



**RECOMMENDED BEST
MANAGEMENT
PRACTICES
for Rabbit Ears gilia
(*Ipomopsis aggregata* ssp.
weberi)**

**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.

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Front Cover: *Ipomopsis aggregata* ssp. *weberi* plants and habitat

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INTRODUCTION

Rabbit Ears gilia (*Ipomopsis aggregata* ssp. *weberi*) is a tall herbaceous plant in the Polemoniaceae (Phlox Family) that is known from north central Colorado in Grand, Jackson, and Routt counties, and is also found in northern Idaho and south central Wyoming. This subspecies is considered to be imperiled at a global and state level (G5T2, S2; 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 Rabbit Ears gilia 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 Rabbit Ears gilia 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 Rabbit Ears gilia, 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 the Rabbit Ears gilia.

BEST MANAGEMENT PRACTICES FOR RABBIT EARS GILIA (*IPOMOPSIS AGGREGATA* SSP. *WEBERI*)

1. Gather mapped location information for Rabbit Ears gilia 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 Rabbit Ears gilia 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, USFS, 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 (Rabbit Ears gilia 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-September 30. Mowing with a 12 inch/0.3 meter or higher cut could take place in the Special Management Areas before May 1 (or after September 30) 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 Rabbit Ears gilia. If guardrails need to be installed/repaired, minimize impacts to the gilia 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 Rabbit Ears gilia, 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 Rabbit Ears gilia 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) Rabbit Ears gilia sites.

NOXIOUS WEED MANAGEMENT IN HABITAT FOR RABBIT EARS GILIA (*IPOMOPSIS AGGREGATA* SSP. *WEBERI*)

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 Rabbit Ears gilia. 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 Rabbit Ears gilia 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 Rabbit Ears gilia 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 Rabbit Ears gilia 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 Rabbit Ears gilia (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

Ipomopsis aggregata ssp. *weberi*
(Rabbit Ears gilia)

Polemoniaceae (phlox family)



Close up of *Ipomopsis aggregata* ssp. *weberi* by David Anderson



Close up of *Ipomopsis aggregata* ssp. *weberi* by David Anderson

Ranks and Status

Global rank: G5T2

State rank: S2

Federal protection status: USFS Sensitive

State protection status: None

Description and Phenology

General description: *Ipomopsis aggregata* ssp. *weberi* is a herbaceous perennial. It has a taproot, a soft woody base, and one to several erect stems. The stems are 15-60 cm/6-24 in tall. The leaves are lobed, relatively large, and well-developed at the base of the plant. Leaves on the stems are much smaller. The flowers are arranged in a panicle on the upper parts of the stem. The flowers are particularly closely spaced, and the flowering stem looks congested. The congested arrangement of the flowers is a distinctive characteristic. The flowers are white, less often pinkish, and fragrant smelling. The calyx lobes are 3 mm/0.1 in long. The corolla has a long slender tube that abruptly flares into a circular limb that looks trumpet-shaped. The tube is slender, 10-22 mm/0.4-0.9 in long, circular in cross-section, approximately 1 mm/0.04 in wide at the base, and has a narrow orifice between 1-2 mm/0.04-0.08 in in diameter. Anthers are usually at the orifice or sometimes exerted (Grant and Wilken 1986, Ladyman 2004).

Look Alikes: *Ipomopsis aggregata* ssp. *attenuata* has a more open corolla tube (1 mm/0.04 in wide at base flaring to 2-3 mm/0.08-0.11 in at orifice), and pink to red flowers. These species intergrade where their ranges overlap (Grant and Wilken 1986, Spackman et al. 1997).

Phenology: Flowers in July (Colorado Natural Heritage Program 2012).

Habitat



Habitat of *Ipomopsis aggregata* ssp. *weberi* by David Anderson

Ipomopsis aggregata ssp. *weberi* is found in openings in coniferous forests (Grant and Wilken 1986, Spackman et al. 1997). This species occurs with other herbaceous perennials, and is most commonly associated with sagebrush (*Artemisia* species) and less often with snowberry, brushy serviceberry, rabbitbrush, and chokecherry (Ladyman 2004). It has also been found in subalpine fir/Englemann spruce/willow habitat and subalpine fir/alder habitat. *Ipomopsis aggregata* ssp. *weberi* grows on ridge tops, in mountain meadows, and on variable slopes, ranging from 0 to 35 percent. Plants have most often been reported from slopes with west, south, and east aspects. *Ipomopsis aggregata* ssp. *weberi* typically grows in rocky, gravelly soils of a sandy and coarse texture that are derived from a variety of geological formations (Layamn 2004).

Elevation Range: 6,634 - 10,567 feet; 2,022 - 3,221 meters

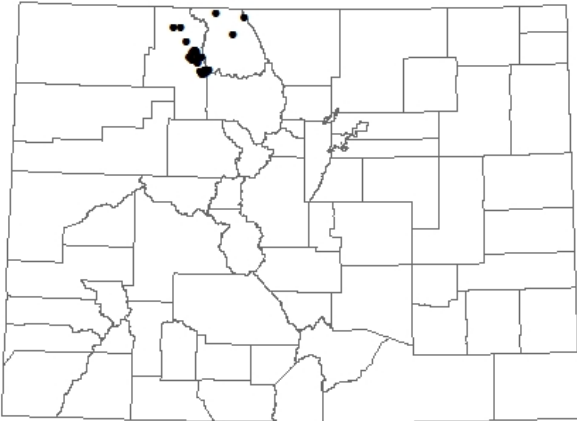
Distribution

Colorado endemic: No

Global range: Regional endemic of northern Idaho, south-central Wyoming, and north-central

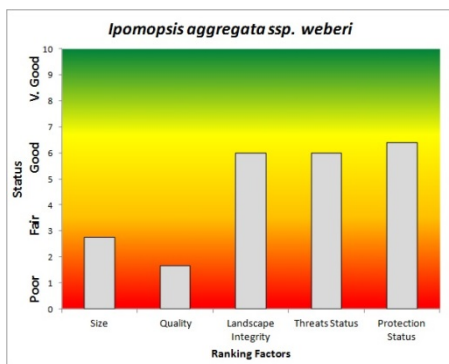
Colorado.

State range: Known from Grand, Jackson, and Routt counties in Colorado. Estimated range in Colorado is 2631 square kilometers (1016 square miles), calculated in GIS by drawing a minimum convex polygon around the known occurrences (calculated by the Colorado Natural Heritage Program in 2008). Also known from Idaho and Wyoming.



Distribution map of *Ipomopsis aggregata ssp. weberi* in Colorado

Threats and Management Issues



Summary results of an analysis of the status of *Ipomopsis aggregata ssp. weberi* based on several ranking factors. This species was concluded to be "moderately conserved". From Rondeau et al. 2011.

The primary threat at this time is considered to be recreational uses of its habitat (Rondeau et al. 2011). It is not known if all of the occurrences are or are not threatened by these activities. Concern about the viability of *Ipomopsis aggregata ssp. weberi* is a result of its limited geographic range and the potential impacts of the multiple uses of its habitat. Recreational activities, such as mountain bike riding, snowmobiling, hiking, horseback riding, and development activities associated with recreation and urbanization, such as campsite development and road building. As the human population grows in areas within easy access to *I. aggregata ssp. weberi* habitat and as recreational use increases, the impacts may become substantially more significant. At current levels, grazing and

trampling by native and non-native ungulates may have an impact, especially on smaller colonies. Activities associated with resource extraction are not currently perceived to be a threat although individual occurrences may have been impacted in the past. Invasive weeds are likely a threat to the long-term sustainability of some occurrences. If other subspecies or races of *I. aggregata* are introduced, for example in revegetation seed mixes, both hybridization and outbreeding depression are potential threats (Ladyman 2004). One occurrence indicates that future logging projects may impact the site. Another is on an old roadbed which is being reopened for parking lot construction. A few occurrences occur near campgrounds. Expansion of these sites may destroy individuals. Several of the occurrences are roadside but do continue into natural habitat (Colorado Natural Heritage Program).

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