

# **Preliminary Conservation Action Plan For Rare Plants in the Plateau Creek and Miramonte Reservoir West Priority Action Areas**



**Cushion bladderpod**  
*(Physaria pulvinata)*



**Lone Mesa snakeweed**  
*(Gutierrezia elegans)*

**Sponsored by the  
Colorado Rare Plant Conservation Initiative**

**Planning workshop date: May 6, 2010  
Report date: May 10, 2011**

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**Cover photographs by Peggy Lyon**

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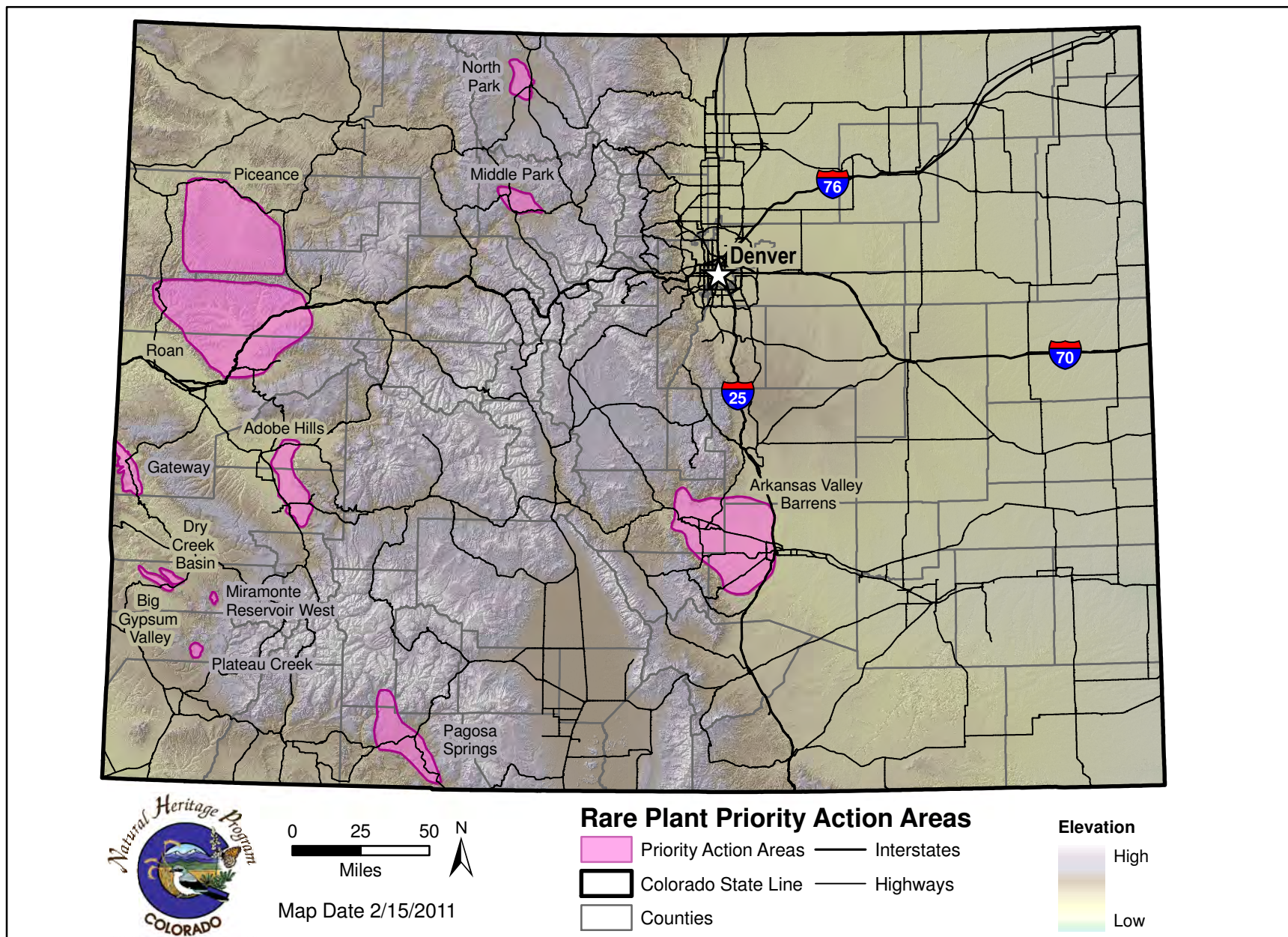
## I. Introduction

This document identifies conservation strategies for two Colorado endemic and globally imperiled plants, Cushion bladderpod (*Physaria pulvinata*) and Lone Mesa snakeweed (*Gutierrezia elegans*) in the Plateau Creek and Miramonte Reservoir West areas (also known as Groundhog Glade) in Colorado, based on an assessment of the plants' viability and threats by participants of a May 6, 2010 workshop. The primary audience is intended to be the workshop participants and other stakeholders interested in helping to implement the conservation strategies.

Plateau Creek and Miramonte Reservoir West 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 10 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 West, 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 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 and Dolores counties, the Plateau Creek and Miramonte Reservoir West Action Areas (also known as Groundhog Glade) include high quality occurrences of Cushion bladderpod (*Physaria pulvinata*, G1) and Lone Mesa snakeweed (*Gutierrezia elegans*, G1), the primary targets of this action plan. Both of these species are included in the Bureau of Land Management's Sensitive Species List (BLM 2010) and the USFS Region 2 Sensitive Species List (USFS 2008). Several other significant elements of biodiversity add conservation value to this area including the Gunnison Sage-grouse, Parish's alkali grass (*Puccinellia parishii*), and King's clover (*Trifolium kingii*). A possible new, undescribed species, to be named *Packera bettyana*, was also documented in this area.



**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 Miramonte Reservoir West and Plateau Creek sites.

## II. Imperiled plants of the Plateau Creek and Miramonte Reservoir West Priority Action Areas

### A. Cushion bladderpod (*Physaria pulvinata*)

The Cushion bladderpod (**Figure 2**) is an attractive, low-growing, yellow-flowered species in the Mustard Family (Brassicaceae). Discovered and described as a new species by James Reveal and Steve O’Kane in 2004, it is only known from Colorado. The type locality is in San Miguel County near Miramonte Reservoir.

The Colorado Natural Heritage Program (2010) at Colorado State University and NatureServe (2010) consider the Cushion bladderpod to be critically globally imperiled (G1) because it is only known from six locations in the world within two counties, and a total of about 22,000 individuals documented on a total of approximately 63 acres (Colorado Natural Heritage Program 2010). The species is known from U.S. Forest Service, Bureau of Land Management (BLM), private, and state lands, and is on the Forest Service Region 2 and the BLM State Sensitive Species Lists. No specific protection is provided by the BLM Resource Management Plan (1984 San Juan/San Miguel RMP). State Park and State Division of Wildlife (CDOW) managers are aware of the occurrences of this species and are actively working to assure its viability on State lands (Elder, Colorado State Parks, pers. comm. 2010; DelPiccolo and Archer, CDOW, pers. comm. 2010).

**Non-technical description:** Plants are low and compact, densely matted, and densely hairy. They are long-lived perennials, less than 3 dm across with reddish stems and gray-green foliage arising from a deep-seated taproot terminated by a buried, densely branched caudex system of up to several hundred branches each ending in a tufted cluster of leaves. Flowers are yellow, with four narrowly spatulate petals 4-7 mm. long. Fruit are ellipsoid, compressed, 4-6 mm. long, and densely pubescent (O’Kane and Reveal 2006).

**Phenology and reproductive ecology:** Flowering occurs in June-July; fruits are produced in July-August.

**Habitat:** The species is known from widely scattered outcrops of grayish, argillaceous shale (Mancos shale) at elevations between 7,500 and 8,500 feet (**Figure 3**). When in flower, it is often the dominant plant in openings between low shrubs of *Artemisia nova*, *Chrysopsis*, and *Tetrandeum*, and herbs such as *Sphaeralcea* and *Cryptantha* (O’Kane and Reveal 2006).

**Range:** Cushion bladderpod is a Colorado endemic known from San Miguel and Dolores counties, within an area of about 20 X 5 miles, from Miramonte Reservoir in San Miguel County to Lone Mesa in Dolores County (**Figure 4**).



**Figure 2.** Cushion bladderpod (*Physaria pulvinata*) by Peggy Lyon, CNHP.



**Figure 3.** Habitat for Cushion bladderpod (*Physaria pulvinata*) at Lone Mesa State Park by Peggy Lyon, CNHP.



**Figure 4.** Global distribution of Cushion bladderpod (*Physaria pulvinata*) shown on map of Colorado.

**Conservation Issues:** The habitat of Cushion bladderpod is threatened by over-grazing, motorized recreational uses, and excessive or repeated soil disturbance—the shale substrate where it grows is mined and used to surface local gravel roads (O’Kane and Reveal 2006). Other issues include oil and gas development, seismic testing, and residential development. Conservation issues for the Cushion bladderpod are discussed in greater detail on pages 17-19.

**Potential Conservation Areas:** This species is known from three Potential Conservation Areas delineated by the Colorado Natural Heritage Program (2010): Plateau Creek, Miramonte Reservoir West, and Dolores-Norwood Road.

## **B. Lone Mesa snakeweed (*Gutierrezia elegans*)**

Lone Mesa snakeweed (**Figure 5**) is a low, shrubby, yellow flowered species in the Sunflower Family (Asteraceae) first discovered at Lone Mesa State Park in 2008 by Peggy Lyon and Al Schneider (Schneider et al. 2008). The species is only known from Colorado.

The Colorado Natural Heritage Program (2010) at Colorado State University and NatureServe (2010) consider the Lone Mesa snakeweed to be globally imperiled (G1) because it is only known from one location in one county and no place else in the world, and a total of about 31,000 individuals have been documented (Colorado Natural Heritage Program 2010). The species, known from Bureau of Land Management (BLM), US Forest Service (USFS), private, and state lands, is on both the BLM and USFS Region 2 Sensitive Species Lists. No specific protection is currently provided by the BLM Resource Management Plan (1984 San Juan/San Miguel RMP). Lone Mesa State Park managers are aware of the occurrence of this species and are actively working to assure its viability on State Lands (Elder, Colorado State Parks, pers. comm. 2010),

**Non-technical description:** The plants are low, compact subshrubs with woody caudex branches and spreading, evenly leafy stems, yellow flowers in congested clusters, and short, 3-nerved leaves. This species differs from other species of *Gutierrezia* in having larger flowers and shorter, broader leaves (Schneider et al. 2008).

**Phenology and reproductive ecology:** Flowering occurs in July through August; fruits are produced in August-September.

**Habitat:** This species is found on outcrops of barren, grayish, argillaceous Mancos Shale at approximately 7,500-7,800 feet elevation (**Figure 6**). Lone Mesa snakeweed is scattered to abundant in the barrens and also occurs with *Artemisia nova* and other species in sites with deeper soil over the shale. Ponderosa pine and pinyon-juniper dominate the surrounding slopes.

**Range:** Lone Mesa snakeweed is a Colorado endemic that is known only from one occurrence (including several sub-occurrences) in and around Lone Mesa State Park in the Plateau Creek area in Dolores County, where it is represented by about 31,000 plants (**Figure 7**).



**Figure 5.** Lone Mesa Snakeweed (*Gutierrezia elegans*) by Peggy Lyon, CNHP.



**Figure 6.** Habitat for Lone Mesa Snakeweed (*Gutierrezia elegans*) taken in the Plateau Creek Action Area by Peggy Lyon, CNHP.



**Figure 7.** Global distribution of Lone Mesa Snakeweed (*Gutierrezia elegans*) shown on map of Colorado.



**Conservation Issues:** The species may be threatened by oil and gas development, seismic testing, excessive or repeated erosion, motorized recreation, over-grazing, water development, and climate change. Conservation issues for the Lone Mesa snakeweed are discussed in greater detail on pages 17-19.

**Potential Conservation Areas:** This species is known from the Plateau Creek Potential Conservation Area delineated by the Colorado Natural Heritage Program (2010).

### III. Plateau Creek and Miramonte Reservoir West Priority Action Areas

This document focuses on globally imperiled plants within the Plateau Creek and Miramonte Reservoir West Priority Action Areas (**Figures 8-11**).

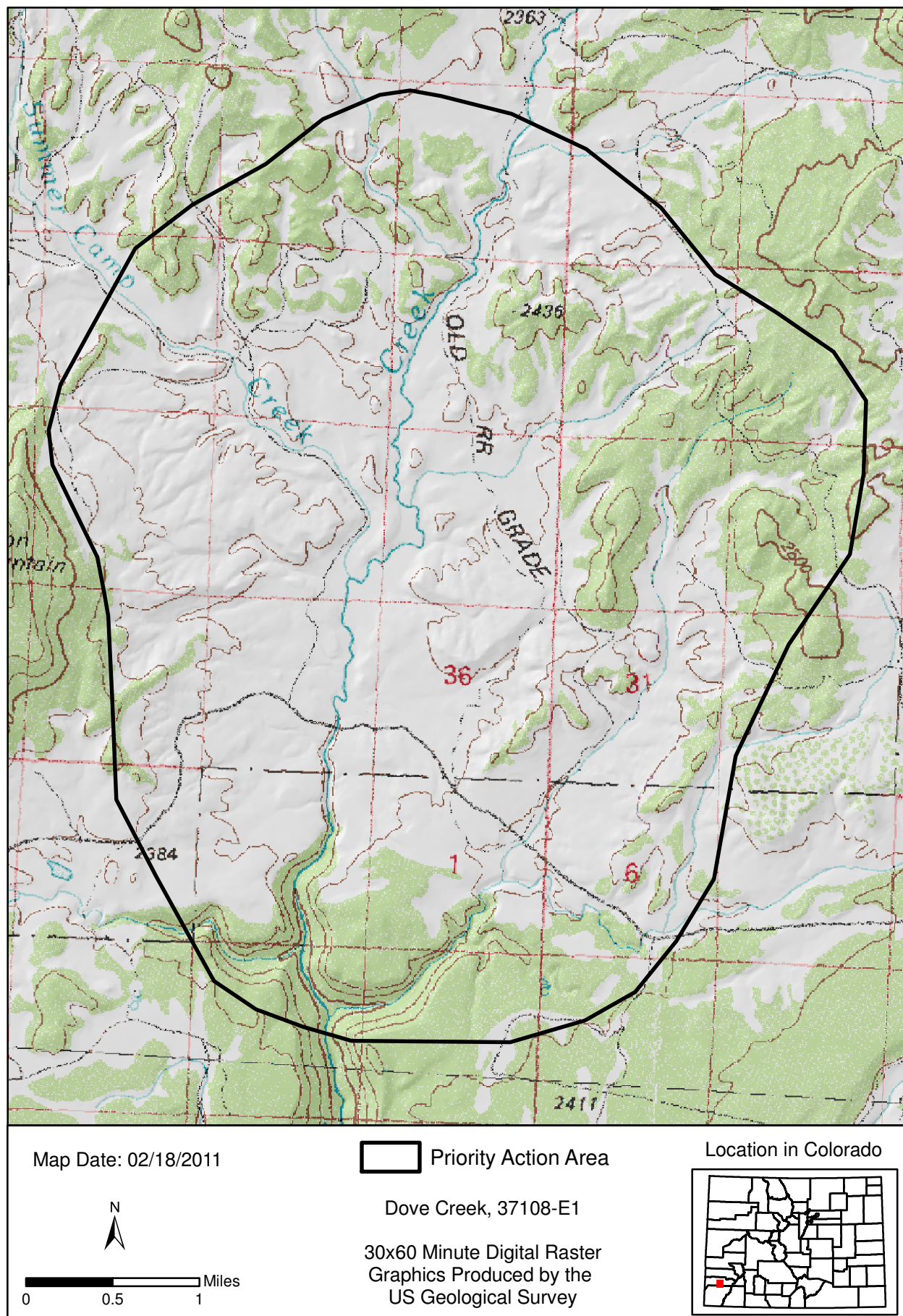
Located in San Miguel (Miramonte Reservoir West) and Dolores (Plateau Creek) counties, the Action Areas include nearly all of the known the occurrences of Cushion bladderpod (two poorly known occurrences lie between the two action areas) and all of the known occurrences of Lone Mesa snakeweed in a spectacular landscape with snow-capped peaks forming a dramatic backdrop. These Areas occur within the vicinity of the San Miguel and Dolores County High Desert Plateau Priority Landscape identified by the Colorado Conservation Partnership. These areas occur within and/or nearby the Southern Rocky Mountains Ecoregion Cottonwood Creek, San Juan Mountains and Naturita Creek Conservation Areas (TNC 2001).

Although the primary focus of this Conservation Action Plan is on the globally imperiled plants described above, there are several additional plants in the Plateau Creek-Miramonte Reservoir West area that are of conservation significance (**Table 1**). These species and associated communities should be integrated into the conservation objectives of future workshops (see also Attachment 1).

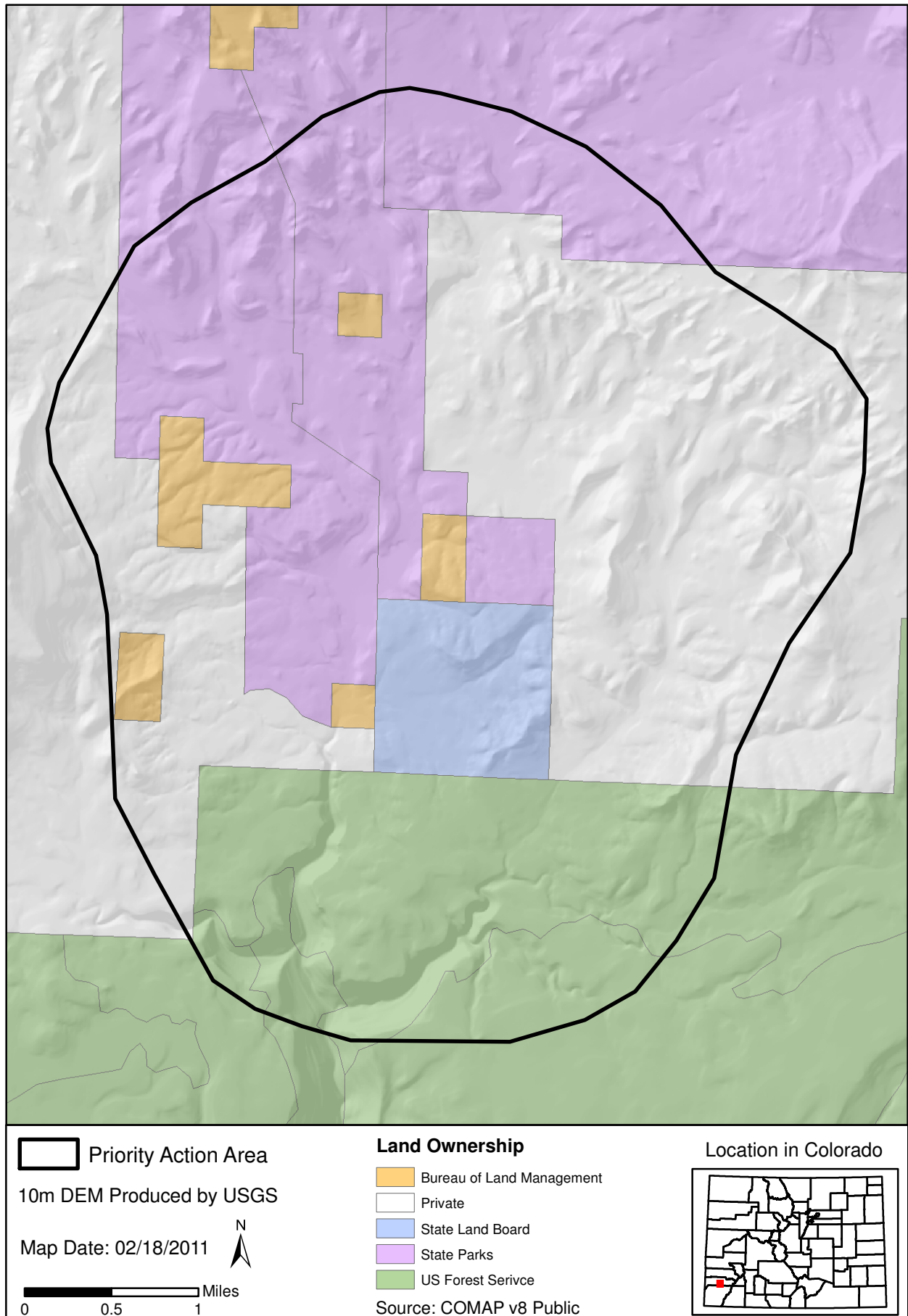
**Table 1.** Plants of Focus in the Plateau Creek and Miramonte Reservoir West Priority Action Areas (Colorado Natural Heritage Program 2010). A list of other significant taxa from this area is provided in Attachment 1.

Common name	Scientific name	Known occurrences	Global rank*	Status
Focus of the workshop and this document				
Cushion bladderpod	<i>Physaria pulvinata</i>	6 occurrences, 3 in Plateau Creek area, 1 in Miramonte area, and 2 along Dolores Norwood Road between these two areas.	G1	BLM and FS Sensitive
Lone Mesa snakeweed	<i>Gutierrezia elegans</i>	1 occurrence, with 89 distinctly mapped polygons, in Plateau Creek area.	G1	BLM and FS Sensitive
Other important rare plants – focus of future efforts				
Parish’s alkali grass	<i>Puccinellia parishii</i>	Two occurrences in Colorado, one in the Plateau Creek area, one in Miramonte area; also known from Utah	G2G3	none
Betty’s ragwort?	<i>Packera bettyana</i> (unpublished name)	Undescribed species known from one location in the world in the Plateau Creek area	G1 is anticipated	
King’s clover	<i>Trifolium kingii</i>	12 locations in Colorado, one in Plateau Creek area. Also known from AZ, NV, and UT.	G5/S2	

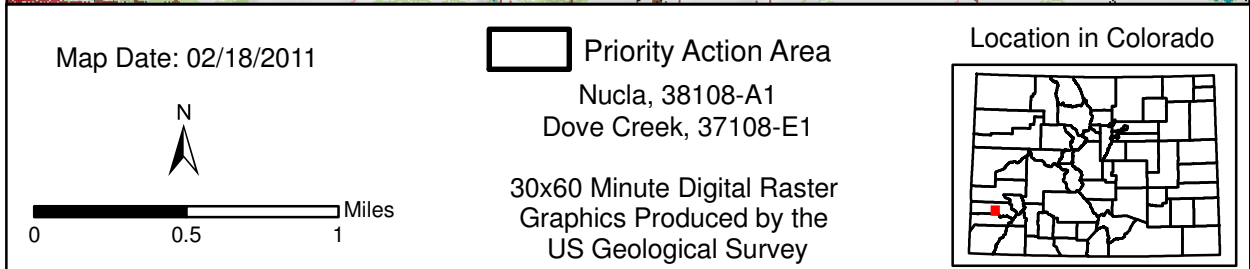
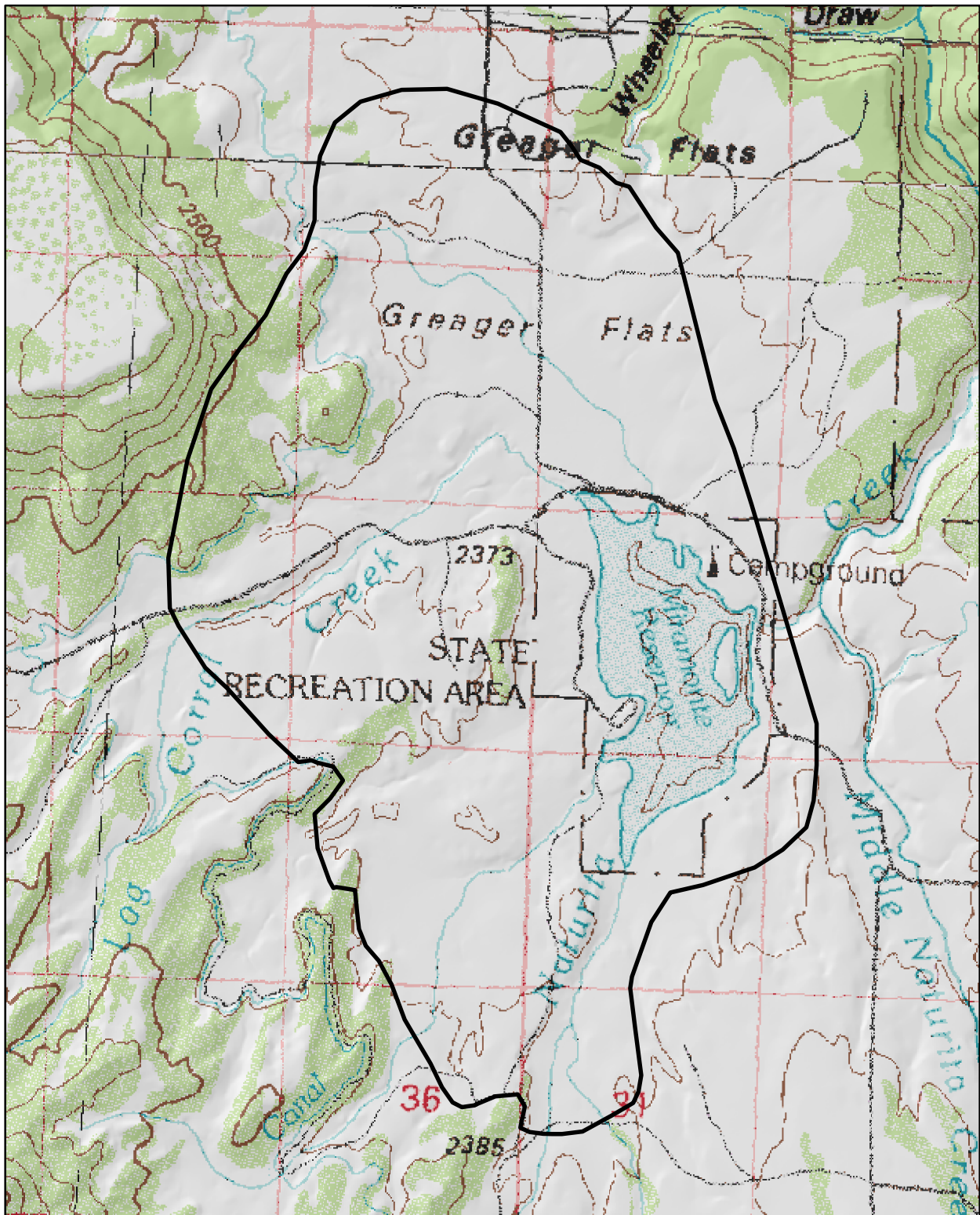
\*G1 = critically imperiled, G2 = imperiled, G3=vulnerable, G4-5=secure. G ranks indicate the level of imperilment on a global/range-wide level; S ranks indicate the level of imperilment/vulnerability on a Colorado state level. For more details on global and state ranks please visit the Colorado Natural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



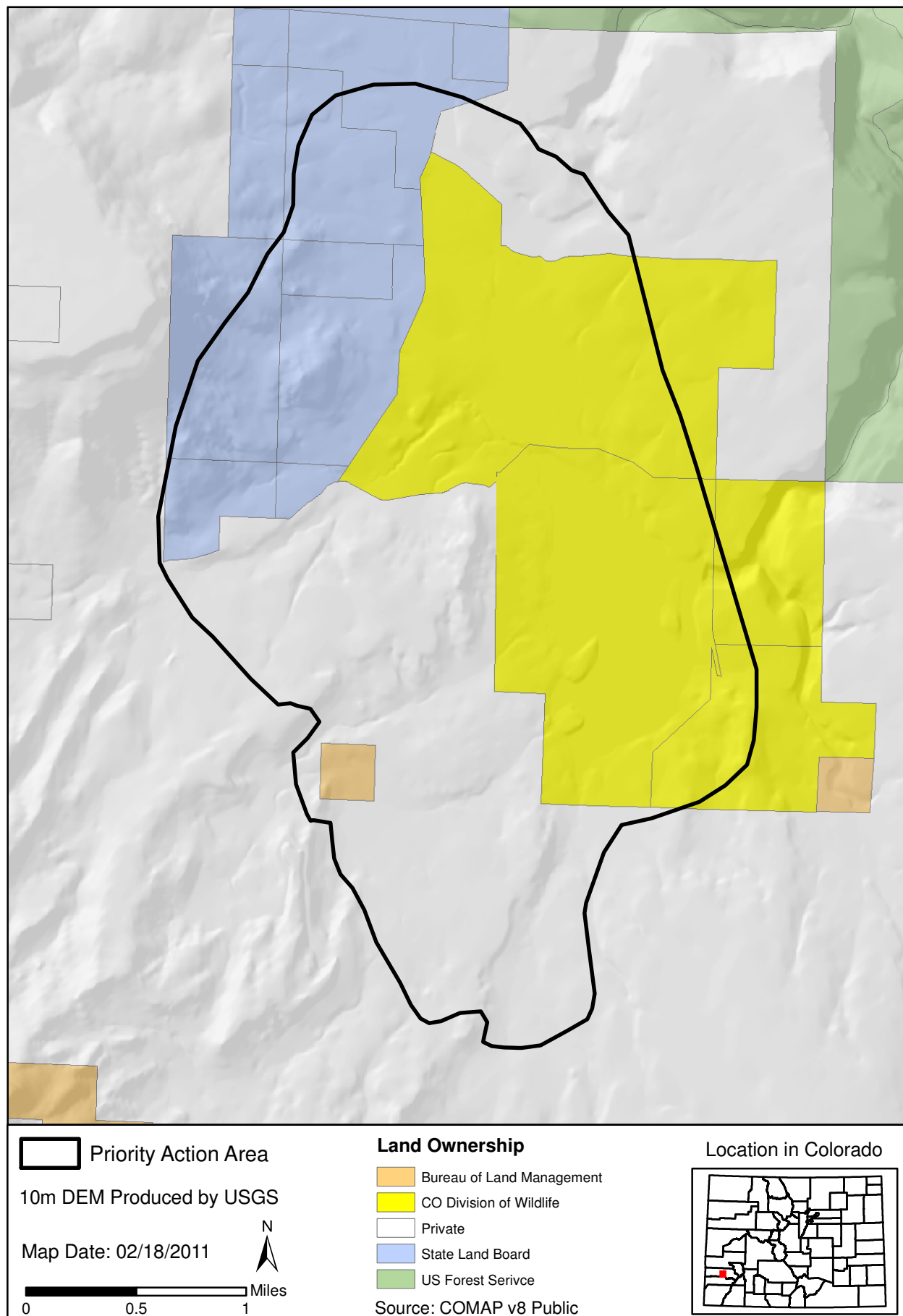
**Figure 8.** Map of the Plateau Creek Priority Action Area showing the topographic setting. Action Area boundaries are based on Potential Conservation Areas developed by the Colorado Natural Heritage Program (2010) and are recognized by the Colorado Rare Plant Conservation Initiative as Important Plant Areas (Neely et al. 2009). 9



**Figure 9.** Map of the Plateau Creek Priority Action Area 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 and Important Plant Areas (Neely et al. 2009).



**Figure 10.** Map of the Miramonte Reservoir West Priority Action Area 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 as Important Plant Areas (Neely et al. 2009).



**Figure 11.** Map of the Miramonte Reservoir West Priority Action Area 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 as Important Plant Areas (Neely et al. 2009).

## IV. Vision and Goals

**Vision:** Populations of the imperiled Cushion bladderpod and Lone Mesa snakeweed 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:

1. Complete extensive surveys for Cushion bladderpod and Lone Mesa snakeweed resulting in a high confidence that all occupied habitat is mapped.
2. Conserve all viable and restorable occurrences of the Cushion bladderpod and Lone Mesa snakeweed in Plateau Creek and Miramonte Reservoir West (total of five occurrences in this area).
3. Conserve habitat for the Cushion bladderpod and Lone Mesa snakeweed (at least 640 acres for each species).
4. 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 Cushion bladderpod and Lone Mesa snakeweed and their habitats, based on an assessment of the species viability and conservation issues in the Plateau Creek and Miramonte Reservoir West areas.

**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 6, 2010 (field trip May 5<sup>th</sup> to Miramonte Reservoir)

**Workshop Participants:**

Name	Affiliation
<b>Attended</b>	
Susan Panjabi (co-facilitator)	Colorado Natural Heritage Program
Betsy Neely (co-facilitator)	The Nature Conservancy
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
Collin Ewing	U.S. Fish and Wildlife Service
Alicia Langton	U.S. Fish and Wildlife Service
Dave Schneck	San Miguel County
Scot Elder	Colorado State Parks
Juniper Katz	Montezuma Land Conservancy
Renzo DelPiccolo	Colorado Division of Wildlife
Ivan Archer	Colorado Division of Wildlife
<b>Unable to Attend</b>	
Peter Mueller	The Nature Conservancy
Cara MacMillan	Bureau of Land Management
Nina Williams	Montezuma Land Conservancy
Ellen Mayo	US Fish and Wildlife
Gina Glenne	US Fish and Wildlife
Erin Robertson	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
Linda L. Broderick	San Miguel County Open Space
Al Schneider	Botanist/photographer
<b>Other Contacts</b>	
Vince Tepidino	Utah State University
Mike Klish	Westwater Engineering
Terry Ireland	U.S. Fish and Wildlife Service



## V. Workshop Results

### A. Conservation Targets

Using The Nature Conservancy’s (TNC) site conservation planning 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 threats and conservation strategies, and measuring conservation effectiveness. At the Plateau Creek and Miramonte Reservoir West Priority Action Areas, our targets are specific locations of the Cushion bladderpod and Lone Mesa snakeweed plants, identified more specifically based on land ownership.

At the Workshop, we organized the occurrences of Cushion bladderpod and Lone Mesa snakeweed into seven 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 seven targets based on landownership and presence of Cushion bladderpod and Lone Mesa snakeweed. For example, there are five targets identified for the imperiled species at the Plateau Creek site: Plateau Creek BLM, Plateau Creek USFS, Plateau Creek State Parks, Plateau Creek State Land Board, and Plateau Creek 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)
Plateau Creek, B1	<ul style="list-style-type: none"> <li>• BLM</li> <li>• USFS</li> <li>• State Park</li> <li>• State Land Board</li> <li>• private</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Lone Mesa snakeweed</b>      A</li> <li>▪ <b>Only known location!</b></li> <li>▪ <b>Cushion bladderpod</b>      A</li> </ul> <p>Other significant plant species:            King’s clover (<i>Trifolium kingii</i>)      B  <i>Packera bettyana</i> (potential undescribed species)</p>
Miramonte Reservoir West, B1	<ul style="list-style-type: none"> <li>• State Division of Wildlife (CDOW)</li> <li>• private</li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Cushion bladderpod</b>      A</li> </ul> <p>Other significant plant species:            Parish's alkali grass (<i>Puccinellia parishii</i>)      A</p>

\* 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

\*\*B1= Area of Outstanding Biodiversity Significance; B2=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 Cushion bladderpod and Lone Mesa snakeweed.

		<b>Indicator rating criteria</b>			
<b>Key Attribute</b>	<b>Indicator</b>	<b>D – Poor</b>	<b>C - Fair</b>	<b>B - Good</b>	<b>A - Very Good</b>
<b>LANDSCAPE CONTEXT:</b> Intactness of occurrence and surrounding area	% Fragmentation	Highly fragmented	Moderately fragmented	Limited fragmentation	Unfragmented
<b>CONDITION:</b> Population structure & recruitment	Evidence of reproduction	Little or no evidence of successful reproduction (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
<b>CONDITION:</b> Species composition / dominance	Percent ground cover of invasive species	>50% cover	11-50% cover	1-10% cover	<1% cover
<b>SIZE:</b> 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 four occurrences of Cushion bladderpod and the one occurrence of Lone Mesa snakeweed in the Plateau Creek and Miramonte Reservoir West Priority Action Areas. Two poorly known occurrences of Cushion bladderpod, known from sites located between the two action areas, are not included in this analysis.

Target Area	Viability Rank*	Occurrence ID # (CNHP)
Cushion bladderpod		
Miramonte Reservoir West	Very Good (A)	2
Plateau Creek	Good (B)	4
Plateau Creek	Very Good (A)	5
Plateau Creek	Very Good (A)	1
Lone Mesa snakeweed		
Plateau Creek	Very Good (A)	1

\* 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 good to excellent condition, the primary conservation issues for the habitat of the Cushion bladderpod and the Lone Mesa snakeweed are oil and gas development (and associated infrastructure including roads, pipelines, exploration activities, etc.), seismic testing, un-authorized motorized recreation, water development, residential development, grazing, excessive or repeated erosion, and climate change.

**Oil and gas exploration and development:** Although much of the land in the area of concern has not been leased, the state does not own mineral rights and there is a great deal of uncertainty regarding federal mineral rights, which are managed by the BLM. Although information is needed about the existence of leases within the Action Area boundaries, workshop participants

agreed that the potential risk of oil and gas development was high. The BLM has 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 a lease package goes out, BLM could place necessary stipulations on lease. However, No Surface Occupancy (NSO) stipulations will not apply to old leases, only new ones.

**Seismic testing:** There is potential for a great deal of disturbance from roads to the actual test sites where there is drilling and dynamite blasting, etc.

**Motorized recreation:** Unmanaged vehicle use is potentially damaging to the plants, their pollinators, and habitat. Currently, the damage from motorized recreation is rare and localized, but actions need to be taken to assure that further damage to the plants does not occur.

**Residential development:** Private lands that support the plants do not currently have protection measures in place, such as conservation easements or management agreements. Further inventories on private lands may also reveal additional areas needing protection.

**Grazing:** If managed properly, domestic livestock grazing may not be an issue. Cattle do not eat the plants but they can trample and uproot them.

**Erosion:** Localized erosion issues resulting in excessive or repeated erosion events, for example along an old road near Miramonte Reservoir, may result in the loss of individuals and habitat.

**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. 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. Colorado will likely become hotter and drier with shorter snow seasons, earlier snow melt, and longer fire seasons. These potential impacts will interact with other stresses to rare plants, e.g., loss or fragmentation of habitat from development, mining, and increase of invasive species. The 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 Cushion bladderpod and the Lone Mesa snakeweed.

**Table 5.** Conservation issues for each target. H = high impact, M = medium impact; L = low impact’  
N/A= not applicable.

<b>Conservation Issue</b>	<b>Miramonte-CDOW</b>	<b>Miramonte-Private</b>	<b>Plateau Creek-BLM</b>	<b>Plateau Creek-USFS</b>	<b>Plateau Creek-State Parks</b>	<b>Plateau Creek-State Land Board</b>	<b>Plateau Creek-Private</b>
<b>Oil and Gas Development</b>	H	H	H	H	H?	H	H
<b>Seismic Testing</b>	H	H	H	H	H	H	H
<b>Erosion</b>	M	M	M	M	M	M	M
<b>Climate Change</b>	M	M	M	M	M	M	M
<b>Residential Development</b>	N/A	H	N/A	N/A	N/A	N/A	?
<b>Potential Dam Construction</b>	N/A	N/A	N/A	N/A	H-though not imminent	N/A	N/A
<b>Unauthorized Motorized Recreation</b>	M	N/A	M	M	L	N/A	N/A
<b>Grazing</b>	L	L	L	L	L	M	L
<b>Invasive Plants</b>	L	L	L	L	L	L	L
<b>Fire Fuels Mitigation</b>	L	L	L	L	L	L	L
<b>Non-motorized Recreation/ Access</b>	L	N/A	N/A	N/A	L	N/A	N/A
<b>Infrastructure Development</b>	L	N/A	N/A	N/A	L	N/A	N/A
<b>Road Maintenance</b>	L	L	N/A	N/A	N/A	N/A	N/A
<b>Tree Removal for Protection of Sage Grouse Habitat</b>	L	N/A	N/A	N/A	N/A	N/A	N/A
<b>Archeological Sites that overlap Rare Plant Habitat</b>	N/A	N/A	N/A	N/A	L	N/A	N/A

#### ***D. Strategies***

Based on an understanding of the status of Cushion bladderpod and Lone Mesa snakeweed in the Plateau Creek and Miramonte Reservoir West area, participants identified strategies to support the long-term conservation of these 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 Cushion bladderpod and Lone Mesa snakeweed in Plateau Creek and Lone Mesa State Park. Highest priority strategies are listed first.

<b>Conservation Issue/Threat</b>	<b>Site</b>	<b>Owner/ Manager</b>	<b>Strategy</b>	<b>Priority level for Strategy</b>	<b>Lead</b>	<b>Notes/Action steps</b>
Oil and Gas Development	all	all	Distribute and encourage implementation of Best Management Practices (BMPs) developed by RPCI (Elliot et al. 2009)	1	Susan	
Oil and Gas Development	all	all	Meet with the Oil and Gas Commission and permitting office staff	1	RPCI	
Oil and Gas Development	all	all	Make contacts to find out when oil and gas development activities will overlap rare plant habitat	1	Bernadette	
Oil and Gas Development	Plateau Creek	BLM	Take steps with BLM for no surface occupancy	1	Susan and Collin (or perhaps someone else with USFWS now that Collin has taken another job)	
Oil and Gas Development	Plateau Creek	all	Find out what Western Resources Group is doing with mineral resource issues, and consider collaborations	1	Juniper	

<b>Conservation Issue/Threat</b>	<b>Site</b>	<b>Owner/ Manager</b>	<b>Strategy</b>	<b>Priority level for Strategy</b>	<b>Lead</b>	<b>Notes/Action steps</b>
Oil and Gas Development, Seismic testing, and Motorized recreation	Plateau Creek	BLM	Comment on the BLM San Juan Resource Area Resource Management Plan (RMP) and ask the BLM to include information in Alternatives that take plants in to consideration, e.g., NSO, no lease, ACEC establishments	1	Susan and Collin (or other USFWS staff as Collin has taken another job)	
Motorized Recreation	Miramonte	CDOW	Strategically place physical barriers to protect rare plant habitat	1	Ivan/Brian	
Motorized recreation	Miramonte	CDOW	Education--develop and strategically place kiosks/signs/brochures and flyers about plant to help raise awareness	1	Brian Kurzel/Ivan	
Motorized recreation	Plateau Creek	BLM and USFS	Comment on BLM San Juan Travel Management Plan and RMP	1	Susan, Collin	
Residential development	Miramonte	private	Pursue conservation easements, or covenants	1	Juniper, Montezuma Land Conservancy	
Residential development	Miramonte	private	Work with developers to avoid rare plant locations	1	Juniper, Montezuma Land Conservancy	
All threats	all	all	Education: alert land owners and managers			
All threats	all	all	Monitor population status to detect declines or changes in occurrence quality and condition		Peggy and Brian	continue on Forest and Park



<b>Conservation Issue/Threat</b>	<b>Site</b>	<b>Owner/ Manager</b>	<b>Strategy</b>	<b>Priority level for Strategy</b>	<b>Lead</b>	<b>Notes/Action steps</b>
All threats	all	all	Conduct demographic research to better understand how long lived the plants are, life cycle, seed dissemination etc.		Peggy and Brian	find PhD student, find funding
All threats	all	all	Conduct pollination ecology studies to determine which insect species are significant to the survival of the rare plants		Denver Botanic Gardens	DBG is proposing to include Cushion bladderpod in a project investigating germination requirements and pollinator needs in 2011
Oil and Gas Development	all	all	Work with operator during surface use agreement creation		specific land owner/ manager	
Oil and Gas Development	San Miguel County	private	Pursue conservation easements that can encumber mineral rights and/or commit to land uses that are favorable to rare plant protection		CCALT or Montezuma Land Conservancy?	
Climate change	all	all	Develop adaptation strategies to help plants cope with changing climate			
Climate change	all	all	Collect and store seeds of the rare plants in cooperation with the Denver Botanic Gardens and the Center for Plant Conservation		Denver Botanic Gardens/ BLM	

<b>Conservation Issue/Threat</b>	<b>Site</b>	<b>Owner/ Manager</b>	<b>Strategy</b>	<b>Priority level for Strategy</b>	<b>Lead</b>	<b>Notes/Action steps</b>
Climate change	all	all	Establish phenological research and long-term monitoring plots to better understand potential response to climate change			
Erosion	Miramonte	CDOW	Use water bars, cut outs, and sand bags to disperse water in old road area to control erosion		Ivan	
Erosion	Plateau Creek	State Park	Bank stabilization is needed along the Dolores River, Dr. Dott will do riparian assessment and help address head cutting		Scot	Work with Dr. Cynthia Dott, Fort Lewis College to create management plan
Motorized recreation	all	all	Education--field trip with Colorado Native Plant Society--June 4-5 2010--is an example of an opportunity to raise awareness.		Peggy	Done
Residential development	Miramonte	private	Participate in/comment on San Miguel County comprehensive planning			
Residential development	Miramonte	private	Participate in/comment on County open space conservation planning			
Archaeology	Plateau Creek	State Park	Work with tribes and others to protect rare plants during research and archeological activities		Scot	Archeological assessments are being done throughout the Park.

<b>Conservation Issue/Threat</b>	<b>Site</b>	<b>Owner/ Manager</b>	<b>Strategy</b>	<b>Priority level for Strategy</b>	<b>Lead</b>	<b>Notes/Action steps</b>
Dam construction	Plateau Creek	all	Education: make sure that the water conservancy people know about rare plants and take them into consideration		Al Schneider	
Fire mitigation	all	all	Education: make sure fire fuels reduction people know where rare plants are			
Fire mitigation	Miramonte	CDOW	Work to avoid disturbing the rare plants during tree removal activities		Ivan	

## **VI. Next Steps**

1. January 2011: Schedule a conference call for January 2011 to obtain feedback, refine strategies, rank other strategies, solidify priorities, leads, and action steps (Betsy/Susan).
2. Ongoing: The leads for all high- and medium-ranked strategies are responsible for ensuring their implementation.
3. January-May 2011: Investigate possibility of working with the State Land Board on land protection (Betsy, Susan, Brian).
4. June-July 2011: Conduct further inventory for target species in potential habitat.
5. 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 a local leader for the Plateau Creek-Miramonte Reservoir West Priority Action Areas. A leader for this area has not been identified. Until such a lead is established, Betsy Neely from TNC/RPCI will coordinate as much as possible, as funding allows. Preferably this meeting would occur in the summer (June-July 2011) so a field visit to the plants is also possible.

## **VII. References**

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## Attachment 1. Additional key species and plant communities in the Plateau Creek-Miramonte Reservoir West area.

Although the focus of the workshop was on the globally imperiled plants, other key species and plant communities are known from the Plateau Creek-Miramonte Reservoir West area as listed in the table below (Colorado Natural Heritage Program 2011?, <http://www.cnhp.colostate.edu/>).

Major Group	Scientific name	Common name	Global rank	State rank	Federal Status	State status
Birds	<i>Centrocercus minimus</i>	Gunnison Sage Grouse	G1	S1	BLM/USFS	SC
Birds	<i>Melanerpes lewis</i>	Lewis's Woodpecker	G4	S4	USFS	
Birds	<i>Dendroica graciae</i>	Grace's Warbler	G5	S3B		
Birds	<i>Empidonax traillii extimus</i>	Southwestern Willow Flycatcher	G5T1	SNA	LE	SE
Natural Communities	<i>Populus angustifolia / Crataegus rivularis Woodland</i>	Narrowleaf Cottonwood Riparian Forests	G2	S2		
Natural Communities	<i>Salix ligulifolia Shrubland</i>	Montane Willow Carr	G2	S2		
Natural Communities	<i>Crataegus rivularis Shrubland</i>	Foothills Riparian Shrubland	G2	S2		

Major Group	Scientific name	Common name	Global rank	State rank	Federal Status	State status
Natural Communities	<i>Populus angustifolia</i> - <i>Picea pungens</i> / <i>Alnus incana</i> Woodland	Montane Riparian Forests	G3	S3		
Natural Communities	<i>Salix monticola</i> / <i>Carex utriculata</i> Shrubland	Montane Riparian Willow Carr	G3	S3		
Natural Communities	<i>Picea pungens</i> / <i>Alnus incana</i> Woodland	Montane Riparian Forests	G3	S3		
Natural Communities	<i>Salix bebbiana</i> Shrubland	Montane Willow Carrs	G3	S2		
Natural Communities	<i>Salix monticola</i> / <i>Mesic Forbs</i> Shrubland	Montane Riparian Willow Carr	G4	S3		
Reptiles	<i>Aspidoscelis velox</i>	Plateau Striped Whiptail	G5	S4		
Reptiles	<i>Crotalus oreganus concolor</i>	Midget Faded Rattlesnake	G5T4	S3	BLM	SC
Vascular Plants	<i>Cryptantha gypsophila</i>	Gypsum Valley cateye	G1	S1	BLM	
Vascular Plants	<i>Puccinellia parishii</i>	Parish's alkali grass	G2	S1		
Vascular Plants	<i>Townsendia rothrockii</i>	Rothrock townsend-daisy	G2	S2		
Vascular Plants	<i>Calochortus flexuosus</i>	Weak-stemmed mariposa lily	G4	S2	USFS	
Vascular Plants	<i>Trifolium kingii</i>	King's clover	G5	S1		

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/cbd/era/reports/index.html>
- Southern Rockies Ecosystem Project: <http://www.restoretherockies.org/reports.html>