

**Changed from California Rare Plant Rank 1B.3 to 4.3 in the CNPS Inventory on  
16 March 2020**

**Rare Plant Status Review: *Clarkia borealis* subsp. *borealis***  
**Proposed Change from California Rare Plant Rank 1B.3, G3T3 / S3 to 4.3, G4T4 / S4**  
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7 February 2020

This species review is being expedited through a challenge cost share agreement between the California Native Plant Society and the USDA Forest Service, Pacific Southwest Region. Aside from being advanced as part of this agreement, the process, content, and information provided herein is not altered, modified, or developed differently in any way or form compared to other status reviews developed by CNPS.

**Background and Taxonomy**

*Clarkia borealis* E. Small subsp. *borealis* is an annual herb in the Onagraceae known only from the Klamath Ranges. It has been included in the *CNPS Inventory* since the second edition (Smith et al. 1980; CNPS 2019). With an increase in the number of known occurrences, a large number of its occurrences considered excellent or good, and its positive response to disturbance, *C. borealis* subsp. *borealis* has been proposed for a rank change from California Rare Plant Rank (CRPR) 1B.3 to 4.3.

**Ecology**

*Clarkia borealis* subsp. *borealis* occurs in chaparral, cismontane woodland, and lower montane coniferous forest, often in roadcuts at an approximate elevation of 400 to 1,565 meters, and flowers between June and September. More information about *C. borealis* subsp. *borealis* can be found in the *CNPS Inventory* at <http://www.rareplants.cnps.org/detail/158.html>.

**Distribution and Abundance**

*Clarkia borealis* subsp. *borealis* is currently known from a total of 131 occurrences. Of the 131 occurrences 11 are considered historical (occurrences not seen in the past 20 years are considered historical by the CNDDDB), and all are considered to be extant. Ninety-one occurrences are considered “excellent” or “good” (A or B), while 16 are ranked “fair” (C), and 24 are unranked. The population sizes of *C. borealis* subsp. *borealis* are fairly well known, with data available for 120 of the 131 occurrences. Twenty-two of the occurrences have population count/estimates of 1,000 or more individuals. Based on the available data, the total number of known individuals of *C. borealis* subsp. *borealis* is estimated to be over 65,000 plants (population count/estimate data is available in the attached “ClarkiaBorealisSspBorealis\_20200207\_change” spreadsheet). More than half of the occurrences (79) are on private land, 44 are located in Shasta-Trinity National Forest, four are located on BLM land, and four are located on lands of unknown ownership.

The validity of subspecies within *Clarkia borealis* has been brought into question. *Clarkia borealis* subsp. *borealis* is very similar, if not indistinguishable to *Clarkia borealis* subsp. *arida* (CRPR 1B.1, G3T2 / S2), with the main key differences being the size of seed and

geographic range. Subspecies *borealis* is strictly a Klamath Ranges endemic, occurring in eastern Trinity and western Shasta counties, whereas subsp. *arida* occurs in the southeastern Klamath Ranges and also south to the Cascade Range foothills, strictly in Shasta and Tehama counties. The following is the key break between the two subspecies in the *Jepson eFlora* (Lewis 2012):

- 39. Seed 1.8–2.5 mm; se KR, CaRF ..... subsp. *arida*
- 39' Seed 1.5–1.8 mm; KR ..... subsp. *borealis*

Julie Kierstead (pers. comm. 2020) pointed out some work done by Martin Lenz in which seed measurements were obtained during post-fire surveys in 2019, finding overlap in the published parameters for both subspecies. Dean Taylor (pers. comm. 2020) also pointed out the troubling overlap in seed size between these subspecies:

“A seed size difference, absent other data, is not particularly strong differentiation (what does one do with a seed exactly 1.8 mm diameter?). Perhaps the only hint of any pattern of differentiation is that reports of *C. borealis* ssp. *arida* are from comparably low elevations, and somewhat southerly from those of the common *C. borealis* ssp. *borealis*.”

If the subspecies aren't valid, then subspecies *arida* (currently known from only six occurrences) should also be changed from CRPR 1B to 4 in the CNPS Inventory, but we are not proposing to change the rank of subspecies *arida* at this time until further research is conducted. According to Dean Taylor (pers. comm. 2020), “This action should not present a particular problem for project scoping, as I would distinctly limit *C. borealis* [subsp.] *arida* to the very lowest elevations of the Cascade Range foothills of Shasta and Tehama counties.”

### **Status and Threats**

The majority of the occurrences (103) of subsp. *borealis* have listed threats in the CNDDDB. Eighty-two of these occurrences are noted to be threatened by direct or indirect impacts of timber harvest activities, including logging and road construction. Additional threats noted include non-native plants, ORV activity, road or trail construction, and altered hydrologic regime. *Clarkia borealis* subsp. *borealis* is a disturbance tolerant plant, especially when it comes to fire (Kierstead, J.; Sims, L.; Taylor, D. pers comms. 2020). “Overall, I would say [subsp. *borealis*] is a disturbance tolerate species to fire and road/trail impacts. The pre-fire occurrences were drastically smaller in population size compared to the first year post fire but expect the numbers to drop from forb and shrub competition as well as decreased light as the forest grows back. Given the past fire history, I concur with the down ranking for this species.” (Sims, L. pers. comm. 2020). Tom Engstrom's 2018 comments on threats to *C. borealis* subsp. *borealis* are as follows:

“Logging is given as a threat for this taxon. Direct experience suggests that *C. borealis* ssp. *borealis*, like all other species of Section *Myxocarpa*, are favored by disturbance. After fire, populations expand greatly (as observed for *C. borealis* at the Bagley Fire, Shasta County or for *C. australis* for the Rim Fire, Tuolumne). Occurrences in forested

setting that lack recent disturbance are often limited only to road cuts (where they have been on occasion subject to brush removal when the plants are flowering according to NDDDB records). Ordinarily, however, *C. borealis* presence on roadcuts is often a setting sufficient to exclude mechanical or vehicle access because of very steep slopes.

Moreover, *Clarkia borealis* and *C. mildrediae* are known to appear in young forestry plantations: we have observed both in ~5-year-old plantations. At one site in Butte County, where *C. mildrediae* was abundant in 2006 in a young plantation, the plantation is now grown sufficiently that the trees are shading out the *Clarkia*, doubtless *C. borealis* behaves similarly.”

### Summary

With 91 occurrences ranked as “excellent” or “good” by CNDDDB, and its positive reaction to a certain level of disturbance, *Clarkia borealis* subsp. *borealis* has met the general level of meriting down ranking from California Rare Plant Rank 1B.3 to 4.3 (in general, California Rare Plant Rank 1B contains plants that are known from fewer than 50 occurrences ranked as “excellent” or “good” by CNDDDB). *Clarkia borealis* subsp. *borealis* is not exhibiting a trend towards extirpation in California at this time, and actually has become more common than originally thought, with additional occurrences being found every year. With its continued increase in known number of occurrences over the past 40 years and positive response to disturbances from fire and road/trail impacts, *C. borealis* subsp. *borealis* does not merit CRPR 1B at this time.

Based on the available information, CNPS and CNDDDB recommend re-ranking *Clarkia borealis* subsp. *borealis* from California Rare Plant Rank 1B.3 to 4.3. If occurrences of *C. borealis* subsp. *borealis* in California begin to trend downward, and/or if threats to its survival increase, CNPS and CNDDDB will re-evaluate its status at that time.

### Recommended Actions

CNPS: Change *Clarkia borealis* subsp. *borealis* from CRPR 1B.3 to CRPR 4.3

CNDDDB: Change *Clarkia borealis* subsp. *borealis* from to G3T3 / S3 to G4T4 / S4

### Current CNPS Inventory Record

*Clarkia borealis* E. Small ssp. *borealis*

northern clarkia

Onagraceae

CRPR 1B.3

Shasta, Siskiyou, Trinity

Miller Mtn. (645A) 4012167, Whitmore (645B) 4012168, Project City (647A) 4012263, Shasta Dam (647B) 4012264, Chalk Mtn. (663A) 4012187, Roaring Creek (663B) 4012188, Montgomery Creek (663C) 4012178, Goose Gap (664A) 4012281, Bollibokka Mtn. (664B) 4012282, Minnesota Mtn. (664C) 4012272, Devils Rock (664D) 4012271, Hanland Peak (665A) 4012283, Lamoine (665B) 4012284, Bohemotash Mtn. (665C) 4012274, O'Brien (665D) 4012273, Damnation Peak (666A) 4012285, Trinity Center (666B) 4012286, Pappoose Creek (666C) 4012276, Schell Mtn. (666D) 4012275, Grizzly Peak (680B) 4112128, Big Bend (680C) 4112118, Skunk Ridge (680D) 4112117, Yellowjacket Mtn.

(681C) 4112212, Shoeinhorse Mtn. (681D) 4112211, Dunsmuir (682A) 4112223, Chicken Hawk Hill (682C) 4112214, Tombstone Mtn. (682D) 4112213  
Chaparral, cismontane woodland, lower montane coniferous forest / often roadcuts; elevation 400 - 1565 meters.

Annual herb. Blooms June to September.

Possibly threatened by road construction and maintenance, and non-native plants.

Potentially threatened by timber harvest activities. Need quads for TRI Co. Distinctiveness from ssp. *arida* needs study. See *Canadian Journal of Botany* 49:1211-1217 (1971) for taxonomic revision.

### Revised CNPS Inventory Record

*Clarkia borealis* E. Small ssp. *borealis*

northern clarkia

Onagraceae

CRPR 4.3

Shasta, Siskiyou, Trinity

Miller Mtn. (645A) 4012167, Whitmore (645B) 4012168, Project City (647A) 4012263, Shasta Dam (647B) 4012264, Chalk Mtn. (663A) 4012187, Roaring Creek (663B) 4012188, Montgomery Creek (663C) 4012178, Goose Gap (664A) 4012281, Bollibokka Mtn. (664B) 4012282, Minnesota Mtn. (664C) 4012272, Devils Rock (664D) 4012271, Hanland Peak (665A) 4012283, Lamoine (665B) 4012284, Bohemotash Mtn. (665C) 4012274, O'Brien (665D) 4012273, Damnation Peak (666A) 4012285, Trinity Center (666B) 4012286, Papoose Creek (666C) 4012276, Schell Mtn. (666D) 4012275, Grizzly Peak (680B) 4112128, Big Bend (680C) 4112118, Skunk Ridge (680D) 4112117, Yellowjacket Mtn. (681C) 4112212, Shoeinhorse Mtn. (681D) 4112211, Dunsmuir (682A) 4112223, Chicken Hawk Hill (682C) 4112214, Tombstone Mtn. (682D) 4112213

Chaparral, cismontane woodland, lower montane coniferous forest / often roadcuts; elevation 400 - 1565 meters.

Annual herb. Blooms June to September.

Changed from 1B.3 to 4.3 on 2020-03-16

More common than originally thought. Possibly threatened by non-native plants.

Potentially threatened by timber harvest activities. Distinctiveness from ssp. *arida* needs study. See *Canadian Journal of Botany* 49(7):1211-1217 (1971) for original description.

### Literature Cited

[CNPS] California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website <http://www.rareplants.cnps.org> [accessed 17 January 2020].

Lewis, H. 2012. *Clarkia* in Jepson Flora Project (eds.) *Jepson eFlora*. Website [http://ucjeps.berkeley.edu/eflora/eflora\\_keys.php?key=9760](http://ucjeps.berkeley.edu/eflora/eflora_keys.php?key=9760) [accessed 17 January 2020].

Smith, J. P., Jr., R. J. Cole, and J. O. Sawyer, Jr. 1980. Inventory of Rare and Endangered Vascular Plants of California. Special Publication No. 1 (2nd Edition). California Native Plant Society, Berkeley. 115 pp.