



RECOMMENDED BEST MANAGEMENT PRACTICES for Rollins' twinpod (*Physaria rollinsii*)

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

CNHP's mission is to preserve the natural diversity of life by contributing the essential scientific foundation that leads to lasting conservation of Colorado's biological wealth.

Colorado Natural Heritage Program

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

Report Prepared for:
Colorado Department of Transportation and
the Colorado Natural Areas Program

Recommended Citation:

Panjabi, S.S. and G. Smith, 2014. Recommended best management practices for Rollins' twinpod (*Physaria rollinsii*): practices developed to reduce the impacts of road maintenance activities to plants of concern. Colorado Natural Heritage Program, Colorado State University, Fort Collins, Colorado.

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

© Steve O'Kane, Scott Smith, Steve O'Kane

**RECOMMENDED BEST MANAGEMENT PRACTICES
for Rollins' twinpod (*Physaria rollinsii*)**

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

Susan Panjabi and Gabrielle Smith

Colorado Natural Heritage Program
Warner College of Natural Resources

Colorado State University
Fort Collins, Colorado 80523



May 2014

ACKNOWLEDGEMENTS

Funding for this important project was provided by the Colorado Department of Transportation (CDOT) and the Colorado Natural Areas Program (CNAP).

We appreciate the input of numerous individuals during the preparation of this document, especially Sarah Triplett, Brian Elliott, Jill Handwerk, and Bernadette Kuhn.

TABLE OF CONTENTS

Acknowledgements	i
Introduction.....	1
Best Management Practices for Rollins' twinpod (<i>Physaria rollinsii</i>).....	1
Noxious Weed Management in Habitat for Rollins' twinpod (<i>Physaria rollinsii</i>)	3
Other Needs and Recommended Guidelines.....	4
Species profile.....	6
<i>Physaria rollinsii</i> (Rollins' twinpod)	6
Ranks and Status.....	7
Description and Phenology.....	7
Habitat.....	8
Distribution	9
Threats and Management Issues.....	10
References	10

INTRODUCTION

Rollins' twinpod (*Physaria rollinsii*) is a small plant in the Brassicaceae (Mustard Family) that is known only from west central Colorado in Gunnison and Mesa counties, Colorado, and is considered to be critically imperiled at a global and state level (G1/S1; Colorado Natural Heritage Program 2014). 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 Rollins' twinpod 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 Rollins' twinpod 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 Rollins' twinpod, 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.

BEST MANAGEMENT PRACTICES FOR ROLLINS' TWINPOD (*PHYSARIA ROLLINSII*)

1. Gather mapped location information for Rollins' twinpod along roadsides (within 50 meters/54 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 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 Rollins' twinpod within 50 meters/54 yards of roads and a recommended avoidance buffer of 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 alteration of hydrological setting. It also reduces impact to pollinators and their habitat. **Special Management Areas** (maps and data tables) are

presented in Appendix One 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 (Rollins’ twinpod 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. Dust abatement applications, if necessary, should be comprised of water only, with use of magnesium chloride to the minimum extent necessary.
5. If mowing is necessary, for example for safety reasons, avoid mowing from May 1-August 31. Mowing with a 6 in/15 cm or higher cut could take place in the Special Management Areas before May 1 (or after August 31) as long as the mowers 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 Rollins’ twinpod. If guardrails need to be installed/repared, minimize impacts to the bladderpod to the greatest extent possible.
9. *Ex-situ* techniques such as transplanting are not recommended under any circumstances.

10. Develop monitoring plans for the roadside locations of Rollins' twinpod, with goals to detect any decrease in the population size or condition, and/or needs for restoration efforts and/or noxious weed management.
11. Minimize impacts to habitat for Rollins' twinpod 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) Rollins' twinpod sites.

NOXIOUS WEED MANAGEMENT IN HABITAT FOR ROLLINS' TWINPOD (*PHYSARIA ROLLINSII*)

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 Rollins' twinpod. 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.

OTHER NEEDS AND RECOMMENDED GUIDELINES

Further inventory, monitoring, research, and conservation planning is recommended for the Rollins' twinpod 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 Rollins' twinpod 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 working, 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 Rollins' twinpod 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 Rollins' twinpod (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 rollinsii (Rollins' twinpod)

Brassicaceae (Mustard Family)



Close up of *Physaria rollinsii* by Steve O'Kane



Close up of *Physaria rollinsii* by Steve O'Kane

Ranks and Status

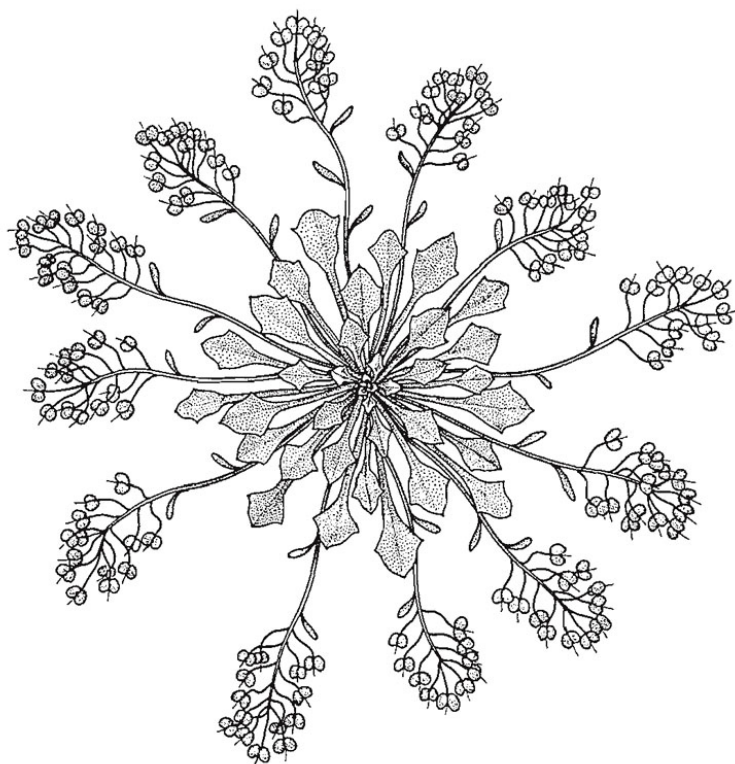
Global rank: G1

State rank: S1

Federal protection status: None

State protection status: None

Description and Phenology



Physaria rollinsii by Ilgvar Steins from: Gerald A. Mulligan, Two new species of *Physaria* in Colorado, Canadian Journal of Botany, 1966, vol 44 (12), page 1664. © Canadian Science Publishing or its licensors.

General description: *Physaria rollinsii* is a small, compact, clump-forming perennial with silvery pubescence and bright yellow flowers. Stems are several from the base, decumbent, and 0.5-1 dm/2-4 in long. Basal leaves form a small rosette, and the leaf blades are usually oblanceolate or broader, and margins entire or with 1 or 2 broad teeth. Cauline leaves are oblanceolate with margins entire. Racemes are congested, and elongate moderately in fruit. Fruits are erect, arranged in pairs, suborbicular, and inflated; replum obovate to oblong, as wide as or wider than the fruit (Flora of North America 1993+).

Look Alikes: *Physaria rollinsii* can be distinguished from other *Physaria* species by its very small size; its linear-oblanceolate basal leaves, which are entire or with a single broad tooth on each

side and less than 4 cm/1.5 in long; and its relatively low elevation range (Weber and Wittmann 2012).

Phenology: Flowers and fruit May-June (Rollins 1993, Colorado Natural Heritage Program 2014).

Habitat



Habitat of *Physaria rollinsii* by Scott Smith

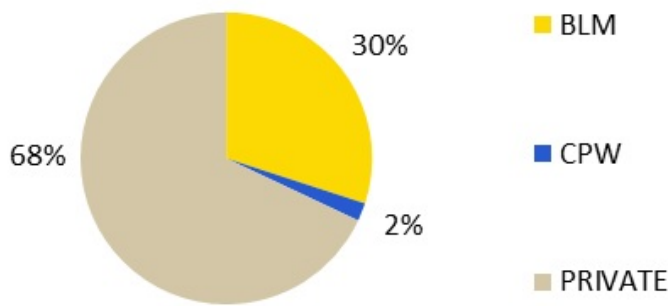
Physaria rollinsii is found in granitic talus, open knolls, limestone chiprock, steep slopes, clay banks, near granite boulders (Rollins 1993), and sagebrush (Weber and Wittmann 2012). Associated plant species include *Opuntia fragilis*, *Cercocarpus montanus*, *Phlox longifolia*, *Artemisia tridentata*, *Chrysothamnus depressus*, *Penstemon caespitosus* (Colorado Natural Heritage Program 2012).

Elevation Range: 6,624 - 9,088 feet; 2,019 - 2,770 meters

Distribution

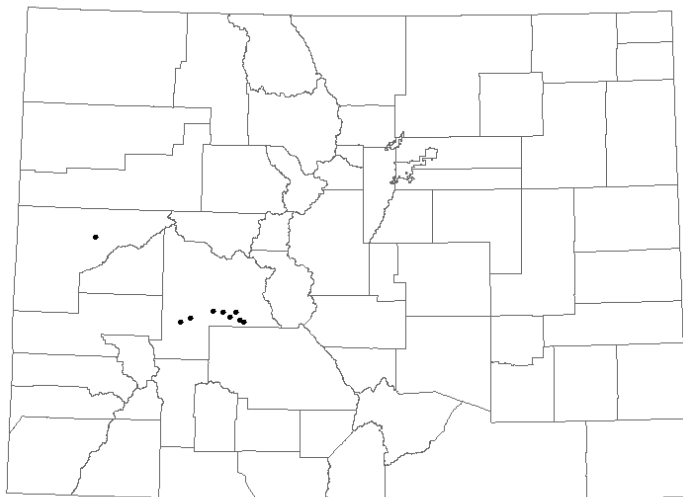
Colorado endemic: Yes

Global range: Endemic to Colorado; known from Gunnison and Mesa counties.



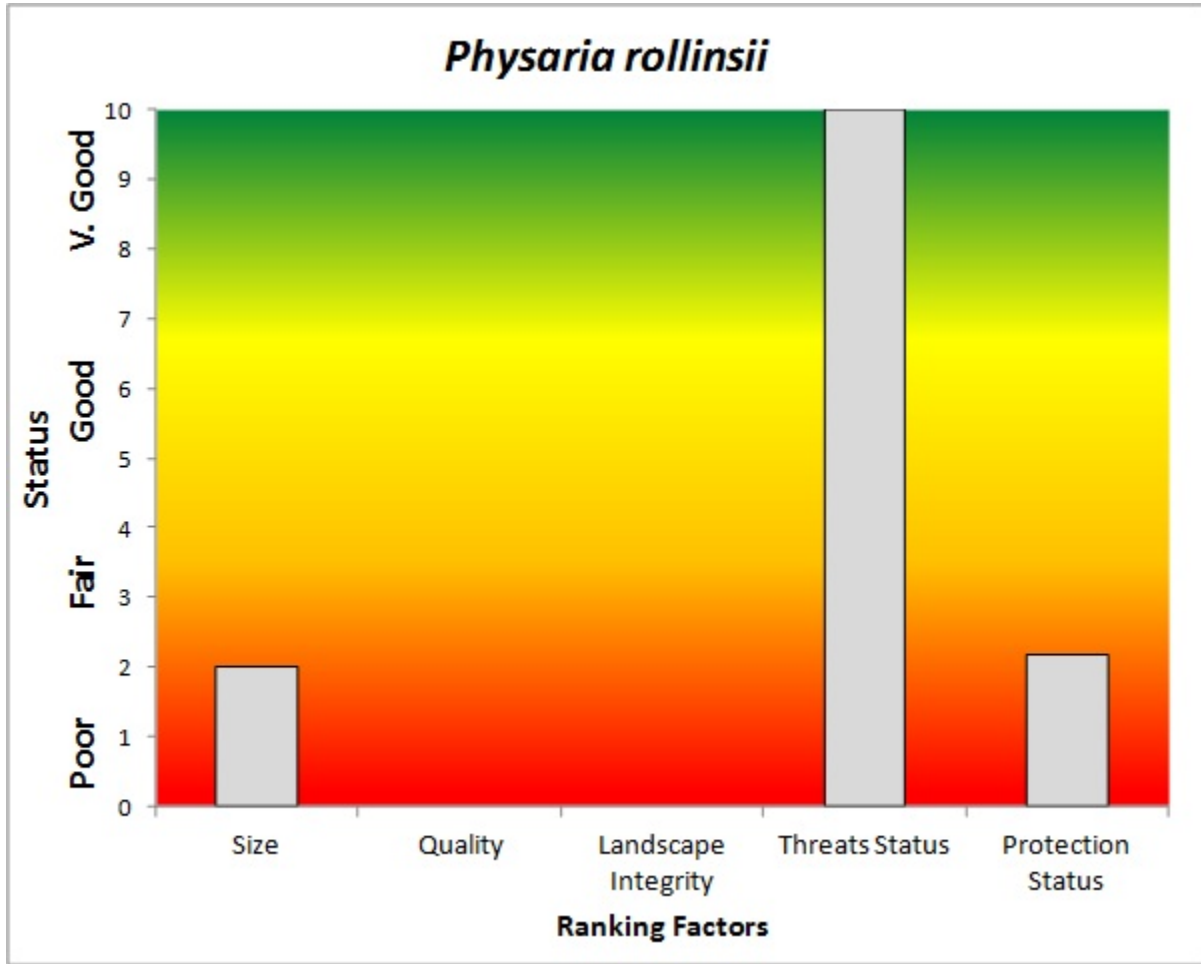
Physaria rollinsii

Distribution of *Physaria rollinsii* in Colorado according to mapped land ownership/management boundaries (CNHP 2012, COMaP v9).



Distribution map of *Physaria rollinsii* in Colorado.

Threats and Management Issues



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

Specific threats are not known.

REFERENCES

- Ackerfield, J. 2012. The Flora of Colorado. Colorado State University Herbarium. 433 pp.
- Colorado Natural Heritage Program. 2008. The Fifth Annual Colorado Rare Plant Symposium: G2 Plants of Colorado. Symposium Minutes. Available on-line <http://www.cnhp.colostate.edu/teams/botany.asp#symposia>.

- Colorado Natural Heritage Program. 2014. Biodiversity Tracking and Conservation System. Colorado State University, Fort Collins, CO.
- Colorado Noxious Weed Act. 2003. Title 35: Agriculture, Article 5.5: Colorado Noxious Weed Act, and 8 CRR 1203-19 Rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act.
- Elliott, B. A., S. Spackman Panjabi, B. Kurzel, B. Neely, R. Rondeau, M. Ewing. 2009. Recommended Best Management Practices for Plants of Concern. Practices developed to reduce the impacts of oil and gas development activities to plants of concern. Unpublished report prepared by the Rare Plant Conservation Initiative for the National Fish and Wildlife Foundation.
- Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1997. Measuring & Monitoring Plant Populations. BLM Technical Reference 1730-1.
- Flora of North America Editorial Committee, ed. (FNA). 1993+. Flora of North America North of Mexico. Oxford Univ. Press, New York, Oxford.
- Flora of North America Editorial Committee. 2010. Flora of North America North of Mexico. Vol. 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, New York. xxii + 797 pp.
- Kartesz, J.T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. 2nd edition. 2 vols. Timber Press, Portland, OR.
- Kartesz, J.T. 1996. Species distribution data at state and province level for vascular plant taxa of the United States, Canada, and Greenland (accepted records), from unpublished data files at the North Carolina Botanical Garden, December, 1996.
- Kartesz, John and the Biota of North America Program. 1998. "A Synonymized Checklist of the Vascular Flora of the United States, Puerto Rico, and the Virgin Islands". <http://plants.usda.gov>.
- Lavender, A.E., M.M. Fink, S.E. Linn, D.M. Theobald. 2011. Colorado Ownership, Management, and Protection v9 Database. Colorado Natural Heritage Program and Geospatial Centroid, Colorado State University, Fort Collins, CO. (30 September).
- 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 pp.
- Panjabi, S.S. and G. Smith. 2014. Conserving Roadside Populations of Colorado's Globally Imperiled Plants 2013-2014 Pilot Project. Colorado Natural Heritage Program, Colorado State University, Fort Collins, Colorado.

Rollins, R.C. 1993. *The Cruciferae of Continental North America: Systematics of the Mustard Family from the Arctic to Panama*. Stanford University Press. Stanford, CA.

USDA, NRCS. 2013. *The PLANTS Database*. National Plant Data Team, Greensboro, NC 27401-4901 USA.

Weber, W. A. and R. C. Wittmann. 2012. *Colorado Flora, Western Slope, A Field Guide to the Vascular Plants, Fourth Edition*. Boulder, Colorado. 532 pp.