



**RECOMMENDED BEST
MANAGEMENT
PRACTICES
for Cushion Bladderpod
(*Physaria pulvinata*)**

**Practices to
Reduce the Impacts of
Road Maintenance Activities
to Plants of Concern**

CNHP's mission: We advance conservation of Colorado's native species and ecosystems through science, planning, and education for the benefit of current and future generations.

Colorado Natural Heritage Program

Warner College of Natural Resources
Colorado State University
1475 Campus Delivery
Fort Collins, CO 80523
(970) 491-7331

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Front Cover: *Physaria pulvinata* plants and habitat, from top to bottom,
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Susan Panjabi and Gabrielle Smith

Colorado Natural Heritage Program
Warner College of Natural Resources

Colorado State University
Fort Collins, Colorado 80523



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INTRODUCTION

Cushion bladderpod (*Physaria pulvinata*) is a low, compact plant in the Brassicaceae (Mustard Family). It is densely matted and hairy, less than 3 dm across with 4-petaled yellow flowers. It is known from widely scattered outcrops of grayish Mancos shale in San Miguel and Dolores counties, Colorado, and is considered to be imperiled at a global and state level (G1/S1; Colorado Natural Heritage Program 2017). One of the biggest conservation issues for this imperiled plant species is the lack of awareness of its existence and status. Avoiding or minimizing impacts to this species during road maintenance activities will effectively help to conserve its habitat and is unlikely to confer substantial impacts on road maintenance goals and projects. The Best Management Practices (BMPs) included in this document are intended to help increase the awareness of this species for anyone involved in road maintenance activities.

The desired outcome of these recommended BMPs is to reduce significantly the impacts of road maintenance activities to the Cushion bladderpod on federal, state, and/or private land. The BMPs listed here are intended to be iterative, and to evolve over time as additional information about the Cushion bladderpod becomes available, or as road maintenance technologies develop.

The intent of these BMPs is to inform people working along roadside areas regarding the importance of cushion bladderpod, one of Colorado's botanical treasures, and to outline some of the ways in which this species can coexist with road maintenance activities. The implementation of these recommendations will help to assure that maintenance activities proceed without unintended harm to these globally imperiled plants. A summary checklist of BMPs is presented in **Appendix One**.

BEST MANAGEMENT PRACTICES FOR CUSHION BLADDERPOD (*PHYSARIA PULVINATA*):

1. Gather mapped location information for Cushion bladderpod along roadsides (within 20 meters/22 yards of all roads: CDOT, County, USFS, BLM, and municipalities) consulting with the Colorado Natural Heritage Program (CNHP) at Colorado State University, local herbaria, and other known sources of rare plant location data. In 2014 and 2016 this step was conducted by the Colorado Natural Heritage Program as part of a pilot project to conserve roadside populations of globally imperiled plants (Panjabi and Smith 2014).
2. Work with the Colorado Natural Heritage Program to create **Special Management Areas** based on the distribution of Cushion bladderpod within 20 meters/22 yards of roads and a recommended avoidance buffer of up to 200 meters/218 yards. The 200 meter/218 yard buffer reduces dust transport, weed invasion, herbicide damage, magnesium chloride damage, and other unintended impacts, such as disturbance of hydrological setting. It also reduces impact to pollinators and their habitat. **Special Management Areas** (maps and

data tables) are presented in **Appendix Two** if a data sharing agreement has been signed with the Colorado Natural Heritage Program.

3. Prior to road maintenance work, the field supervisor (CDOT) or land manager (County, BLM, etc.) should provide maps to road crews showing all known Special Management Areas for the plants (as hard-copy and GIS files, and including the UTM coordinates indicating the extent of the Special Management Areas along roads). The maps and other data should be “species blind”; they should *not* indicate what species are found within the Special Management Areas (Cushion bladderpod as well as other rare taxa). The maps should be updated as new plant locations are found.
4. Within the Special Management Areas the roadsides should not be seeded, sprayed or mowed to avoid disturbance to soils, plants, and habitat. This includes all brush control, fire control, and weed control. (For appropriate management of noxious weeds, please refer to the Noxious Weed Management section below.) Dust abatement applications, if necessary, should be comprised of water only, with use of magnesium chloride limited to the minimum extent necessary.
5. If mowing is necessary, for example for safety reasons, avoid mowing from June 1-August 31. If mowing is necessary during June 1-August 31, mow with as high of a blade height as practicable, and do not drive over/park on top of the plants.
6. Discourage use of vehicle pull-off and turn-around areas where the plants are present. Signage, fencing, obstacles (boulders) are possible solutions.
7. If grading is necessary, following rain or other events that wash out roads, avoid burying the rare plants.
8. Snow and ice control measures present some concerns for the Special Management Areas, though public safety is a priority. When possible, plowing, deicer and sand applications, rock slide removal, snow fence maintenance and construction activities should consider the locations of the Special Management Areas. For example, sand applications could cover plants when the snow melts and should be avoided if possible.
9. Locating signs away from Special Management Areas would benefit the Cushion bladderpod if guardrails need to be installed/repared, minimize impacts to the bladderpod to the greatest extent possible.
10. Transplanting is not recommended under any circumstances.
11. Develop monitoring plans for the roadside locations of Cushion bladderpod, with the goals of detecting any decrease in the population size or condition, and/or needs for restoration efforts and/or noxious weed management.

12. Minimize impacts to Cushion bladderpod habitat through appropriate and creative project planning. Some examples of appropriate and creative project planning include:
 - Wash vehicles and other equipment to reduce the spread of noxious weeds from other areas.
 - Assure that straw and hay bales used for erosion control are certified free of noxious weeds.
 - Contact the Colorado Natural Heritage Program at Colorado State University when planning ground breaking activities at or near (within 200 meters/218 yards of) Cushion bladderpod sites.

NOXIOUS WEED MANAGEMENT IN HABITAT FOR CUSHION BLADDERPOD (*PHYSARIA PULVINATA*):

1. Document, map, monitor and control all infestations of noxious weeds (Colorado Noxious Weed Act 2003) and other non-native invasive plant species in and adjacent to occupied habitat for Cushion bladderpod. The Colorado Noxious Weed List can be found online at: <https://www.colorado.gov/pacific/agconservation/noxious-weed-species>
2. Monitor Special Management Areas for new weed infestations. Noxious weeds in close proximity (within 400–800 meters/437-875 yards) to the plants of concern should be the highest priority for control. Ensure that the rare plants are protected from any damage resulting from weed control efforts.
3. Control noxious weeds using integrated techniques. Limit chemical control in areas within 200 meters/218 yards of rare plant species to avoid damage to non-target species. Mechanical or chemical control in and near rare plant habitat should only be implemented by personnel familiar with the rare plants.
4. Herbicide application should be kept at least 200 meters/218 yards from known plant populations, except in instances where weed populations threaten habitat integrity or plant populations. Great care should be used to avoid pesticide drift in those cases.
5. For further information on managing weeds in the vicinity of rare plant populations please see the Recommended Best Management Practices for Managing Noxious Weeds on Sites with Rare Plants (Mui and Panjabi 2016). Link provided here: http://www.cnhp.colostate.edu/download/documents/2016/BMP_Noxious_Weeds_on_Sites_with_Rare_Plants_CMui_SPanjabi_May_2016.pdf.

OTHER NEEDS AND RECOMMENDED GUIDELINES

Further inventory, monitoring, research, and conservation planning is recommended for the Cushion bladderpod to assist with future development and implementation of these Best

Management Practices (BMPs), as well as our basic understanding of this rare species. As we work to manage for the long-term viability of the Cushion bladderpod it will be important to conduct botanical surveys (inventories) and map new locations to improve our understanding about how roadside locations contribute to full species distribution. Inventory work may also help to identify sites that could be suitable for conservation efforts. Monitoring roadside locations is important to determine if the BMPs are effective, and clarify the conservation status of the species. Research into pollination ecology, recommended setbacks, and phenology is also suggested. As these research efforts are undertaken, the following recommendations can help assure high quality results that will be most useful in conservation planning activities.

1. Botanical field surveys should be conducted by qualified individual(s) with botanical expertise, according to commonly accepted survey protocols, and using suitable GPS equipment. The Colorado Natural Heritage Program (CNHP) at Colorado State University can provide references, field forms, etc. Surveys should be repeated at least once every 10 years. Prioritize surveys on preferred geologic substrates within species range.
2. Botanical field surveys should be conducted during June and July when the Cushion bladderpod is in bloom and in August when in fruit as the plants can be detected and accurately identified. In some cases multi-year surveys may be necessary, e.g., if drought conditions occur during the survey window.
3. If Cushion bladderpod (or other species of concern) are found within the survey area, the botanist should endeavor to determine the complete extent of the occurrence and the approximate number of individuals within the occurrence. Ideally, occurrences should be delineated by GPS and the results imported to GIS for inclusion on updated project maps.
4. Field survey results should be reported to CNHP, and to appropriate land managers. A photograph or voucher specimen (if sufficient individuals are present) should be taken. Vouchers should be deposited in one of Colorado's major herbaria (e.g., University of Colorado, Colorado State University, Denver Botanic Gardens). Negative results of surveys should also be reported to CNHP.
5. Perform frequent and timely inspections of development sites and plants of concern occurrences to ensure that BMPs are being followed, and to identify areas of potential conflict. Inspections of plant occurrences should be performed by a botanist or other qualified personnel.
6. Monitoring is more likely to succeed if properly planned. Collection of baseline data, prior to any impact, is vital. Although land management agencies may have specific monitoring guidelines, an excellent reference for developing and implementing a monitoring plan is Elzinga et al. (1997).

7. Monitor impacts on plants of concern from road maintenance or other activities in the area. If impacts are noted, change management to address the cause of impacts.
8. Develop and implement monitoring plans for noxious weeds. Plans should be designed to detect new infestations and document the extent and spread of existing weeds.

SPECIES PROFILE

Physaria pulvinata (Cushion Bladderpod)

Brassicaceae (Mustard Family)



Close up of Cushion bladderpod (*Physaria pulvinata*) in flower by Al Schneider.



Close up of cushion bladderpod (*Physaria pulvinata*) in flower by Al Schneider.



Close up of cushion bladderpod (*Physaria pulvinata*) seed pods by Al Schneider.

Ranks and Status

Global rank: G1

State rank: S1

Federal protection status: USFS Sensitive, BLM Sensitive

State protection status: None

Description and Phenology

General description: Cushion bladderpod (*Physaria pulvinata*) plants are low and compact, densely matted and densely hairy. A long-lived perennial, 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. Fruits are ellipsoid, compressed, 4-6 mm long and densely pubescent (O'Kane and Reveal 2006).

Look Alikes: Cushion bladderpod is not likely to be confused with other species in this habitat in this part of Colorado.

Phenology: Plants flower in June-July and produce fruit in August (Colorado Natural Heritage Program 2012).

Habitat



Habitat of cushion bladderpod (*Physaria pulvinata*) by Bernadette Kuhn (above) and Al Schneider (below).

Habitat description: The cushion bladderpod is known from widely scattered outcrops of grayish, argillaceous (Mancos) shale. It grows in openings between low shrubs *Artemisia nova*, *Chrysopsis*, and *Tetrandeum*, and forbs *Sphaeralcea* and *Cryptantha* (O'Kane and Reveal 2006).

Elevation Range: 7,543 - 8,487 feet, 2,299 - 2,587 meters.

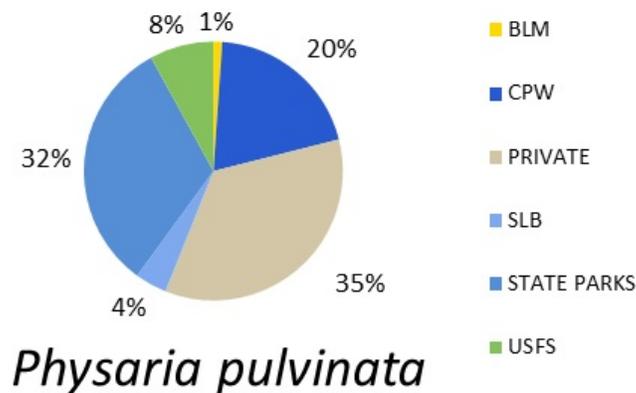
Distribution

Colorado endemic: Yes

Global range: Cushion bladderpod is endemic to Colorado and is known from San Miguel and Dolores counties. Estimated range is 55 square kilometers (21 square miles), calculated in GIS by drawing a minimum convex polygon around the known occurrences (calculated by the Colorado Natural Heritage Program in 2008).

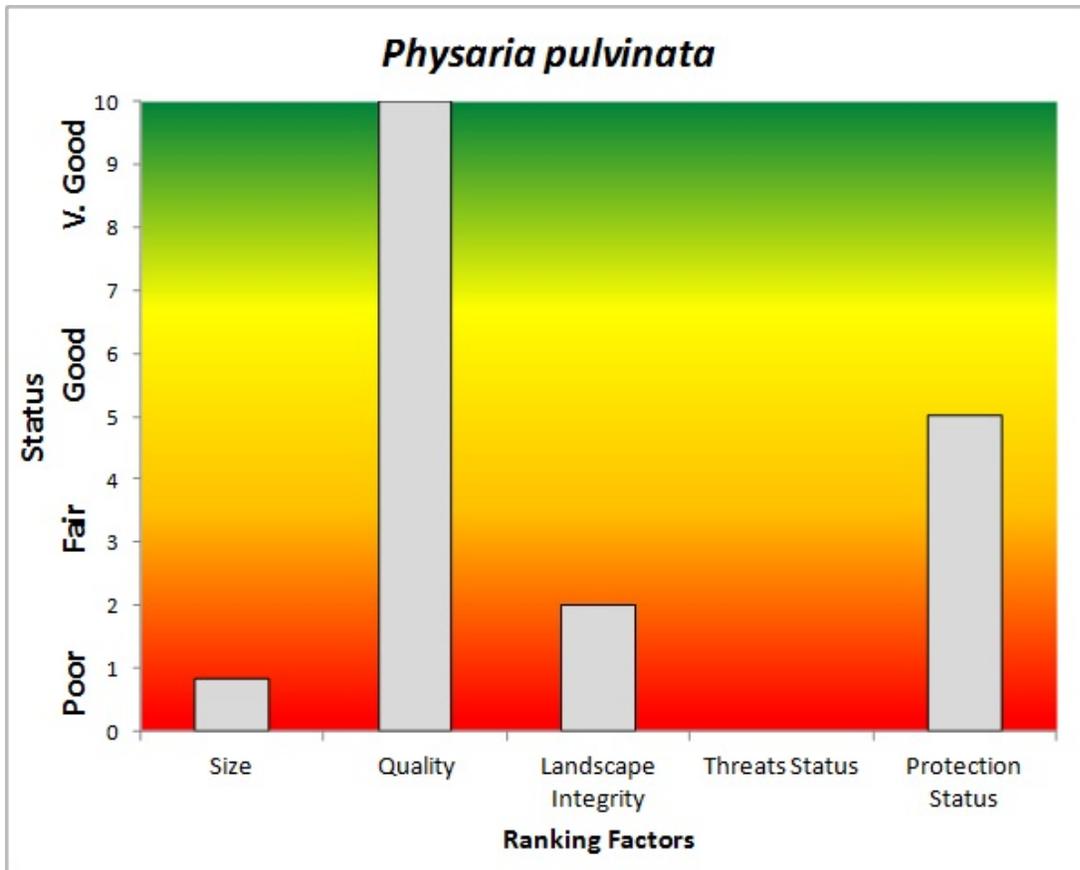


Distribution of cushion bladderpod (*Physaria pulvinata*) in Colorado.



Distribution of cushion bladderpod (*Physaria pulvinata*) in Colorado according to mapped land ownership/management boundaries (Lavender et al. 2011, COMaP v9).

Threats and Management Issues



Summary results of an analysis of the status of Cushion bladderod (*Physaria pulvinata*) based on several ranking factors. This species was concluded to be “Weakly Conserved”. From Rondeau et al. 2011.

The primary threat is considered to be recreation, both motorized and non-motorized. This species also is threatened by over-grazing, road maintenance activities, and removal of shale for road work (Colorado Natural Heritage Program 2017, O’Kane and Reveal 2006).

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APPENDIX ONE-SMA BMP CHECKLIST

This checklist is intended as a reminder for the Best Management Practices (BMPs) presented in the full report above that are recommended for the Special Management Areas (SMAs) presented in Appendix Two. Please see the full report for further details about the recommended BMPs listed here.

1. Avoid seeding, spraying, and mowing.
2. If mowing is necessary, avoid mowing during the “No Mow Dates”. If mowing is necessary during the “No Mow Dates”, mow with as high of a blade height as practicable, and do not drive over/park on top of the plants.
3. If weed control is necessary, use integrated techniques that are implemented by personnel familiar with the rare plants.
4. Avoid burying plants.
5. Plowing, deicer and sand applications, rock slide removal, snow fence maintenance and construction activities should consider the locations of the SMAs.
6. Locate signs and guardrails away from SMAs to the greatest extent possible.
7. Minimize the use of vehicle pull-off and turn-around areas in SMAs.
8. Do not transplant rare plants.
9. Monitor rare plant occurrences within SMAs.
10. Monitor SMAs for new weed infestations.
11. Wash vehicles and other equipment to reduce the spread of noxious weeds from other areas.
12. Assure that straw and hay bales used for erosion control are certified free of noxious weeds.
13. Contact the Colorado Natural Heritage Program at Colorado State University when planning ground breaking activities in SMAs.

APPENDIX TWO-SPECIAL MANAGEMENT AREAS

Maps and location specific information provided to project partners only.