

PENLAND'S EUTREMA

Eutrema penlandii Rollins
 Plant Symbol = EUPE10

Contributed by: USDA NRCS Colorado Plant
 Materials Program



Figure 1: Penland's eutrema, *Eutrema penlandii*. Photo USFWS, Alicia Langton July 2010.

Alternate Names

Eutrema edwardsii ssp. *Penlandii*, Weber 1985)
 Penland Alpine Fen mustard
 Mosquito Range mustard

Uses

Penland's eutrema was first collected near Hoosier Pass, Colorado, by C. William T. Penland of Colorado College in 1935. Reed C. Rollins of the Gray Herbarium described the species as *Eutrema penlandii* in 1950 (Rollins, 1950). Many mustard family plant species have known food value (cabbage, broccoli, kohlrabi, kale, etc.), in fact, Wasabi, *Eutrema japonica*, is a commonly recognized member of the *Eutrema* genus in Asia. It

is unknown at this time if the plant requires pollinators for reproduction. The plant is browsed by alpine wildlife. It has no known agricultural, economic, or other human uses at this time.

Status

Penland's eutrema was designated as endangered by the U.S. Fish and Wildlife Service (USFWS) in 1993, at which time it was known to occur at 14 sites with an estimated population of 16,400 individuals (USFWS, 1993). A habitat survey conducted in 2003 resulted in the discovery of two additional sites but this addition did not significantly change the known overall population or habitat extent (USFWS, 2011). The NatureServe conservation status rank, an international effort which ranks species on their "global" status, ranks Penland's eutrema as G1/S1-critically imperiled globally and in Colorado, (Figure 2). Penland's eutrema is only one of two species of *Eutrema* in North America and the only one in the lower 48 states (NatureServe 2011), (CPC, 2011).

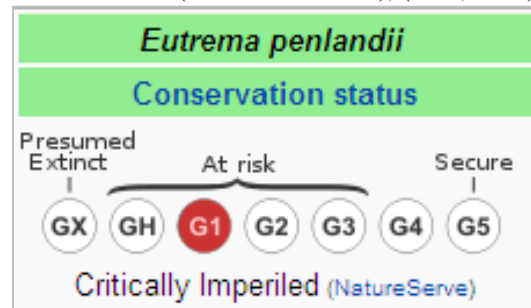


Figure 2. Penland's eutrema global "rarity" rank (NatureServe 2008).

Description

General:

Mustard family (Brassicaceae). Penland's eutrema is a diminutive herbaceous perennial plant that grows from a taproot (Figure 3). Plants grow up to 6 inches (15 cm) in height with one to several spreading erect stems (Figure 1). Basal leaves are heart-shaped with rounded tips. Several white, four-petaled flowers top each stem. The leaves and fruit are without hairs (glabrous) and stalked which distinguishes this species from many other small types of mustard that grow in the area such as *Draba* (whitlow-grass). Flowering occurs June to August and even into September, depending on the site and snow melt (USFWS, 2011). Fruits of Penland's eutrema are the characteristic mustard family siliques; they are diamond-shaped in cross-section and turn purple-black when mature which also distinguishes the plant from other look-alikes (USFWS, 2011).



Figure 3: Penland's eutrema posed with a penny for size perspective. USFWS Alicia Langton July 2010.

Distribution:

Eutrema penlandii is a narrow endemic known only to occur in the Mosquito mountain range of Colorado in Lake, Park, and Summit counties (US FWS, 1993). Range-wide distribution reaches 18 miles from north to south and approximately 10 miles east to west, encompassing roughly 200 acres of occupied habitat. This species is thought to be an ice-age relic with its closest relative, *E. edwardsii*, found in the Canadian Arctic Archipelago. (Roy et al. 1993). According to the FWS 2011, approximately 40% of the existing known populations and habitat for Penland's Eutrema occurs on private land. Please consult the USFWS website at www.fws.gov for more information. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Habitat:

Penland's eutrema is an alpine tundra species that grows above treeline in association with many species of moss, forbs, and graminoids in alpine meadow habitat (Spackman, et al. 1997), (Chapman 2006). It occurs in wetlands with perennial water flow from snowmelt, at 11,800 -13,100 ft. in elevation (USFWS, 2011). Penland's eutrema generally grows on the leeward, south and east-facing, flat to gently sloping benches with steep walls that provide some protection from snow-melting winds (USFWS, 2011). The annual precipitation is 30-40 inches (US Department of Agriculture, 2006). Penland's eutrema is known to frequently occur in association with a variety of alpine tundra species including: white marsh marigold (*Caltha leptosepala*), water sedge (*Carex aquatilis*), mountain sedge (*Carex scopulorum*), Bering chickweed (*Cerastium beerigianum*), alpine spring beauty (*Claytonia megarhiza*), tufted hairgrass (*Deschampsia cespitosa*), Ross avens (*Geum rossii*), elephanthead (*Pedicularis groenlandica*), arctic bluegrass (*Poa arctica*), America bistort (*Polygonum bistortoides*), alpine bistort (*Polygonum viviparum*), King's crown (*Rhodiola integrifolia*), Rose crown

(*Rhodiola rhodantha*), diamondleaf saxifrage (*Saxifraga rhomboidea*), and alpine meadow rue (*Thalictrum alpinum*), (Figure 4), (USFWS, 2011), (RMH, 2010). The Mosquito Range includes thirteen other rare plant species, of which, two are known only from the range (USFWS 2011).

Adaptation

Penland's eutrema is adapted to grow in the Mosquito Range in central Colorado (Spackman 1997), where a unique set of habitat conditions exist. An arctic circumpolar species, Penland's eutrema is separated from its closest relative *E. edwardsii*, which occurs in the Canadian Arctic Archipelago by over 1000 miles to the north (Roy et al. 1993).



Figure 4: Penland's eutrema habitat. Photo USFWS, Alicia Langton, July 2010.

Management

Primary threats to Penland's eutrema appear to be from habitat loss through recreation (off-highway vehicle use, camping, and hiking), alterations to hydrology, mining impacts, and climate.

Pests and Potential Problems

Currently there are no known pests affecting the growth and vigor of Penland's eutrema. Associated threats may include the introduction of non-native invasive plant species from hikers and campers as recreational use numbers continue to increase annually of this popular recreation area that constitutes the only habitat of Penland's eutrema.

Impacts of herbivory from pikas and rodents have been noted by researchers (USFWS 2011). However, Penland's mustard has evolved some tolerance to grazing and wildlife usage. For instance, a taproot growth form enables re-sprouting after grazing. Interestingly, to date, the main non-native constituent in Penland's mustard habitat is dandelion, *Taraxacum officinale*, another tap-rooted species.

Concerns

Hydrology is the most fragile aspect of the habitat affecting Penland's eutrema. Any activity that directly or indirectly alters the surface or ground water supply and alters the wetland habitat required by this species could pose a significant threat. On a larger scale, climate change could potentially threaten this and other alpine species since there are no upward elevation to which the species may migrate.

Seeds and Plant Production

Depending on snow-melt, Penland's eutrema produces mature fruits from late-July into August and into September (USFWS). Penland's eutrema produces from seed with no means of vegetative reproduction. Little else is known about the reproduction, pollinators, or seed dispersal at this time.

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