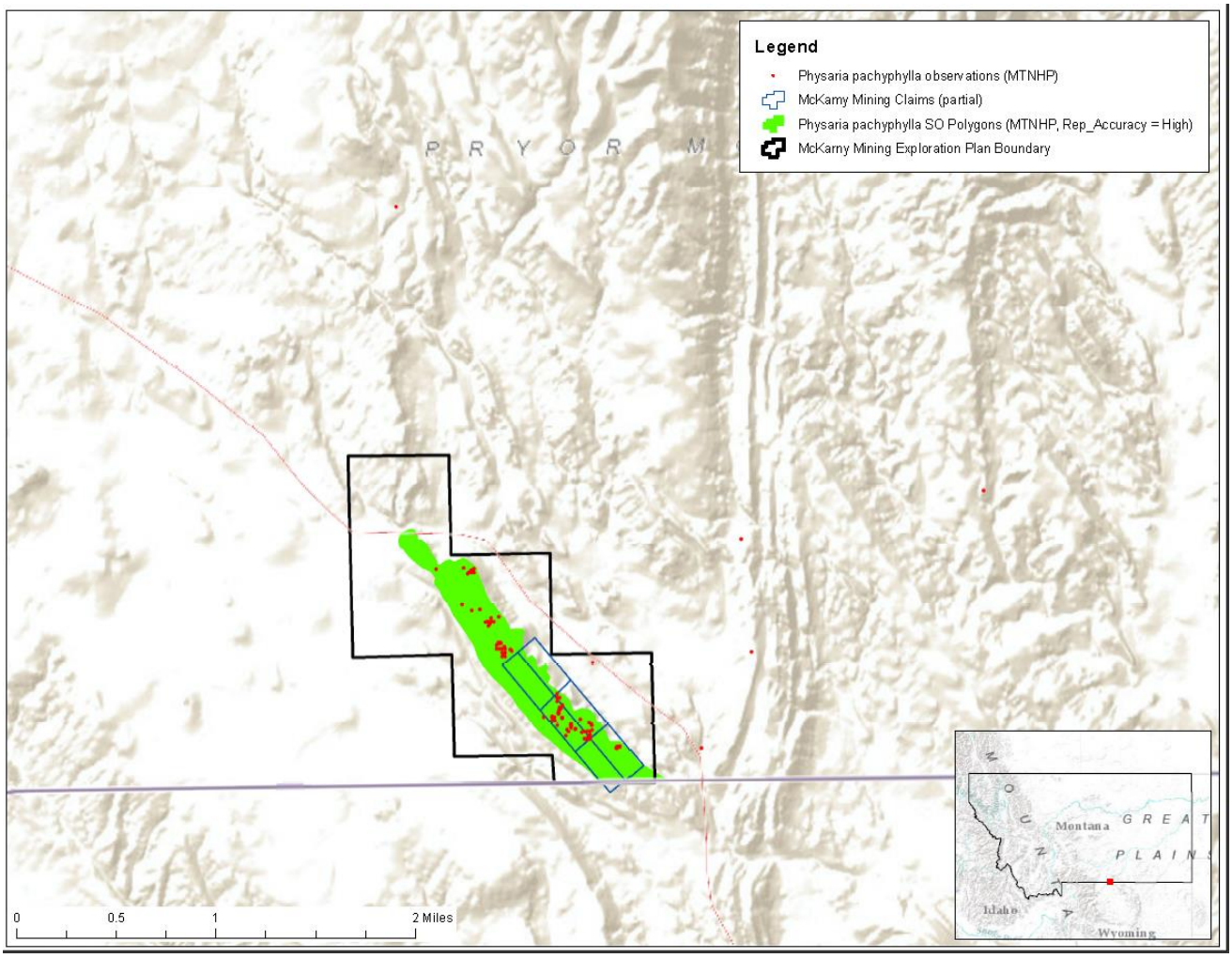

Figure 4: Individual species observations of the thick-leaf bladderpod within the gypsum exploration plan boundary.

As outlined in the GCC-McKamy Mine Plan of Operations, the exploration project will use a Geosonic drill rig to drill seven holes to a maximum of 70 feet each and three holes to a maximum of 200 feet deep, totaling 95.5 ft^3 taken from the area for testing to determine the extent of gypsum (Plan of Operations 2020, p. 2). Thick-leaf bladderpods are found in eight of the ten gypsum exploratory claims (Figure 5) (USDOIa 2020, p. 16, 17). While the plan of operations attempts to minimize the impact to the thick-leaf bladderpod and its habitat, direct mortality will occur (USDOIa 2020, p. 20), threatening an already rare plant. The draft Environmental Assessment (EA) for the mining exploration concluded that "some unavoidable impacts to (thick-leaf bladderpod) populations through disturbance, invasive species introduction, and direct mortality on proposed routes and overland travel could occur" (USDOIa 2020, p. 20).

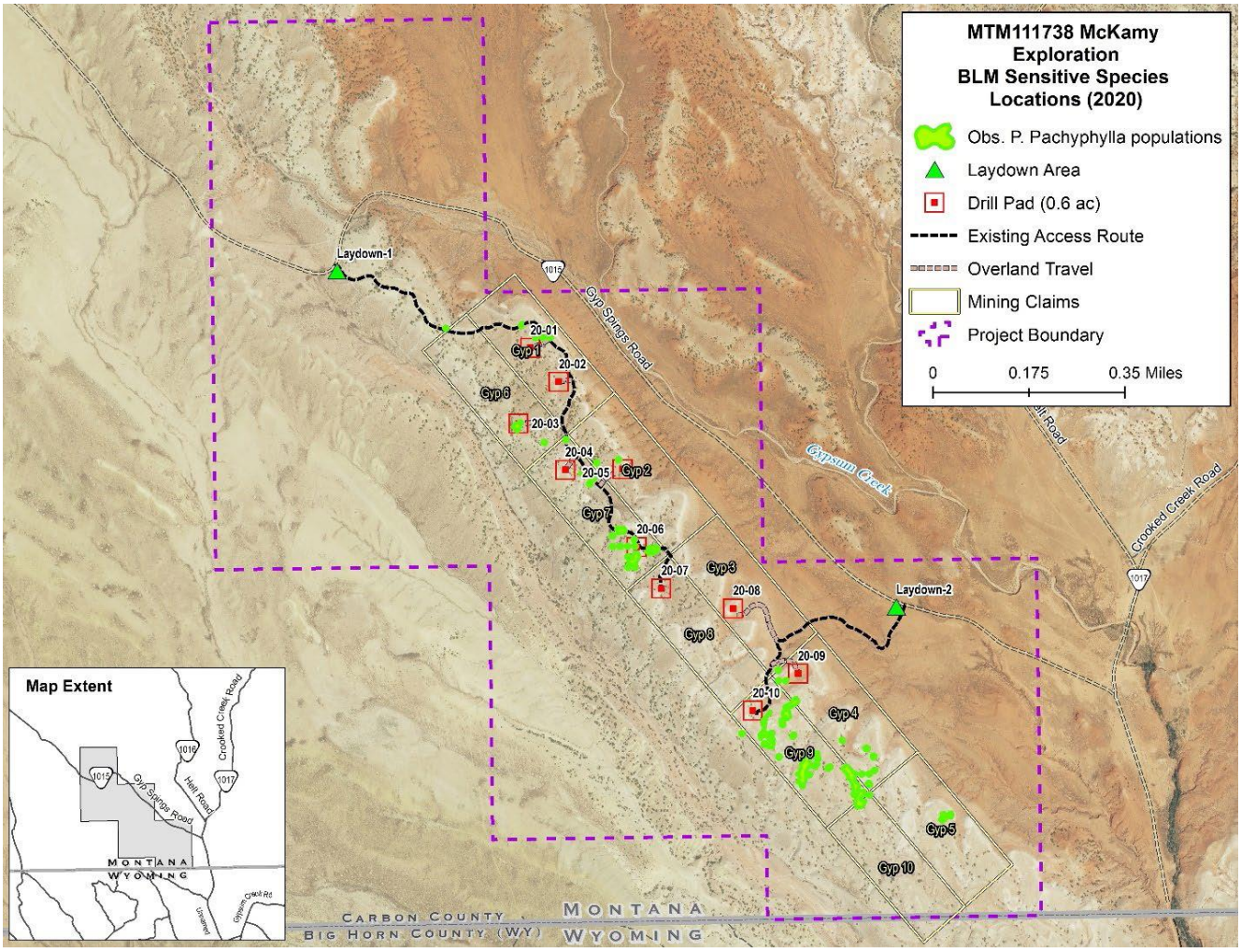

Figure 5: 2020 survey mapped locations of *Physaria pachyphylla* in proposed routes and drill sites.

As outlined below, we further conclude that gypsum exploration and mining, along with access roads, will have a range of deleterious impacts on the bladderpod and the fragile ecosystem in

which it occurs, including destruction of cryptogamic crusts, soil compaction, and erosion. Secondary and additive effects from exploration and mining include the introduction of invasive species and increased off-road vehicle use.

Soil Loss, Compaction, and Erosion cause by Road Construction and Use

Thick-leaf bladderpods are found along the proposed roads to all but two of the ten gypsum claims (Figure 6) (Holloway 2020, p. 3). The project plans a major upgrade of 8,210 feet of almost reclaimed two-track trail, as well as creating 1,944 feet of new temporary roads, totaling close to 3 acres of road construction (USDOIa 2020, p. 1, 7, 10-11). These roads would be regularly travelled by a rotary sonic drill rig, a semi-truck to haul a geo-probe and water tank, a one-ton pickup truck with a trailer for a telehandler, an all-wheel drive vehicle, and an excavator (Plan of Operations 2020, p. 3). When the mine is developed, these roads would be maintained and used by heavy trucks for the lifespan of the mine, leading to direct mortality of the thick-leaf bladderpod. Further, soil compaction and erosion from the exploration and mining would destroy the habitat of the thick-leaf bladderpod due to the makeup of the biotic soil crusts, low precipitation, aridness of the desert environment, and steep slopes created from water and wind erosion over time (Holloway 2020, p. 2).

Fig. 6: Examples of thick-leaf bladderpod growing on routes to and on Gyp claim 4 and 5.

Specifically, heavy equipment from vehicles driving back and forth from the exploration site would amplify damage the cryptogamic soil structure already experienced by the road construction (Figure 7) (DeJong-Hughes 2018, p. 1). Undisturbed cryptogamic crusts, which prevent erosion and increases nitrogen availability in the soil, can easily be destroyed by vehicles (Fike 2019, p. 1). Once damaged, it can take up to 100 years for crusts to recover from disturbances (Fike 2019, p. 1). The thick-leaf bladderpod relies on cryptogamic crusts for survival; loss of these crusts would affect seedling germination, water retention and additional nutrient retention for the thick-leaf bladderpod as cracks in the crust provide germination sites and spaces for water and other nutrients (Figure7) (Fike 2019, p. 1). Any changes to the crust that supports life for the thick-leaf bladderpod could be detrimental to its existence.

Figure 7: cryptogamic soil crust at Gyp site 10. Cracks in the crust provide space for germination, water, and other nutrients.

Due to erosion, drought, and rooting depth vehicle compaction will also lead to soil and plant destruction, which both the soil and the thick-leaf bladderpod are poorly suited to handle and recover from (USDOIa 2020, p. 6; Soil Survey Reclamation 2020, p. 3-4). An existing two-track trail has already shown signs of erosion (USDOIa 2020, p. 7) and lays next to an older trail that has completely eroded (Figures 8 and 9) (Holloway 2020, p. 5). Soil surveys that have been done to assess erosion hazards state that the area surrounding the two-track trail is severely eroded and more erosion is likely (Soil Survey Erosion 2020, p. 4).

Figure 8: Downslope view of 2-track that leads to project site (connecting to Gyp Springs Rd in background). Older, eroded ruts on left and newer tracks on right.

Figure 9: Upslope view of 2-track that leads to project site. Older, eroded ruts on right and newer tracks on left.

Soil compaction changes pore space size, distribution, and soil strength, impeding root elongation and nutrient uptake (DeJong-Hughes 2018, p. 2; Bockstette et al 2017, p. 686). This reduced pore space and lack of pore continuity can have wide-ranging implications for water-holding capacity, oxygen availability, and increased risk of drought stress, producing adverse conditions for the thick-leaf bladderpod (Bockstette et al 2017, p. 686). The thick-leaf bladderpod will have restricted access to water and nutrients, producing adverse conditions for the survival of the plant.

Invasive Species

The combination of lost cryptogamic crusts, altered nitrogen and carbon dioxide, and ground disturbances from mining vehicles would alter the biotic community and favor invasive grasses in the thick-leaf bladderpod's habitat (Smith et al 2009, p. 36 and 37). Gypsum soils naturally resist invasion (Abella et al 2007, p. 221), but disturbances from mechanical traffic and soil disruption make them more susceptible to invasion by non-native plants (Holloway 2020, p. 2). Non-native grasses will quickly colonize bare soil, many with oversized and dense root systems to pre-emptively occupy as much space as possible to prevent competition for water and nutrients with other plants (Bockstette 2017, p. 686). It would be a major threat to the thick-leaf bladderpod if invasive plant species got a foothold in the bladderpod's small range.

While the area being considered for gypsum exploration is supposed to be monitored and patrolled annually by the Carbon County weed district, and spot treated as needed for invasive plants (USDOIa 2020, p. 13), local experts have stated that this is only along the main Gyp Springs Road and not within the specific project area (Walton 2020, personal comms). The area immediately to the east of the ACEC/RNA (the basin containing Gyp Springs Rd) has large populations of non-native species such as cheatgrass (*Bromus tectorum)*, African mustard (*Strigosella africana)*, saltlover (*Halogeton glomeratus)*, and prickly Russian thistle (*Salsola tragus)* (USDOIa, p. 19). Cheatgrass is one of the most problematic weeds in Montana and its populations have increased substantially in the last ten years (Mangold et al 2013, p. 554), as their seeds have been noted to be viable for 5-11 years (Whitson et al 1997, p. 644-645). *Bromus* plants form dense mats of plants and roots that outcompete other plants for water and nutrients, fuel wildfires which kill long-lived native plants and increase soil erosion, all major threats to the thick-lead bladderpod (Abella et al 2007, p. 222; Bockstette 2017, p. 686). The grass covers nearly 23 million hectares in 17 western states and continues to invade areas, despite extensive management efforts to curb its spread (Mangold et al 2013, p. 554). Saltlover can stay dormant and survive in the seed bank for up to ten years (Khan et al 2001, p. 1189). Saltlover also has a long taproot which outcompetes native plants for water (Khan et al 2001, p. 1189) and there is evidence that it alters the soil chemistry and ecology, creating conditions that favor it over native plants (Duda et al 2001, p. 72). African mustard grows well on gypsum and limestone soils (Abella et al 2007, p. 226), and is a weedy aggressor of disturbed wild areas, starting as a tiny carpet of dark green leaves, then forming dense vegetation over a foot tall that crowds other plants out (Schneider 2020). On rangelands, prickly Russian thistle is often the first species to appear on disturbed sites (Kostivkovsky and Young 2000, p. 4) and has a high tolerance for drought, is a prolific seed producer, and includes a deep and aggressive tap root system capable of using large quantities of soil moisture (Kumar et al 2017, p. 239). These invasive plants impact plant diversity and wildlife habitat; change soil morphology, organic

matter, and nitrogen dynamics; and accelerate rates of soil erosion (Wrangle 2019, p. 19). The thick-leaf bladderpod grows in a unique habitat and any changes to the soil or nutrients, or competition for those limited nutrients, will have negative effects on its survival. Gypsum exploration will increase vehicle traffic to and from the site and invasive plants from surrounding areas could easily disperse upland into the project area (Holloway 2020, p. 2), threatening the thick-leaf bladderpod.

ii. Off-Road Vehicles

ORVs are detrimental to thick-leaf bladderpod survival due to soil compaction, erosion, crushed plants, increased spread of invasive plants, and illegally created paths. ORV use in the Pryor Foothills RNA/ACEC is currently limited to a small number of designated routes and requires a state permit (French 2018, p. 5; Montana State Parks 2020, p. 2; USDOI 2015, p. 3-100, 3-102, K-103). To find these designated routes, a rider must contact the Forest Service or BLM office for information on road designation, closures, conditions, and maps (Montana State Parks 2020, p. 2). Soil compaction and erosion due to ORVs results in water runoff and alteration of the cryptogamic crust, increasing erosion, and altering nitrogen levels in the soil (Jones 2005, p. 14; Fike 2019, p. 1). Nitrogen is a key nutrient for plant growth as well as attracting pollinators that require nitrogen-rich pollen for progeny development and population growth (Wiesenborn 2010, p. 5). Other impacts include crushed plants, exposed roots, diminished seed germination and seedling establishment, as well as increased spread of invasive plants (Wrangle 2019, p. 21). Tracks created by ORVs, even one time, can facilitate the spread of invasive plants by creating areas that trap and shelter seeds (Jones 2005, p. 16, 17). ORVs also create environmental pollution by expelling and kicking up significant amounts of fine and coarse particulate matter (Goossens and Buck 2009, p. 118, 134). While there are no studies that look at ORV dust on plant-pollinator interactions, studies have shown that deposition of particles from volcanic ash decreased bee species richness and pollination (Morales et al 2014, p. 46-47) as well as visitation by pollinators to affected plants (Martínez et al 2013, p. 271).

As some riders already disregard designated routes and ORV ethics, use is likely to increase on unauthorized trails that have been “improved” for gypsum exploration (USDOIa 2020, p. 7). A 2006 survey of registered ORV owners by Montana Fish Wildlife and Parks found that 16.3% reported that they only sometimes or never follow the guideline to “closely follow all trail, road and area restrictions that are put in place to protect natural resources, wildlife, and provide non-motorized opportunities” and 23% reported that they only sometimes or never follow the guideline “to minimize impacts to the environment, ORV users should avoid riding cross-country or shortcutting the main route when riding on trails or roads” (Lewis and Paige 2006, p. 2). New ORV use in the thick-leaf bladderpod habit could have dire consequences for the plant and the cryptogamic crusts that the plant needs to survive in the harsh climate.

B. Overutilization

Overutilization is not known to pose a significant threat to the thick-leaf bladderpod.

C. Disease and Predation

Disease and predation are not known to pose a significant threat to the thick-leaf bladderpod at this time.

D. Inadequacy of Existing Regulatory Mechanisms

The existing regulatory mechanisms are inadequate for preventing the thick-leaf bladderpod from heading towards extinction. There are no federal protections and the state and regional protections have yet to meet the needs of the thick-leaf bladderpod to ensure its survival. This BLM defined sensitive species lives entirely in the Pryor Desert with a large population on BLM land in the Pryor Foothills RNA/ACEC. Yet it is still facing an imminent threat from gypsum mining exploration.

i. State Protections

Montana Sage Grouse Habitat Conservation Plan

The habitat of the thick-leaf bladderpod overlaps with a small area of the greater sage-grouse (*Centrocercus urophasianus*) range per the Montana Sage Grouse Habitat Conservation Plan (MSGHCP) (Executive Order 2015, page A-8), but protections for sage-grouse do not take into consideration the protections needed for the thick-leaf bladderpod. The MSGHCP places limitations on production, maintenance, and noise levels at certain times of year and certain times of day to not disturb breeding, nesting and early brood rearing for the grouse (Executive order 2015, p. 5, 7). Due to the MSGHCP, the McKamy Exploration project will limit surface disturbance to less than five percent of the sage-grouse habitat in affected area, prohibit activities between March 15 – July 15 to protect breeding and nesting activities, limit vegetation removal to July 16 – March 4 within four miles of an active lek, and reclaim all temporary roads at the end of the exploration by replacing soil and seeding with native seed (USDOIa 2020, p. 9). The limited time-sensitive protection for the grouse will not address the protection the thick-leaf bladderpod needs year-round. As the thick-leaf bladderpod is dependent on cryptogamic soil crusts that are highly sensitive to erosion and maintains a seed bank in the soil, soil replacement and reseeding will not be enough to ensure that the habitat for the plant resorts back to its original state. Thus, none of the restrictions in place for the greater sage-grouse address the specific needs for the survival of the thick-leaf bladderpod and it is not an adequate protective mechanism.

Montana Department of Environmental Quality

The Montana Department of Environmental Quality requires an exploration license for all mineral exploration activities, such as drilling and trenching to determine if an economical mineral resource is present (DEQ 2020, p. 1). An exploration license requires noting actual proposed disturbances and agreeing to reclaim any surface area disturbed during exploration operations, along with a plan of operations, map, or sketch in detail to locate the area, and a filing fee and reclamation performance bond (Admin Rules(a) 2020, p. 1). Consideration is given to roads regarding width, grading, streams, tree and vegetation removal, drainage facilities and barriers (Admin Rules(b) 2020, p. 1) and reclamation requirements for backfilling, material disposal, soil compaction, revegetation, and regrading (Admin Rules(c) 2020, p. 1). This

authorization process does not consider the effect that the project could have on sensitive plant species, including the thick-leaf bladderpod, and therefore is not an adequate mechanism for protection.

ii. Federal Protections

Greater Sage-Grouse Approved Regional Management Plan (RMP)

The Greater Sage-Grouse Approved RMP was created to provide a comprehensive land use plan to guide management of BLM-administered lands in the Billings Field Office (USDOI 2015, p. I-I). The RMP designated the Pryor Foothills as an RNA/ACEC with the goal to protect unique vegetation, preserve examples of all significant natural ecosystems and preserve gene pools of typical and endangered plants and animals (USDOI 2015, p. 3-100). The ACEC's purpose is to protect unique vegetation and limit certain actions, including: no oil and gas leasing within a quarter mile of known plant sites, no geophysical exploration or renewable energy development, no solid leasable minerals or mineral material sales and permits, BLM road maintenance to designated roadways, and limited routes for off-highway vehicles/ORVs (USDOI 2015, p. 3-101, 3-102). Per the ACEC, BLM may only allow activities if there is minimal or no conflict and any impacts on ACEC resource values can be fully mitigated (USDOI 2015, p. 3-102). The RMP requires that the designated RNA/ACEC must be managed to protect the unique vegetation (USDOI 2015, p. 3-101) and BLM authorized activities should maintain or improve habitat for federally listed threatened, endangered, and special status plants (USDOI 2015, p. 3-13). While these designations may provide some general protection for plants in the ACEC, there is no direct mention of the thick-leaf bladderpod as a species of concern within the RMP. This regulation is currently not protecting the plant from the inevitable damage and plant loss that will occur with the McKamy Exploration Project and is therefore an inadequate regulation mechanism.

Under the RNA/ACEC designation for the Pryor Foothills, there is a recommendation to withdraw the designated area from mineral entry and location under the Mining Law of 1872 (USDOI 2015, p. 3-101). The Federal Land Policy and Management Act of 1976 requires the BLM to "manage the public lands . . . in accordance with the land use plans . . ." 43 U.S.C. § 1732(a). Once BLM has approved an RMP, "all future resource management authorizations and actions . . . shall conform to the approved plan." 43 C.F.R. § 1610.5-3(a). Under this "consistency" requirement, a BLM decision must be set aside if it is not consistent with the operative land use plan. This applies to proposed mine plan of operations. 43 C.F.R. § 3809.420 (a)(3) ("Consistent with the mining laws, your operations and post-mining land use must comply with the applicable BLM land-use plans and activity plans"). Even though the BLM has recommended withdrawing the area from mineral entry, the BLM is considering allowing an exploration project to move forward (USDOIa 2020, p. 15-20). This designation by the BLM is not an adequate mechanism to ensure the protection of the thick-leaf bladderpod.

Bureau of Land Management Sensitive Species Designation

The thick-leaf bladderpod has been designated by the BLM as a sensitive species, which requires the BLM to "initiate proactive conservation measures that reduce or eliminate threats

to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA" (USDOI 2008, p. 3). Since this designation is not stopping an exploration project in the heart of the thick-leaf bladderpod habitat in a preserved area, it is not an adequate mechanism to protect the plant from all threats that could lead to extinction. There is no enforceable regulatory mechanism to prohibit mining exploration or mining.

McKamy Gypsum Exploration Draft Environmental Assessment

A draft Environmental Assessment (EA) of the McKamy Gypsum Exploration was done in October 2020, including the exploration's impact on the thick-leaf bladderpod. It inadequately addresses mitigation measures for the threats facing the thick-leaf bladderpod: direct mortality, invasive species, soil erosion, and habitat destruction.

Direct Mortality

The draft EA states that impact to native vegetation would be minimal (USDOIa 2020, p. 6), yet it also noted that excessive mortality to the thick-leaf bladderpod as part of the project can lead to extinction, as the species survives within a small ecological niche (USDOIA 2020, p. 18, 19). The draft EA proposes several steps to avoid the thick-leaf bladderpod and other sensitive species (USDOIa 2020, p. 12). Roads, trails, and drill pads will be placed in areas not occupied by the thick-leaf bladderpod, or if any must be placed in areas with the bladderpod, the area of least impact will be chosen (USDOIa 2020, p. 12). The EA recommends a botanist on site to identify and help avoid the thick-leaf bladderpod, determine suitable drilling locations and routes to avoid the plant, and record the number of individual plants removed or directly impacted (USDOIa 2020, p. 12; USDOIb 2020, p. 2). This measure does not protect the thick-leaf bladderpod plants that will be lost due to mining exploration. As already noted, there are numerous thick-leaf bladderpods on drill sites as well as long the roads to different drilling locations (Holloway 2020, p. 2 3). The draft EA also states that the work will only occur in the summer months when the plant is more easily identified (USDOIa 2020, p. 13, 14). While these steps do acknowledge the thick-leaf bladderpod's status as a sensitive plant species, it is not taking into consideration the full range of requirements for the plant to survive.

Invasive Species

To prevent invasive plants from infiltrating the thick-leaf bladderpod habitat, the draft EA states that equipment and vehicles will be washed prior to entering the disturbed area. There will also be a follow up with spot treatment of any non-native plants from a BLM approved herbicide for three years after the end of the project; however, it will take more time than allocated in the draft EA to eradicate any invasive plants that would likely arrive from the exploration due to their presence in the seed bank (USDOIa 2020, p. 14). Due to potential herbicide drift and human error in identifying plants to be sprayed, there is a high possibility that the bladderpod itself will be eradicated by the herbicide spraying. Preventing undesired non-native and invasive species from arriving to an area is considered the most economical and ecologically viable means to limiting their impact on a habitat (Abella et al 2007, p. 222). As noted above, the non-native plant species that could potentially invade following mining disturbance are very difficult to eradicate and out compete native species. With no long-term plan to prevent invasive species, this mitigation measure is not adequate in protecting the thick-leaf bladderpod from invasive plant species overtaking the habitat.

Soil Erosion

According to the draft EA, the project area consists of soil susceptible to erosion and unfavorable for reclamation, but this is dismissed from further analysis (USDOIa 2020, p. 6). The reclamation project proposed in the draft EA will alter the soil composition by de-compacting the ground, moving the soil around to pull back berms, remove culverts, clear drainages, fill drill holes, and seeding with a BLM-approved seed mix (USDOIa 2020, p. 14, Plan of Operations 2020, p. 6). As the thick-leaf bladderpod grows in such a unique habitat with specific needs for survival, reclaiming with previously excavated soil will change the soil composition and affect the bladderpod, its seed bank, and other rare plant communities living there. As discussed earlier, the fine-textured cryptogamic crusts are important for thick-leafed bladderpod survival, are highly susceptible to erosion, and take decades to reform (DeVelice and Lesica 1993, p. 28; OALS 2001, p.1), as well as feed nitrogen and other nutrients into the soil, retaining water and influencing seed germination. (Jones 2005, p. 14, Fike 2019, p. 1). Thus, the draft EA does not adequately address soil loss and erosion in the thick-leaf bladderpod habitat.

Habitat Destruction

To mitigate the 2.8 acres of new roads and massive altering of old two-track trails, the draft EA states that berms will be constructed along all roads, cut slopes will be graded, temporary roads will be constructed on gentle slopes, and care will be taken to use the existing roads and trails wherever possible (USDOIa 2020, p. 1, 6, 7, 9-12, 14). However, placing roads, trails and drill pads in areas not occupied by the plant or in areas of least impact will still incur long term effects to the biotic soil, affecting seedling germination and water and nutrient retention that the thick-leaf bladderpod needs to survive or areas the rare plant could utilize to expand into, especially due to climate change (Jones 2005, p. 14; Fike 2019, p. 1). The reclamation project after the exploration will not be capable of restoring the habitat to its pre-disturbance state, therefore affecting the thick-leaf bladderpod's chance for survival.

The McKamy Gypsum Exploration project goal is to find out if there is gypsum in the area. If the thick-leaf bladderpod escapes harm during this exploratory period and gypsum is found, the project will likely result in a full-blown mining proposal (USDOIa 2020, p. 20) which could be approved in as short as a year, whereas the average period to list a species as endangered takes 12 years (Puckett et al 2016, p. 220, 224, 225). That process would permanently destroy the habitat and result in devastating loss of the thick-leaf bladderpod. At this time, the existing regulatory mechanisms available to protect the thick-leaf bladderpod and its habitat have failed, strongly warranting their consideration for listing under the ESA.

E. Other Natural or Manmade Factors that Affect the Continued Existence of the Species

Other natural or manmade factors are not known to pose a significant threat to the thick-leaf bladderpod at this time.

IV. REQUEST FOR CRITICAL HABITAT

The Center for Biological Diversity requests that the USFWS designate critical habitat for the thick-leaf bladderpod concurrently with its listing. Critical habitat as defined by Section 3 of the Endangered Species Act is: (i) the specific areas within the geographical area occupied by a 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 protections; and (ii) the 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).

Congress recognized that the protection of habitat is essential to the recovery and/or survival of listed species, stating that "classifying a species as endangered or threatened is only the first step in ensuring its survival. Of equal or more importance is the determination of the habitat necessary for that species' continued existence... If the protection of endangered and threatened species depends in large measure on the preservation of the species' habitat, then the ultimate effectiveness of the Endangered Species Act will depend on the designation of critical habitat." H. Rep. No. 94-887 at 3 (1976).

Critical habitat is an effective and important component of the Act, without which the thick-leaf bladderpod's chance for survival diminishes. The Center thus requests that the USFWs propose critical habitat for the thick-leaf bladderpod concurrently with its proposed listing.

V. CONCLUSION

The thick-leaf bladderpod (*Physaria pachyphylla*), is a unique species found in one sub-basin of Montana on limestone, sandstone, and diatomaceous earth with cryptobiotic crusts. Only nine subpopulations of the thick-leaf bladderpod are known to exist in a 60 km^2 area. The thick-leaf bladderpod is under immediate threat from gypsum mine exploration, with the proposed project located within the largest documented subpopulation of the bladderpod. Threats stemming from the mining exploration include direct mortality, habitat loss caused by road creation, soil loss and erosion, and invasive species. Other threats to the thick-leaf bladderpod include off-road vehicles. While the thick-leaf bladderpod is recognized as a sensitive species by BLM and resides in a designated ACEC, there are no regulatory mechanisms in place to protect the bladderpod from the proposed exploratory gypsum mining project. Any mining exploration or subsequent gypsum mining will leave the thick-leaf bladderpod vulnerable to extinction with little chance of survival. Based on the best available scientific information, the thick-leaf bladderpod qualifies for immediate protection under the Endangered Species Act.

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