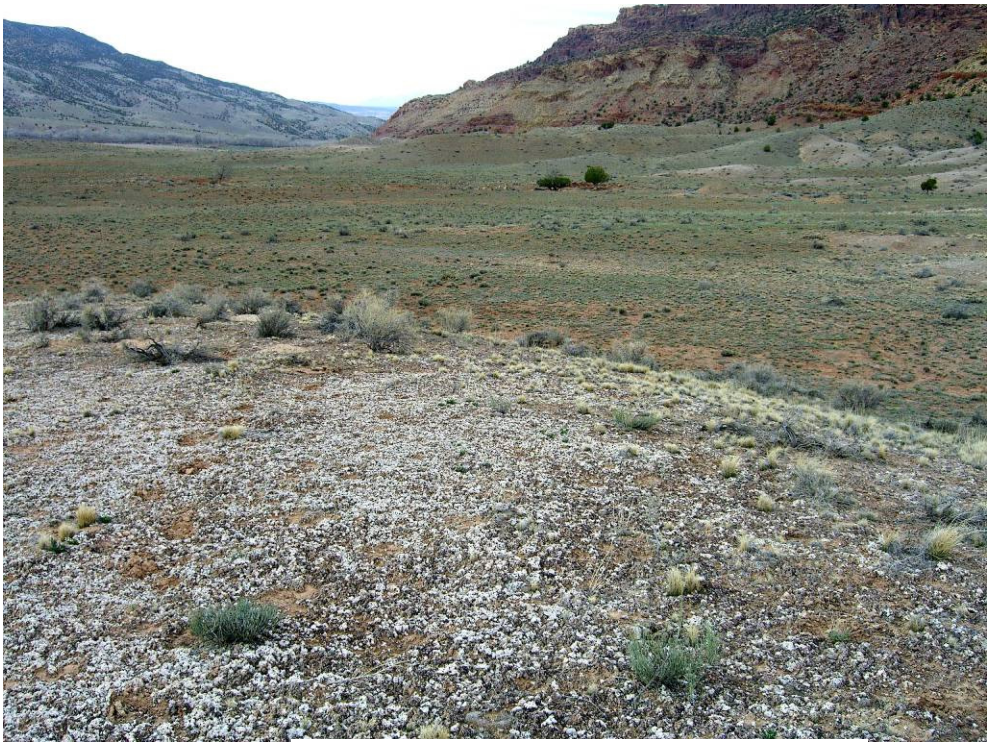
Preliminary Conservation Action Plan: Rare Plants in Big GypsumValley and Dry Creek Basin, Colorado



Cryptantha gypsophila
Gypsum Valley cat's-eye

Sponsored by the
Colorado Rare Plant Conservation Initiative

Planning Workshop date: May 5, 2010
Report date: May 11, 2011

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Cover photographs: habitat photo by Peggy Lyon, close up by Susan Panjabi

Panjabi, S., B. Neely and P. Lyon. 2011. Rare Plant Conservation Action Plan: Big Gypsum Valley and Dry Creek Basin, Colorado. Unpublished report prepared by The Nature Conservancy and the Colorado Natural Heritage Program for the National Fish and Wildlife Foundation. 25 pp.

I. Introduction

This document identifies conservation strategies for the Colorado endemic and globally imperiled plant, Gypsum Valley cat's-eye (*Cryptantha gypsophila*), in Big Gypsum Valley and Dry Creek Basin, Colorado, based on an assessment of the plants' viability and conservation issues in this area by participants of a May 4-5, 2010 workshop. The primary audience is intended to be the workshop participants and other stakeholders interested in helping to implement the conservation strategies.

Big Gypsum Valley and Dry Creek Basin are Priority Action Areas recognized by the Colorado Rare Plant Conservation Initiative (RPCI). The RPCI is a diverse partnership of public and private organizations dedicated to conserving Colorado's natural heritage by improving the protection and stewardship of the state's most imperiled plants. RPCI has developed a statewide strategy for the conservation of Colorado's most imperiled plant species (Neely et al. 2009). As part of this effort, the group is working with partners to identify site-specific strategies in areas supporting the most imperiled species. RPCI partners have identified ten Priority Action Areas around the state: Adobe Hills, Arkansas Valley Barrens, Middle Park, North Park, Pagosa Springs, Piceance Basin, Roan Cliffs, Big Gypsum Valley-Dry Creek Basin, Plateau Creek-Miramonte Reservoir, and Gateway (**Figure 1**). Thus far, RPCI has led workshops with local partners to identify priority conservation strategies for eight of these areas (Adobe Hills and Roan Cliffs forthcoming).

A Priority Action Area is an area identified as needing immediate conservation action to prevent the need for listing, extinction, or further losses of imperiled plant species (Neely et al. 2009). Selection was based on the level of imperilment of rare plant species, quality of the occurrences, urgency of the management and protection actions, and other opportunities such as funding and land ownership patterns. These areas are based on the Potential Conservation Areas identified by the Colorado Natural Heritage Program (2010), at Colorado State University, with input by the RPCI and the Rare Plant Technical Committee.

Located in San Miguel County, the Big Gypsum Valley and Dry Creek Basin Action Areas include high quality occurrences of Gypsum Valley cat's-eye (*Cryptantha gypsophila*), the primary target of this conservation plan. Several other significant elements of biodiversity add conservation value to this area including the Gunnison Sage Grouse, Sage Sparrow, White-tailed Prairie dog, Little penstemon, Nealley's dropseed and a unique community of globally and state-rare lichens (see also Attachment 1).

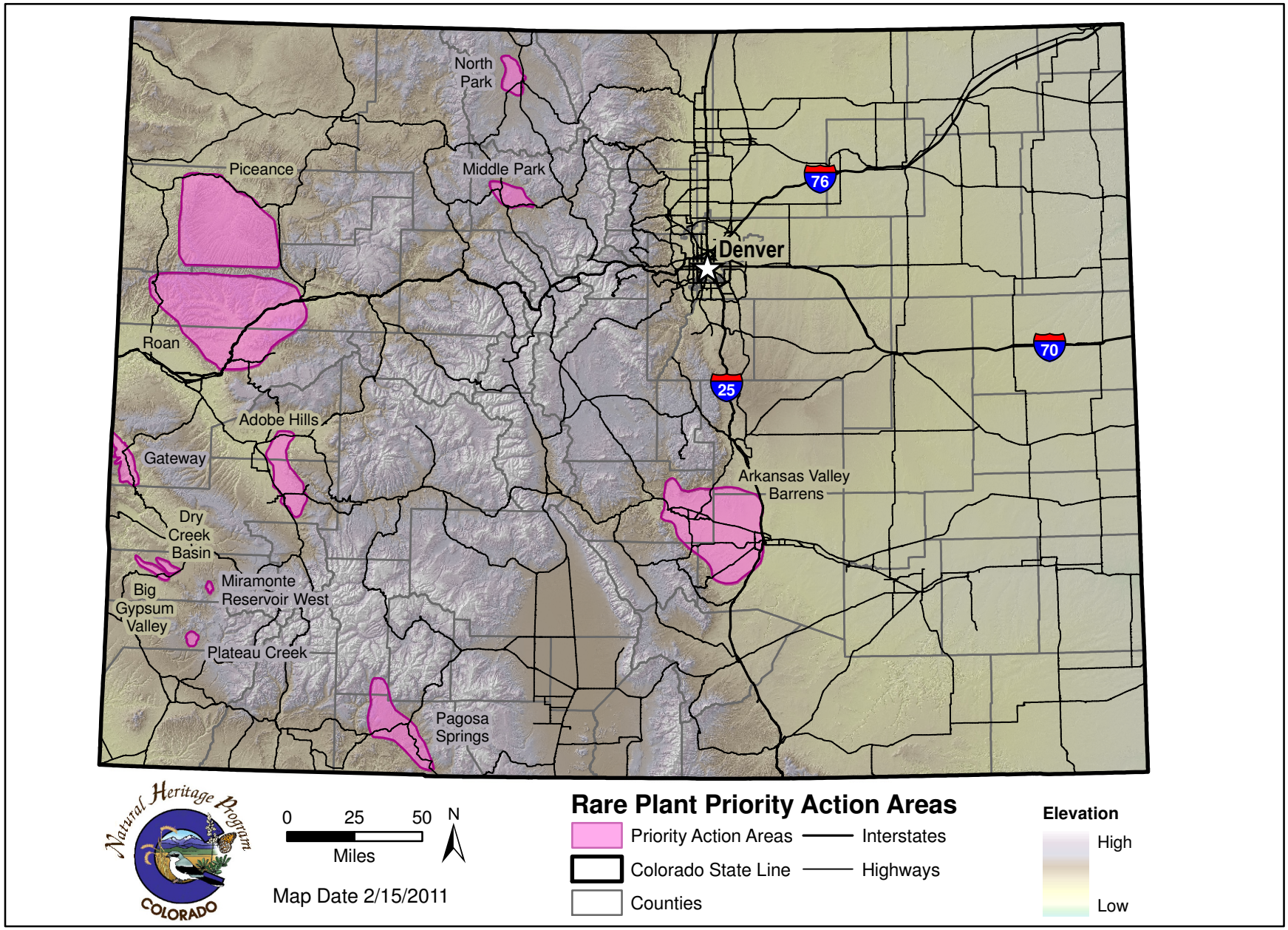

Figure 1. Priority Action Areas identified by the Colorado Rare Plant Conservation Initiative (RPCI, Neely et al. 2009). These areas are also recognized by RPCI as Important Plant Areas, and are based on Potential Conservation Areas developed by the Colorado Natural Heritage Program at Colorado State University (CNHP 2010). This report focuses on the Big Gypsum Valley and Dry Creek Basin sites.

II. Gypsum Valley cat's-eye *(Cryptantha gypsophila)*

The Gypsum Valley cat's-eye (**Figure 2**) is a low growing plant in the Forget-me-not Family (Boraginaceae). Described in 2004 as a new species by James Reveal (Reveal and Broome 2006), it is known only from Colorado.

The Colorado Natural Heritage Program (2010) at Colorado State University and NatureServe (2010) consider the Gypsum Valley cat's-eye to be globally imperiled (G2) because it is only known from 15 locations in the world within four counties, and a total of about 40-60,000 individuals documented (Colorado Natural Heritage Program 2010). The species is known from Bureau of Land Management (BLM), private, and state lands, and is included on the BLM sensitive species list. No specific protection is provided by the BLM Resource Management Plan (1984 San Juan/San Miguel RMP). However, at least two alternatives for the revised RMP (in prep.) would include an ACEC that could offer some protection for the cat's-eye (MacMillan, BLM, pers. comm. 2010). The USFWS completed a Species Assessment and Listing Priority Assignment Form in 2007 (Ireland 2007) and determined that there was inadequate information for listing at the time. Extensive surveys have been conducted for the species since that time (e.g., CNHP 2008; Lyon et al. 2009; CNHP 2010).

Non-technical description: Gypsum Valley cat's–eye (*Cryptantha gypsophila*) plants are low, densely tufted, herbaceous perennials with small white and yellow flowers. The species is similar to the more common Paradox cat's-eye (*Cryptantha paradoxa).* Gypsum Valley cat's-eye can be distinguished in the field by its glabrous upper leaf surfaces. Further information about the technical characteristics of these species can be found in the original description (Reveal and Broome 2006) and the Rare Plant Survey of San Juan Public Lands (Lyon et al. 2009).

Phenology and reproductive ecology: Flowering occurs in late April through May; fruits are produced in June. Observations suggest that Big Gypsum cat's-eye may be pollinated by one species of Apidae bee, in the genus *Anthophora. Anthophora* bees dig holes in the ground for nests (Carol English pers. comm. 2010).

Habitat: Gypsum Valley cat's–eye is often the dominant vascular plant on the light-gray, near-barren gypsum hills of the Paradox Member of the Hermosa Formation (**Figure 3**, Reveal 2006). It is also found on other barren shale substrates in the area. In some sites, the dominant plant is a whitish-gray cryptobiotic soil crust. In a survey of the associated lichens by Larry St. Clair (2005) over 20 lichen species were identified, including two that are globally rare (see **Table 1**). Associated vascular plant species include Nealley's dropseed (*Sporobolus nealleyi*), needle-and-thread grass (*Hesperostipa comata*), broom snakeweed (*Gutierrezia sarothrae*), spearleaf buckwheat (*Eriogonum lonchophyllum*), winterfat (*Krascheninnikovia lanata*), fourwing saltbush (*Atriplex canescens*), James' galleta (*Pleuraphis jamesii*), and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*).

Range: Gypsum Valley cat's-eye is a Colorado endemic known from fifteen locations in Mesa, Montrose, San Miguel and Dolores counties (**Figure** 4). Although the species is locally common,

with thousands of individuals at a site, it is very restricted in habitat and geographic range.

Conservation issues: The most immediate conservation issue (threat, stress, or source of stress) for the Gypsum Valley cat's-eye appears to be Off Highway Vehicle (OHV) use. Much of the area where the plants have been found is also being explored or developed for oil and gas production. Other potential impacts to the species include utility structures, uranium mining, dust events, incompatible grazing, and climate change. Conservation issues for the Gypsum Valley cat's eye are discussed in greater detail on pages 14-16.

Figure 2. Big Gypsum cat's eye (*Cryptantha gypsophila*) by Susan Panjabi, CNHP.

Figure 3. Habitat for Big Gypsum cat's eye (*Cryptantha gypsophila*) by Susan Panjabi, CNHP.

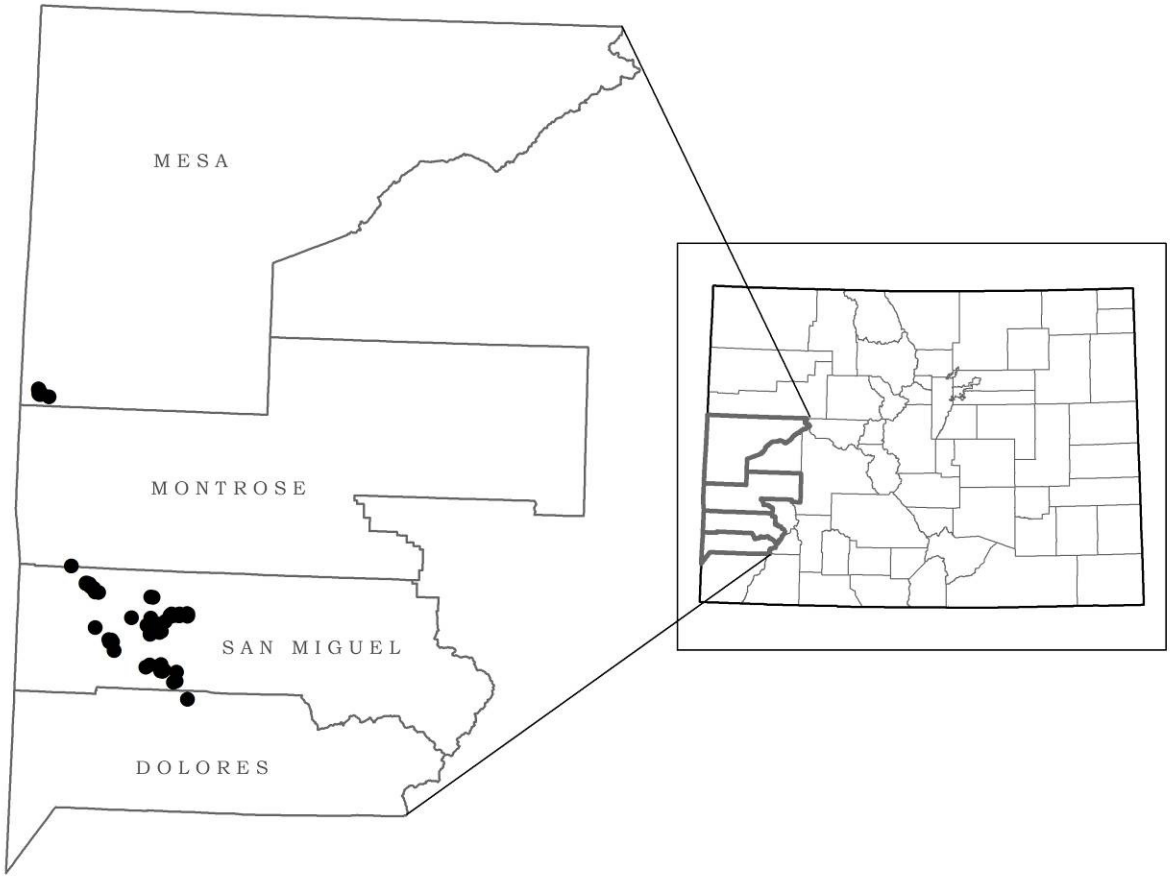

Figure 4. Global distribution of Big Gypsum cat's eye (*Cryptantha gypsophila*) in relation to Colorado counties.

III. Big Gypsum Valley and Dry Creek Basin Priority Action Area

This document focuses on rare plants within the Big Gypsum Valley and Dry Creek Basin Priority Action Areas (**Figures 5 and 6**).

Located in San Miguel County, the Big Gypsum Valley and Dry Creek Basin Priority Action Areas include seven occurrences of Gypsum Valley cat's-eye (*Cryptantha gypsophila)* in a dramatic landscape of red rock canyons, pinyon-juniper woodlands, and expansive valleys. These are among the best known locations of this species. This Area occurs within the vicinity of the San Miguel and Dolores County High Desert Plateau Priority Landscape identified by the Colorado Conservation Partnership.

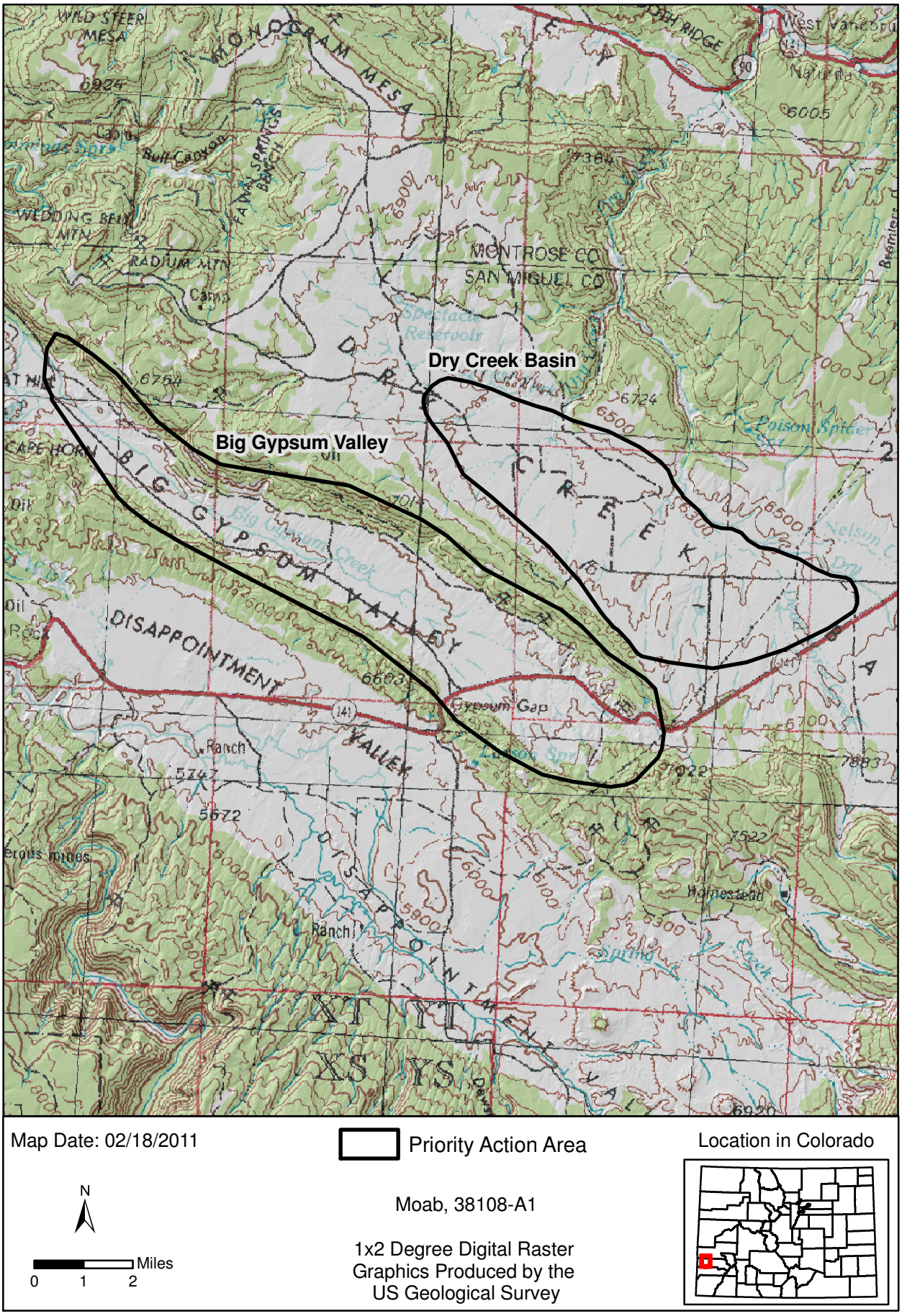

Figure 5. Map of the Big Gypsum Valley and Dry Creek Basin Priority Action Areas showing the topographic setting. Action Area boundaries are based on Potential Conservation Areas developed by the Colorado Natural Heritage Program (2010) and are recognized by the Colorado Rare Plant Conservation Initiative an Important Plant Areas (Neely et al. 2009).

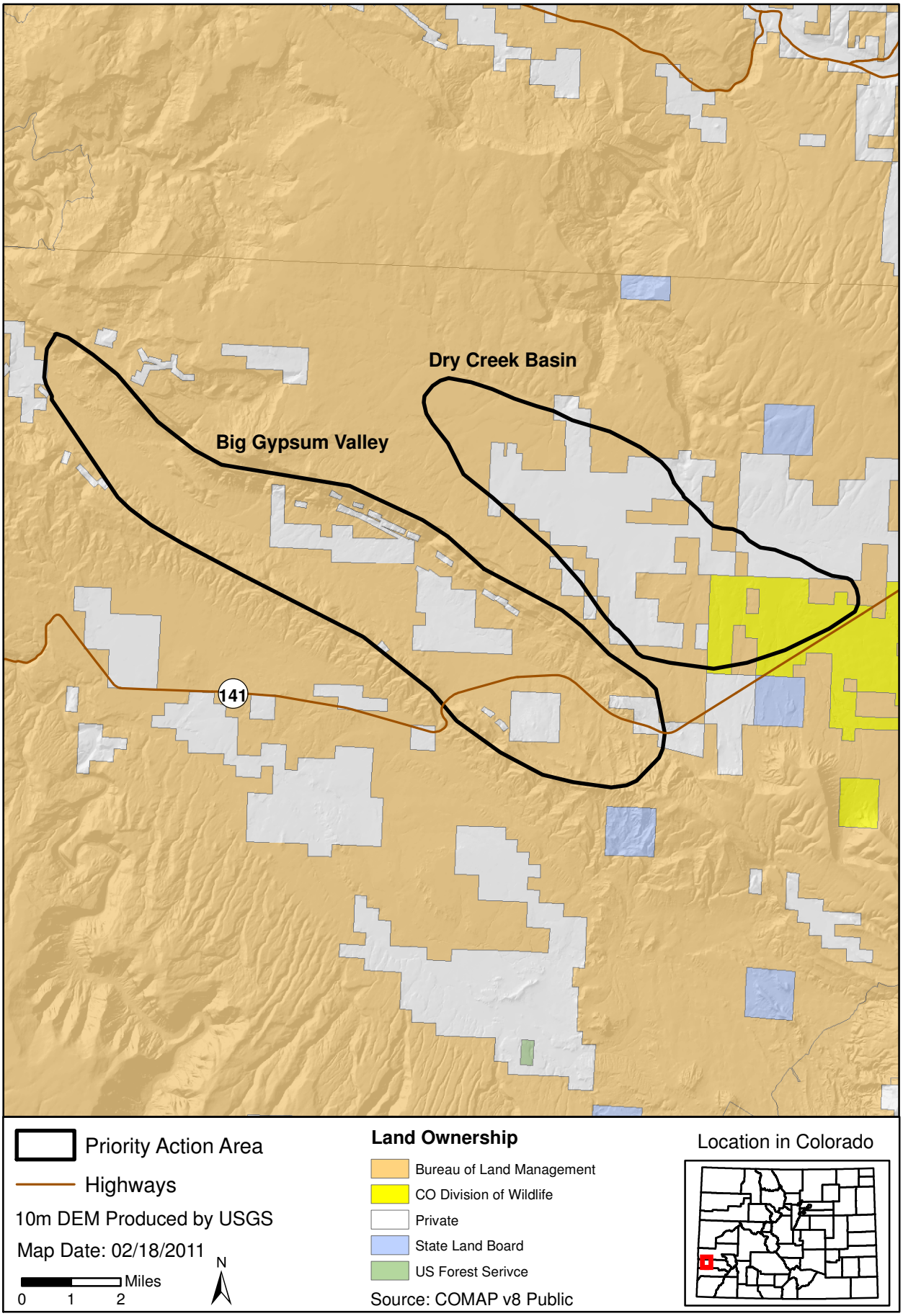

Figure 6. Map of the Big Gypsum and Dry Creek Basin Priority Action Areas showing local land ownership. Action Area boundaries are based on Potential Conservation Areas developed by the Colorado Natural Heritage Program (2010) and are recognized by the Colorado Rare Plant Conservation Initiative an Important Plant Areas (Neely et al. 2009).

Although the primary focus of this Conservation Action Plan is on the Gypsum Valley cat's-eye described above, there are 10 additional plants in the Big Gypsum Valley-Dry Creek Basin area that are tracked by the Colorado Natural Heritage Program (**Table 1**). These species and associated communities should be integrated into the conservation objectives of future workshops.

Table 1. Plants of concern in the Big GypsumValley and Dry Creek Basin Priority Action Areas (Colorado Natural Heritage Program 2010). A list of other significant taxa from this area is provided in Attachment 1.

Common name	Scientific name	Known occurrences	Global and State rank*	Federal Status
Primary target				
Gypsum Valley cat's-eye	*Cryptantha gypsophila*	15 (7 in Priority Action Area, 6 nearby, 2 in Sinbad Valley	G2/S2	None
Other vascular plants of concern in area				
Pygmy sagebrush	*Artemisia pygmaea*	6 in CO, 1 in PAA	G4/S1	none
Naturita milkvetch	*Astragalus naturitensis*	39 in CO, 1 in PAA in Dry Creek Basin	G2G3/ S2S3	BLM sensitive
Wetherill's milkvetch	*Astragalus wetherillii*	47 in CO, 1 in PAAin Big Gypsum Valley	G3/S3	FS sensitive
Weak-stem mariposa lily	*Calochortus flexuosus*	16 in CO , 1 in PAA in Big Gypsum Valley	G4/S2	FS sensitive
Little penstemon	*Penstemon breviculus*	24 in CO, 3 in PAA	G3/S2	none
Constance's Phacelia	*Phacelia constancei*	3 in CO, 1 in PAA in Big Gypsum Valley	G4/S1	none
Nealley's dropseed	*Sporobolus nealleyi*	1 in CO, in Big Gypsum Valley	G5/S1	none
Lichens				
Nodule cracked lichen	*Acarospora nodulosa*	1 in CO, in Big Gypsum Valley	G5/S1	none
Changing earthscale	*Gypsoplaca macrophylla*	1 in CO, in Big Gypsum Valley	G3/S1	none
Gypsum rim-lichen	*Lecanora gypsicola*	1 in CO, in Big Gypsum Valley	G1/S1	none

*G1 = critically imperiled, G2 = imperiled, G3=vulnerable, G4-5=secure. G ranks indicate the level of imperilment on a global/range-wide level; S ranks indicate the level of imperilment/vulnerability on a Colorado state level. For more details on global and state ranks please visit the Colorado Natural Heritage Program's website at http://www.cnhp.colostate.edu/heritage.html.

IV. Vision and Goals

Vision: Populations of the imperiled Gypsum Valley cat's-eye thrive within a mosaic of native plant communities and the ecological processes are functioning. A coalition of partners is working together to ensure its long-term survival and stewardship.

Long-term Goals: Conserve all viable and restorable occurrences of the Gypsum Valley cat's-eye in Big Gypsum Valley and Dry Creek Basin (total of seven occurrences in this area). Conserve habitat for the Gypsum Valley cat's-eye (at least 640 acres). Maintain/restore a mosaic of high quality plant communities (indicated by low levels of fragmentation and low cover of non-native species) in the vicinity of the occurrences to support ecological processes such as pollination ecology.

V. About the Workshop

Workshop Purpose: To identify conservation strategies for the Gypsum Valley cat's-eye and its habitat based on an assessment of the species viability and conservation issues in the Big Gypsum Valley and Dry Creek Basin area.

Methods: The planning process, known as Conservation Action Planning (CAP), used at the Workshop was developed by The Nature Conservancy and has been applied across the US and the world. Due to time constraints, we followed a rapid version of the CAP process by: 1) identifying conservation targets, 2) assessing viability of the targets, 3) identifying conservation issues (threats, stresses, sources of stress), and 4) detailing specific strategies to address the conservation issues.

For additional information about TNC's Conservation Action Planning methods, please see:
http://conserveonline.org/workspaces/cbdgateway/
and
http://conserveonline.org/workspaces/cbdgateway/cap/index_html

Workshop date: May 4-5, 2010

Workshop Participants:

Name	Affiliation
Attended	
Susan Panjabi (co-facilitator)	Colorado Natural Heritage Program
Betsy Neely (co-facilitator)	The Nature Conservancy
Cara MacMillan	Bureau of Land Management
Brian Kurzel	Colorado Natural Areas Program
Carol English	Colorado Natural Areas Program
Peggy Lyon	Colorado Natural Heritage Program
Bernadette Kuhn	Colorado Natural Heritage Program
Art Goodtimes	San Miguel County Commissioner
Dave Schneck	San Miguel County
Linda L. Broderick	San Miguel County Open Space
Collin Ewing	U.S. Fish and Wildlife Service
Alicia Langton	U.S. Fish and Wildlife Service
Al Schneider	Botanist/photographer
Unable to Attend	
Peter Mueller	The Nature Conservancy
Juniper Katz	Montezuma Land Conservancy
Nina Williams	Montezuma Land Conservancy
Ellen Mayo	US Fish and Wildlife
Gina Glenne	US Fish and Wildlife
Megan Mueller	Center for Native Ecosystems
Paige Lewis	The Nature Conservancy
Carol Dawson	Bureau of Land Management
Dean Stindt	Bureau of Land Management
Jim Garner	Colorado Division of Wildlife
Jim Boyd	Colorado Division of Wildlife
Leigh Robertson	Sage Grouse Working Group
Other Contacts	
Vince Tepidino	Utah State University
Mike Klish	Westwater Engineering
Terry Ireland	U.S. Fish and Wildlife Service

VI. Workshop Results

A. Conservation Targets

Using The Nature Conservancy's (TNC) conservation action planning (CAP) workshop methodology, "conservation targets" are a limited suite of species, communities, and/or ecological systems, or specific locations of these elements of biodiversity (e.g., occurrences, sub-occurrences, or other areas) that are the basis for setting goals, identifying conservation strategies, and measuring conservation effectiveness. At the Big Gypsum Valley and Dry Creek Basin Priority Action Area, our targets are the specific locations of the Gypsum Valley cat's-eye, identified more specifically based on land ownership.

At the Workshop, we organized the occurrences of Gypsum Valley cat's-eye into five targets based on land ownership within two Priority Action Areas, or Potential Conservation Areas (PCAs) as identified by the Natural Heritage Program (**Table 2**). A PCA represents CNHP biologists' best estimate of the primary area required to support the long-term survival of species or communities of interest or concern. Distinguishing between different landowners enabled us to effectively evaluate threats and identify meaningful strategies later in the Workshop.

Table 2. Total of five targets based on landownership and presence of Gypsum Valley cat's-eye. For example, there are three targets identified for the imperiled species at the Dry Creek Basin site: Dry Creek Basin BLM, Dry Creek Basin CDOW, and Dry Creek Basin private.

Target area (each area is a Potential Conservation Area (PCA) as identified by CNHP; Biodiversity significance rank follows the PCA name)	**Associated landownership**	**Targets and other significant species and plant communities present in area, followed by highest occurrence rank*** (some areas support more than one occurrence of listed element)
Big Gypsum Valley, B2	▪ BLM ▪ Private	▪ **Gypsum Valley cat's-eye G2/S2 A** Other species: *Astragalus wetherillii* G3 S3 E *Calochortus flexuosus* G4 S2 A *Sporobolus nealeyii* G5 S1 B *Acarospora nodulosa* var. *nodulosa* G5S1 E *Lecanora gypsicola* G1S1 E *Gypsoplaca macrophylla* G3S1 E
Dry Creek Basin, B2	▪ BLM ▪ Private ▪ CDOW	▪ **Gypsum Valley cat's-eye G2/S2 A** Other species: *Artemisia pygmaea* G4 S1 E *Astragalus naturitensis* G2G3 S2S3 B *Penstemon breviculus* G3 S2 D

* CNHP assigns a rank to each occurrence using the following codes: A = Very good; B = good; C = fair; D = poor; E=extant/viability unknown; H = possibly extirpated/ possibly extinct; X presumed extirpated/presumed extinct. B2=Potential Conservation Area of Very High Biodiversity Significance.

B. Viability

"Viability" per TNC terminology is the "health" or "functionality" of the conservation targets. During the Workshop we attempted to answer two key questions through the viability assessment: *How do we define 'health' (viability) for each of our targets?* and *What is the current status of each of our targets?* Following Natural Heritage Program methods (CNHP 2010) we define viability based on three factors: landscape context, condition, and size (**Table 3**).

Table 3. Basis for viability ratings of Gypsum Valley cat's-eye.

		Indicator rating criteria			
Key Attribute	**Indicator**	**D – Poor**	**C - Fair**	**B - Good**	**A - Very Good**
LANDSCAPE CONTEXT; Intactness of occurrence and surrounding area	% fragmentation	Highly fragmented	Moderately fragmented	Limited fragmentation	Unfragmented
CONDITION; Population structure & recruitment	Evidence of reproduction	Little or no evidence of successful repro. (few seedlings and/or no flowering or fruiting)	Less productive, but still viable with evidence of flowering and/or fruiting and mixed age classes	Good likelihood of long-term viability as evidenced by flowering, fruiting, and mixed age classes.	Excellent viability as evidenced by high % flowering and fruiting, and mixed age classes
CONDITION; Species composition / dominance	Percent ground cover of invasive species	>50% cover	11-50% cover	1-10% cover	<1% cover
SIZE; Population size & dynamics	# individuals	<10	10-300	300-1,000	>1,000

Table 4 shows the viability for each occurrence as previously identified by the Colorado Natural Heritage Program (CNHP), and confirmed by the group at the Workshop. We do not show viability by *land ownership* because CNHP identifies viability by *occurrence*. Any one occurrence can occur on multiple land ownerships.

Table 4. Viability of the seven occurrences of the Gypsum Valley cat's-eye in the Big Gypsum Valley and Dry Creek Basin area.

Target Area	Viability Rank*	Occurrence ID # (CNHP)
Gypsum Valley cat's-eye		
Big Gypsum Valley	Very Good	4
Big Gypsum Valley	Good	5
Big Gypsum Valley	Very Good	6
Big Gypsum Valley	Very Good	7
Dry Creek Basin	Good	15
Dry Creek Basin	Good	16
Dry Creek Basin	Very Good	17

* CNHP assigns a rank to each occurrence using the following categories: Very good (A); Good (B); Fair (C); Poor (D); E=extant/viability unknown; H = possibly extirpated/ possibly extinct; X presumed extirpated/presumed extinct.

C. Conservation Issues

With the viability analysis complete, the Workshop participants then identified the primary conservation issues (threats, stresses, sources of stress) at each site. Conservation issues include the stresses that impair, degrade or destroy the viability of the targets (e.g., trampling) as well as the stressors, the causes or sources of the stress (e.g., cattle grazing, OHV traffic). The participants identified and ranked the issues based on their expertise, local knowledge, and sense of the key issues facing each target (**Table 5**).

Although most of the known occurrences appear to be in fair to excellent condition, the primary conservation issues for the habitat of Gypsum Valley cat's-eye are OHV use, oil and gas development (and associated infrastructure including roads, pipelines, exploration activities, etc.), utility structures, dust events, climate change, uranium mining.

Motorized recreation: OHV use is the most urgent conservation issue to address. Unmanaged vehicle use is the most damaging activity to the habitat, damaging both the lichens and the vascular plants. The BLM is pursuing a temporary closure that would prohibit off-road travel in the rare plant area in Big Gypsum Valley.

Oil and gas exploration and development: There is seismic activity, but it is hard to know if it is urgent or not. Most of the area is already leased for oil and gas. If it does occur, road construction could be an issue. Patara is the primary energy company working in the area, but apparently the company has been considering pulling out of the area over the past three years. BLM developed an amendment to the existing Resource Management Plan (San Juan Public Lands) regarding oil and gas development. The amendment requires developers to avoid the sensitive plant habitat. The BLM can request that the developer move the pad up to 100 meters.

When new lease packages go out, BLM could place necessary stipulations on lease. No Surface Occupancy stipulations will not apply to old leases, only new ones.

Climate change: There is strong scientific consensus that human-induced climate change is affecting species and ecological systems, and this is likely to exacerbate the effects of other human activities. In Colorado, temperatures have already increased by approximately 2 degrees F between 1977 and 2006 (Ray et al. 2008). Climate models project Colorado will warm by 2.5 degrees F by 2025 and 4 degrees F by 2050 (Ray et al. 2008). There will likely be more frequent and severe droughts and other extreme weather events in the future. Colorado will likely become hotter and drier with shorter snow seasons, earlier snow melt, and longer fire seasons. These potential impacts will likely interact with other stresses to rare plants, e.g., loss or fragmentation of habitat from development, mining, and increase of invasive species. The full impacts of climate change on imperiled plant species are likely to significantly reduce habitat, which is particularly problematic for rare plants that demand very specific growing conditions, such as the cat's-eye.

Mining: The whole area has been leased for uranium mining, and the rare plants need to be protected from these activities. Apparently there are thousands of leases, but most of the activity has been closed down or stalled. Denison is the company that is running active mines in the Big Gypsum Valley. Gypsum mining for use in making dry wall is another issue, but the surface disturbance is apparently small. Associated roads with mining could be an issue and provide further access to non-motorized recreation.

Utility Structures: Potential pipeline and/or power-line corridors. Need to determine the specific locations of the lines.

Dust events: Workshop participants described recent, naturally occurring, dust storms that could have serious ramifications to the plants ability to photosynthesize and reproduce.

Cattle grazing: Although cattle grazing is currently considered a low impact in this area, grazing practices could change over time and introduce additional concerns. The BLM is aware of the rare plant locations and is working to make sure that grazing activities and other associated developments do not impact the rare plants.

Table 5. Conservation issues for each target. H = high impact, M = medium impact; L = low impact.

Conservation Issue	Big Gypsum-BLM	Big Gypsum-Private	Dry Creek-State	Cry Creek-BLM	Dry Creek-Private
Motorized recreation	H	H	L	L	L
Oil and gas development	M	M	M	M	M
Utility structure	M	M	M	M	M
Dust events	M	M	M	M	M
Climate change	M?	M?	M?	M?	M?
Uranium mining	M	M	L	L	L
Non-motorized recreation	L	L	L	L	L
Gypsum mining	L	L	L	L	L
Invasives	L	L	L	L	L
Road maintenance	L	L	L	L	L
Cattle grazing	L	L	L	L	L

D. Strategies

Based on an understanding of the status of Gypsum Valley cat's-eye in Big Gypsum Valley and Dry Creek Basin, participants identified strategies to support the long-term conservation of the species, focused on strategies needed to address key conservation issues (**Table 6**). After brainstorming strategies, participants prioritized them as high, medium, or low based on their anticipated effectiveness and level of impact. Specific to private land protection efforts, the RPCI is also evaluating opportunities to work with willing private landowners and local land trusts and local governments to conserve these species and their habitats on private lands using voluntary tools such as conservation easements.

Table 6. Strategies for the conservation of Gypsum Valley cat's-eye in Big Gypsum Valley and Dry Creek Basin. Highest priority strategies are listed first.

Conservation Issue/ Threat	Site	Owner/ mgr	Strategy	Priority	Lead	Notes/Action steps
All threats ranked M and H	ALL	BLM	Submit comments in support of Alternative C and B for revised BLM Resource Management Plan (RMP). Fall 2010	1	Bernadette/ all partners	Bernadette will draft letter and send to all partners/workshop participants. Dave will send comments regarding RMP from San Miguel Co., same action for all partners.
Mining and Utilities	ALL	BLM	Review stipulations in RMP alternatives regarding T and E species and gypsum soils, utilities. . . Submit comments to BLM. Fall 2010	1	Bernadette and Peggy	See Volume 3 Appendix H of RMP
OHV use	ALL	BLM	Submit comments to BLM on Resource Management Plan regarding OHV use in Big Gypsum Valley--prefer Alternative B and C. Fall 2010	1	Bernadette/ all partners	Review plans and see language about OHV traffic/motorized recreation. Draft letter to support measures that protect rare plants from OHV uses.
OHV use	ALL	BLM	Write to BLM District Ranger to express concern about plants and suggest consideration in Travel Management Plan. Fall 2010	1	Bernadette	Bernadette will draft letter and send to all partners/workshop participants.
OHV use	Big Gypsum	BLM	Communicate with the OHV community-Colorado Off Highway Vehicle Coalition (COHVCO) and local OHV clubs- how can we work together to assure viability of the plants	1	Susan	Give presentation to Colorado Off Highway Vehicle Coalition (COHVCO) and Thunder Mt. Four-wheelers, Susan email Art
Oil and Gas Development and associated infrastructure	ALL	ALL	Encourage implementation of Best Management Practices developed by RPCI with energy companies and BLM (Elliott et al. 2008)	1	Susan	Susan will share BMPs with Dave, Mike, and oil and gas companies (Cabbott, others?)

Conservation Issue/ Threat	Site	Owner/ mgr	Strategy	Priority	Lead	Notes/Action steps
All threats ranked M and H	ALL	ALL	Education: alert land owners and managers about the presence of the plants		RPCI	Produce brochure about the rare plants of San Miguel County
All threats ranked M and H	ALL	ALL	Monitor plants to detect changes in size and condition of populations		CNAP?	San Miguel County could possibly fund monitoring on private lands, Colorado State rare plant monitoring stewards, local intern, CNAP funding
All threats ranked M and H	ALL	ALL	Research pollination ecology to determine a) if there is one or more important pollinator for Big Gypsum cat'- eye, and b) what the pollinators need to survive		RPCI	RPCI to work through Information committee to identify researcher
Dust events	ALL	ALL	Promote land management activities that support healthy plant communities--better grazing practices, travel management, etc. to avoid dust event problems			See Western Lands Council article
Dust events	ALL	ALL	See the results of the current dust study being conducted by Biologic: effects of dispersed development funded by CNAP, USFWS			
Dust events	ALL	ALL	See results from Sara Clark's current research on pollination ecology and dust.			
Dust events	ALL	ALL	Look at the patterns of OHV use and how it contributes to dust problems			
Motorized and non-motorized recreation	Big Gypsum	BLM	Develop educational materials/signs at boat launch and other areas regarding the important natural resources found in the area. Include information			Determine who can work on this.

Conservation Issue/ Threat	Site	Owner/ mgr	Strategy	Priority	Lead	Notes/Action steps
			about the ACEC, etc.			
OHV use	Big Gypsum	BLM	Post signs to inform/encourage ORV users to protect sensitive plant habitat			
OHV use	Big Gypsum	BLM	Re-direct OHV use to other less sensitive areas?		Art/BLM/RPCI	Art will talk with OHV users to find out more about most desirable areas
Oil and Gas Development and associated infrastructure	ALL	ALL	Recognize/award companies that follow BMPs and respect rare plant habitat		RPCI	RPCI will present award at the Colorado Native Plant Society meeting in September 2010.
Oil and Gas Development and associated infrastructure	ALL	ALL	Work to get BMPs adopted statewide through the oil and gas commission			
Oil and Gas Development and associated infrastructure	ALL	ALL	Encourage broader level planning from oil and gas cos., e.g., geographic area plan			Oil and gas cos. don't usually support, but BLM can push for this.
Oil and Gas Development and associated infrastructure	ALL	ALL	Map pipelines and other corridors, such as gathering lines from individual wells (less regulated)			
Oil and Gas, Utilities, OHV use, and mining	ALL	ALL	Encourage the use of native plants in all revegetation efforts			San Miguel County already does
Utilities	ALL	ALL	Work with the Public Utility Commission (group that make decisions about power lines) to keep them informed and understand the rare plants			
	ALL	private	Conduct additional surveys on private lands			

VI. Next Steps

1. Conference call: Schedule a conference call for September or October to obtain feedback, refine strategies, and solidify priorities (Betsy/Susan).

2. Ongoing: The leads for all high- and medium-ranked strategies are responsible for ensuring their implementation.

3. Ongoing: The group proposed to meet annually to gauge progress toward implementing strategies and updating our understanding of the viability and conservation issues. Ideally this meeting would be coordinated by the RPCI lead (e.g., a local member of the Colorado Native Plant Society?) for the Big Gypsum Valley and Dry Creek Basin Priority Action Areas. Until such a lead is established, Betsy Neely from TNC/RPCI will coordinate as time and funding allow. Preferably this meeting would occur in the spring so a field visit to the plants is also possible.

VII. References

Colorado Natural Heritage Program. 2008. Field surveys conducted in southwestern Colorado by the Colorado Natural Heritage Program. Colorado State University, Fort Collins, Colorado.

Colorado Natural Heritage Program. 2010. Biodiversity Tracking and Conservation System. Colorado State University, Fort Collins, Colorado.

Elliot, B., S. Panjabi, B. Neely, R. Rondeau, B. Kurzel, and M. Ewing. 2008. Best Management Practices: Practices Developed to Reduce the Impacts of Oil and Gas Development Activities to Plants of Concern. Unpublished report on file at The Nature Conservancy, Boulder, Colorado. 10 pp.

English, Carol. 2010. Personal communication with Natural Areas Field Technician, Colorado Natural Areas Program, Colorado Department of Natural Resources, Denver.

Lyon, P. and J. Hanson. 2005. Survey of Rare Plants San Juan Public Lands in Dolores and Montezuma counties, Colorado. Available on-line at: www.cnhp.colostate.edu.

Lyon, P. and J. Hanson. 2006. Final Report: 2005 Rare Plant Survey of San Juan Public Lands, Colorado. Colorado Natural Heritage Program, Fort Collins, Colorado.

Lyon, P., D. White and J. Huggins. 2009. Rare Plant Status, Survey and Monitoring, San Juan Public Lands. Colorado Natural Heritage Program, Fort Collins, Colorado.

MacMillan, Cara. 2010. Personal communication with Bureau of Land Management Ecologist.

Neely, B., S. Panjabi, E. Lane, P. Lewis, C. Dawson, A. Kratz, B. Kurzel, T. Hogan, J. Handwerk, S. Krishnan, J. Neale, and N. Ripley. 2009. Colorado Rare Plant Conservation Strategy. Developed by the Colorado Rare Plant Conservation Initiative. The Nature Conservancy, Boulder, Colorado. 117 pages.

Ray, A., Barsugli, J., K. Averyt, K. Wolter, M. Hoerling, N. Doesken, B. Udall, and R. Webb. 2008. Climate change in Colorado. A Synthesis to Support Water Resources Management and Adaptation. A Report by the Western Water Assessment for the Colorado Water Conservation Board.

Reveal, J.L., and C. R. Broome. 2006. *Cryptantha gypsophila* (Boraginaceae: Boraginoideae), a new species from western Colorado. *Brittonia* 58(2): 178-181.

St. Clair, L. 2005. Lichen Communities of Selected Gypsiferous Sites in Big Gypsum Valley, San Miguel County, Colorado. Report to the Colorado Natural Heritage Program and the Bureau of Land Management. Brigham Young University, Provo UT.

Attachment 1. Additional key species and plant communities in the Big Gypsum Valley-Dry Creek Basin area.

Although the focus of the Workshop was on the globally imperiled plants, other key species and plant communities are known from the Big Gypsum Valley-Dry Creek Basin area as shown in the table below (Colorado Natural Heritage Program 2010, http://www.cnhp.colostate.edu/). Specifically, the table identifies rare species and rare and/or high quality examples of plant communities in the Big Gypsum Valley-Dry Creek Basin area. These and other biodiversity values should be considered with more detailed planning efforts for this area.

Major group	**Scientific name**	**Common name**	**Global rank**	**State rank**	**Federal Status**	**State Status**
Amphibians	*Hyla arenicolor*	Canyon Treefrog	G5	S2	BLM	
Birds	*Centrocercus minimus*	Gunnison Sage Grouse	G1	S1	BLM/USFS	SC
Birds	*Strix occidentalis lucida*	Mexican Spotted Owl	G3T3	S1B,SUN	LT	ST
Birds	*Vireo vicinior*	Gray Vireo	G4	S2B		
Birds	*Falco peregrinus anatum*	American Peregrine Falcon	G4T4	S2B	USFS	SC
Birds	*Asio flammeus*	Short-eared Owl	G5	S2B	USFS	
Birds	*Amphispiza belli*	Sage Sparrow	G5	S3B	USFS	
Insects	*Ochlodes yuma*	Yuma Skipper	G5	S2S3		
Mammals	*Cynomys leucurus*	White-tailed Prairie Dog	G4	S4	USFS	
Mammals	*Plecotus townsendii pallescens*	Townsend's Big-eared Bat subsp	G4T4	S2	BLM/USFS	SC
Mammals	*Cynomys gunnisoni*	Gunnison's Prairie Dog	G5	S5	C, USFS	
Reptiles	*Urosaurus ornatus*	Tree Lizard	G5	S4		
Reptiles	*Aspidoscelis velox*	Plateau Striped Whiptail	G5	S4		
Reptiles	*Crotalus oreganus concolor*	Midget Faded Rattlesnake	G5T4	S3?	BLM	SC
Natural Communities	*Forestiera pubescens* Shrubland	Foothills Riparian Shrubland	G1G2	S1		
Natural Communities	*Rhus trilobata* Shrubland	Skunkbrush Riparian Shrubland	G2	S2		

Major group	Scientific name	Common name	Global rank	State rank	Federal Status	State Status
Natural Communities	*Aquilegia micrantha - Mimulus eastwoodiae* Herbaceous Vegetation	Hanging Gardens	G2G3	S2S3		
Natural Communities	*Hesperostipa comata* Great Basin Herbaceous Vegetation	Western Slope Grasslands	G2G4	S2		
Natural Communities	*Crataegus rivularis* Shrubland	Foothills Riparian Shrubland	G2Q	S2		
Natural Communities	*Populus angustifolia / Rhus trilobata* Woodland	Narrowleaf Cottonwood/Skunkbrush	G3	S3		
Natural Communities	*Atriplex confertifolia / Pleuraphis jamesii* Shrubland	Cold Desert Shrublands	G3G5	S2		
Natural Communities	*Pinus ponderosa / Quercus gambelii* Woodland	Foothills Ponderosa Pine Scrub Woodlands	G5	S4		
Natural Communities	*Pinus edulis - Juniperus spp. / Cercocarpus montanus* Woodland	Mesic Western Slope Pinyon-Juniper Woodlands	G5	S4		
Natural Communities	*Salix exigua / Mesic Graminoids* Shrubland	Coyote Willow/Mesic Graminoid	G5	S5		
Natural Communities	*Sarcobatus vermiculatus / Suaeda moquinii* Shrubland	Saline Bottomland Shrublands	GUQ	S2S3		
Natural Communities	*Acer negundo - Juniperus scopulorum / Salix exigua* Woodland		GUQ	SU		

Major group	Scientific name	Common name	Global rank	State rank	Federal Status	State Status
Natural Communities	*Juniperus scopulorum - Quercus gambelii* Woodland		GUQ	SU		
Nonvascular Plants	*Lecanora gypsicola*		G1	S1		
Nonvascular Plants	*Gypsoplaca macrophylla*		G3G4	S1		
Nonvascular Plants	*Acarospora nodulosa var. nodulosa*		G5T4?	S1		
Vascular Plants	*Physaria pulvinata*	Cushion bladderpod	G1	S1	BLM/USFS	
Vascular Plants	*Lupinus crassus*	Payson lupine	G2	S2	BLM	
Vascular Plants	*Puccinellia parishii*	Parish's alkali grass	G2G3	S1		
Vascular Plants	*Astragalus naturitensis*	Naturita milkvetch	G2G3	S2S3	BLM	
Vascular Plants	*Townsendia rothrockii*	Rothrock townsend-daisy	G2G3	S2S3		
Vascular Plants	*Astragalus naturitensis*	Naturita milkvetch	G2G3	S2S3	BLM	
Vascular Plants	*Pediomelum aromaticum*	Paradox breadroot	G3	S2	BLM	
Vascular Plants	*Penstemon breviculus*	Little penstemon	G3	S2		
Vascular Plants	*Astragalus eastwoodiae*	Eastwood milk-vetch	G3	S3		
Vascular Plants	*Mimulus eastwoodiae*	Eastwood monkey-flower	G3G4	S1	BLM	
Vascular Plants	*Seriphidium pygmaeum*	Pygmy sagebrush	G4	S1		
Vascular Plants	*Phacelia constancei*	Constance's phacelia	G4	S1		
Vascular Plants	*Calochortus flexuosus*	Weak-stemmed mariposa lily	G4	S2	USFS	
Vascular Plants	*Epipactis gigantea*	Helleborine	G4	S2S3	USFS	

Major group	Scientific name	Common name	Global rank	State rank	Federal Status	State Status
Vascular Plants	*Enneapogon desvauxii*	Spike pappusgrass	G5	S1		
Vascular Plants	*Sporobolus nealleyi*	Nealley's dropseed	G5	S1		
Vascular Plants	*Adiantum capillus-veneris*	Southern maiden-hair	G5	S2		
Vascular Plants	*Pellaea suksdorfiana*	Smooth cliff-brake	G5T4?	S2		

For more information about these and other biodiversity values, see reports including but not limited to the following:

- Colorado Wildlife Action Plan http://wildlife.state.co.us/WildlifeSpecies/ColoradoWildlifeActionPlan/
- The Nature Conservancy Ecoregional Assessments.
- http://conserveonline.org/workspaces/cbdgateway/era/index_html/view.html
- Southern Rockies Ecosystem Project: http://www.restoretherockies.org/reports.html