RECOMMENDED BEST MANAGEMENT PRACTICES for Piceance Bladderpod (*Physaria parviflora*)

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.

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Front Cover: *Physaria parviflora* plants and habitat, from top to bottom,

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INTRODUCTION

Piceance bladderpod (*Physaria parviflora = Lesquerella parviflora*) is a low, rosette-forming, yellow-flowered plant in the Brassicaceae (Mustard Family) that is found chiefly on outcrops of the Green River Shale Formation in the Piceance Basin. It grows on ledges and slopes of canyons in open areas of pinon juniper communities. It is considered to be imperiled at a global and state level (G2/S2; 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 Piceance 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 Piceance 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 Piceance 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 PICEANCE BLADDERPOD (*PHYSARIA PARVIFLORA*)

1. Gather mapped location information for Piceance 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 Piceance bladderpod within 20 meters/22 yards of roads. **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 UTMs 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 (Piceance 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-July 31. If mowing is necessary during June 1-July 31, as high of a blade height as practicable, and do not drive over/park on top of the plants.

6. If grading is necessary, following rain or other events that wash out roads, avoid burying the rare plants.

7. 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.

8. Locating signs away from Special Management Areas would benefit the Piceance bladderpod. If guardrails need to be installed/repaired, minimize impacts to the bladderpod to the greatest extent possible.

9. Minimizing and/or discouraging the use of vehicle pull-off and turn-around areas where the rare plants are present would also be beneficial. Proper signage, fencing, obstacles (boulders) are all possible solutions.

10. Transplanting is not recommended under any circumstances.

11. Develop monitoring plans for the roadside locations of Piceance 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 Piceance 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) Piceance bladderpod sites.

NOXIOUS WEED MANAGEMENT IN HABITAT FOR PICEANCE BLADDERPOD (*PHYSARIA PARVIFLORA*)

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 the Piceance bladderpod. The Colorado Noxious Weed List can be found online at: http://www.colorado.gov/cs/Satellite/Agriculture-Main/CDAG/1174084048733

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 Piceance 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 Piceance 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 Piceance bladderpod 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 Piceance 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.

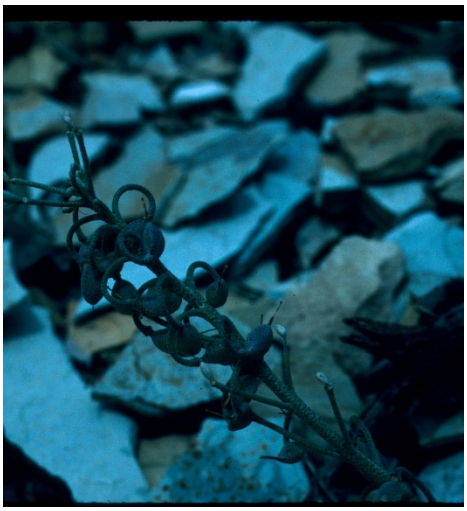
SPECIES PROFILE

Physaria parviflora
(Piceance Bladderpod)

Brassicaceae (Mustard Family)

Close up of Piceance bladderpod (*Physaria parviflora)* in flower and fruit by Peggy Lyon.

Close up of Piceance bladderpod (*Physaria parviflora*) in flower and fruit by Steve O'Kane.

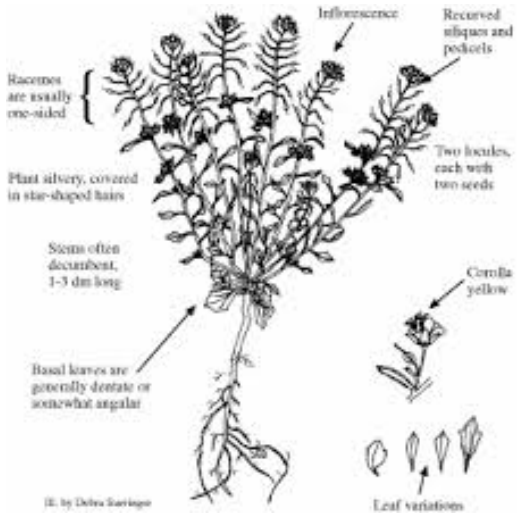


Close up of Piceance bladderpod (*Physaria parviflora*) pods by Susan Spackman Panjabi.

Ranks and Status

Global rank: G2
State rank: S2
Federal protection status: BLM Sensitive
State protection status: None

Description and Phenology



Piceance bladderpod (*Physaria parviflora)* by Debra Barringer.

General description: Annual or short-lived perennial herb with decumbent stems from low growing rosettes. Basal leaves flat and dentate to angular, covered in stellate hair giving a silver appearance. Golden yellow flowers are born on secund racemes; pendant siliques formed.

Look Alikes: The recurved siliques and pedicels are similar to *P. arenosa* and *P. ludoviciana*. The fundamental differences are in the ovule number and the position of the funiculi on the replum of the silique. The basal leaves are more similar to those of *P. ludoviciana* (Rollins 1983; more details included). *Physaria parviflora* racemes are usually secund (one sided). Basal leaves are usually flat and generally dentate or somewhat angular. *Physaria ludoviciana* racemes are not secund. Basal leaves on this species are involute and usually entire (pers. comm. Minton November 1994).

Phenology: Flowers in June through early July; fruits in July (Peterson and Baker 1982; pers. comm. Jennings 1995).

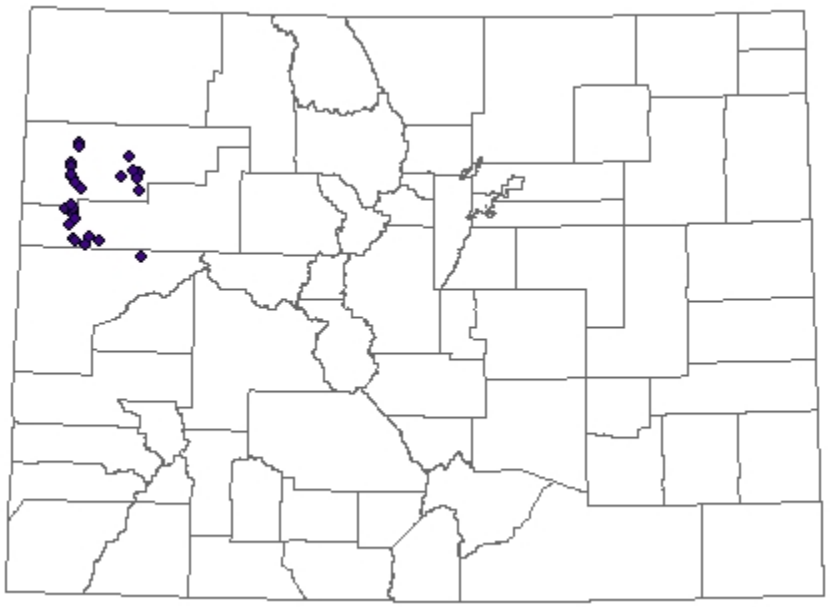
Habitat

Habitat of Piceance bladderpod (*Physaria parviflora*) by Janis Huggins

Habitat description: The Piceance bladderpod is endemic to outcrops of the Green River Shale Formation in the Piceance Basin. It grows on ledges and slopes of canyons in open areas of pinon juniper communities. The soils are Torriorthent Rock outcrop complex (Peterson and Baker 1982). Frequently associated species include *Pinus edulis, Juniperus osteosperma, Eriogonum* sp.*, Cirsium* sp.*, Astragalus lutosus, Cercocarpus* sp.*, Galium coloradense, Oryzopsis hymenoides, Penstemon* sp.*, and Machaeranthera* sp.
Elevation Range: 6,115 - 8,937 feet (1,864 - 2,724 meters) meters

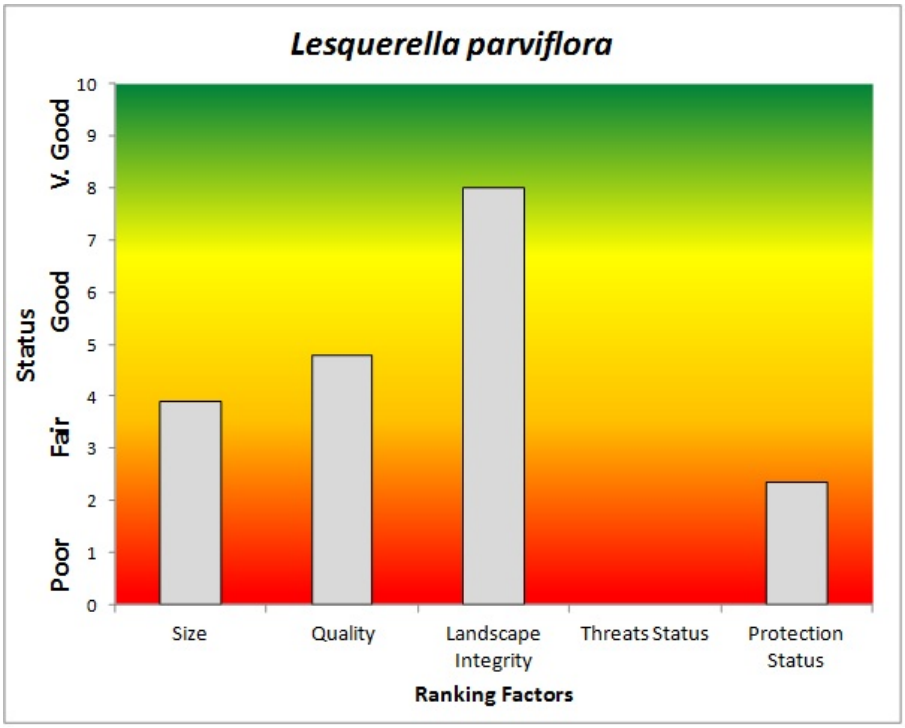
Distribution

Colorado endemic: Yes
Global range: Piceance bladderpod is a Colorado endemic known from Rio Blanco, Garfield, and Mesa Counties. Estimated range is 4,165 square kilometers (1,611 square miles), calculated in GIS by drawing a minimum convex polygon around the known occurrences.



Distribution map of Piceance bladderpod (*Physaria parviflora*) in Colorado.

Threats and Management Issues



Summary results of an analysis of the status of Piceance bladderpod (*Physaria parviflora=Lesquerella parviflora*) based on several ranking factors. This species was concluded to be "under conserved". From Rondeau et al. 2011.

Oil shale mining and oil and gas development are the primary threats. Off road vehicles, overgrazing and urban development are also potential threats.

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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.