Added to California Rare Plant Rank 3.2 of the CNPS Inventory on October 2, 2013

Rare Plant Status Review: *Lewisia kelloggii* ssp. *kelloggii*
Proposed Addition to California Rare Plant Rank 3.2, G3G4T2T3Q / S2S3

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Changes made to the original document appear in blue text.

Background

Lewisia kelloggii subsp. *kelloggii* is a perennial herb in the Montiaceae. Another currently-recognized taxon within the species, subsp. *hutchisonii*, is currently included in the CNPS Inventory as a California Rare Plant Rank (CRPR) 3.3 taxon. *Lewisia kelloggii* subsp. *kelloggii* is included in *The Jepson Manual, Second Edition* (Miller and Dempster 2012; available online at http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=80216). *The Jepson Manual* (Dempster 1993) was published before the original description of subsp. *hutchisonii* by Dempster (1996), so *L. kelloggii* was only treated at the species level, but subsp. *hutchisonii* was referred to under *L. kelloggii*. The *Flora of North America* (Hershkovitz and Hogan 2003; available online at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415772) treats all infra-taxa, as well as *L. yosemitana*, as synonyms of *L. kelloggii*. The differentiation of the subspecies of *L. kelloggii* is still poorly understood, and several studies have attempted to address the issue. First, a brief summary of their taxonomic history is warranted. Brandegee (1894) first described *L. kelloggii*; a change in place names makes the type locality uncertain, but it was likely collected at Cisco in Placer County, just south of the Nevada County line (D. Taylor pers. comm. 2012). Later, Jepson (1925) described *L. yosemitana* from Yosemite material, differentiating it from *L. kelloggii* by its higher number of stamens (16 to 26 in *L. yosemitana*, vs. 12 to 15 in *L. kelloggii*). That name did not receive widespread acceptance, and *L. kelloggii* is now known to have a highly variable stamen number; Miller and Dempster (2012) state that *L. kelloggii* has between 8 and 26 stamens. However, Taylor (2010) revived the specific epithet as *L. kelloggii* subsp. *yosemitana* in his *Flora of the Yosemite Sierra*. Taylor (pers. comm. 2013) is now uncertain if subsp. *yosemitana* should be recognized. In 1996, Dempster described *L. kelloggii* subsp. *hutchisonii* based on a single population from Sierra County. It was separated from the typical variety based on its larger leaves and flowers as well as pink flowers (vs. white in subsp. *kelloggii*). Miller and Dempster (2012) currently separate the two taxa based on petal length (greater than 20 mm in subsp. *hutchisonii*; less than 20 mm in subsp. *kelloggii*) and leaf blade size (greater than 4.5 cm long x 1 cm wide in subsp. *hutchisonii*; less than 4.5 cm long x 1 cm wide in subsp. *kelloggii*). Plants from Idaho had also been treated as *L. kelloggii* (Dempster 1993), but Wilson et al. (2005) treated these plants as an Idaho endemic, *L. sacajaweana*, based on isozyme and morphological data. *Lewisia kelloggii* subsp. *kelloggii* is known to flower from May to August.

Lewisia kelloggii subsp. *kelloggii* is known from the same habitat type and elevation as subsp. *hutchisonii*. Both occur on slate in openings and ridgetops of upper montane coniferous forest, at an approximate elevation of 1,465 to 2,365 meters.

At the time of Wilson et al.'s (2005) study, *L. kelloggii* was only known from the northern and central Sierra Nevada. Subsequent observations have shown that *L. kelloggii* also occurs farther north, in the Klamath Ranges of northwestern California (NFGEL 2012). Many populations do not key out clearly to one subspecies, so NFGEL (2012) performed an isozyme study using data from Wilson et al. (2005) as well as new isozyme data collected on the populations in northwestern California. Unfortunately, the populations studied by NFGEL (2012) were not vouchered, so no morphometric analysis could be included in the study. The study's results were inconclusive, and showed a high degree of genetic variation that often did not correlate well with the geographic locations of the populations. For example, plants from Shuteye Peak (Madera County, near the southern edge of *L. kelloggii*'s range) were closely related to plants from Trinity County, near the northern edge of *L. kelloggii*'s range (NFGEL 2012). Also, plants from the Panther Rock area (Trinity County) were most closely related to plants form the Plumas National Forest, and more distantly related to plants from nearby populations in Trinity County (NFGEL 2012). An analysis of the isozyme data using the program Structure grouped the populations into six separate genetic groups; without voucher specimens, it was impossible to tell if these genetic groups could also be grouped based on morphology (NFGEL 2012). Wilson (pers. comm. 2013) noted that the NFGEL study did not support recognition of subsp. *kelloggii*, but it also did not conclusively refute its validity. Additional study is needed to determine if morphology is correlated with genetic data, which could support the recognition of subspecies within *L. kelloggii*. If no correlation between morphology and genetics is found, then recognition of infra-taxa may not be warranted.

Placement of individual populations into a subspecies presents a challenge, as there is often insufficient morphological and genetic data to adequately identify them. Also, the lack of correlation between genetic identity and geography (NFGEL 2012) suggests that determination of populations to a subspecies based on geography may not be appropriate. It appears that subsp. *hutchisonii* is reported more frequently, perhaps as a result of its rarity status. For example, several field survey forms were submitted for subsp. *hutchisonii* in an area very close the type locality of subsp. *kelloggii* (CNDDB 2013). After assessing all known populations of *L. kelloggii*, we estimate a total of 17 occurrences of subsp. *kelloggii*, 22 occurrences of subsp. *hutchisonii*, and 31 occurrences that could not confidently be assigned to subspecies. The 31 occurrences with an unknown identification will be included in the CNPS Inventory accounts of both subsp. *kelloggii* and subsp. *hutchisonii* with a question mark until their identification can be accurately determined in the future.

Lewisia kelloggii subsp. *kelloggii* is threatened by road- and trail-building, as well as off-road vehicles (S. Urie and A. Walker pers. comm. 2013) and camping (K. Callahan pers. comm. 2013). It frequently grows on ridgetops, which are well-suited to roads, trails, and fuelbreaks, and could potentially be damaged in firefighting operations (L.

Janeway pers. comm. 1999; NFGEL 2001). Also, at least a few populations have suffered from overcollecting (NFGEL 2001).

Based on the available information, CNPS and CNDDB recommend adding *Lewisia kelloggii* subsp. *kelloggii* to CRPR 3.2 of the CNPS Inventory. If more data on this group becomes available, we will re-evaluate the rarity status of both subsp. *kelloggii* and *hutchisonii* at that time.

Recommended Actions
CNPS: Add to 3.2
CNDDB: Add to G3G4T2T3Q / S2S3

New CNPS Inventory Record
Lewisia kelloggii Brandegee subsp. *kelloggii*
Kellogg's lewisia
Montiaceae
CRPR 3.2
Mariposa, Placer, Tuolumne, Alpine?, Amador?, El Dorado?, Humboldt?, Madera?, ~~Placer?,~~ Shasta?, Sierra?, Siskiyou?, Trinity?
Duncan Peak (540A) 3912025, Cisco Grove (556D) 3912035, Tamarack Flat (455C) 3711976, El Capitan (437B) 3711966, Half Dome (437A) 3711965, Mariposa Grove (437D) 3711955, Yosemite Falls (455D) 3711975, Kangaroo Mtn. (736B)? 4112382, Fish Lake (704C)? 4112336, Seven Lakes Basin (682B)? 4112224, Whisky Bill Peak (683D)? 4112215, Pondosa (679B)? 4112126, Dead Horse Summit (680A)? 4112127, Sierra City (572C)? 3912056, Royal Gorge (539B)? 3912024, Foresthill (541D)? 3912017, Soda Springs (555C)? 3912034, Leek Spring Hill (508A)? 3812063, Pyramid Peak (523C)? 3812072, Tragedy Spring (507B)? 3812072, Bear River Reservoir (507C)? 3812052, Peddler Hill (508D)? 3812053, Caples Lake (507A)? 3812053, Carson Pass (506B)? 3811968, Shuteye Peak (417C)? 3711934
Upper montane coniferous forest (openings, often slate, sometimes rhyolite tuff, ridgetops); elevation 1465-2365 meters.
Perennial herb. Blooms May to August.
Move to CRPR 1B or 4? Taxonomic distinctiveness from ssp. *hutchisonii* is uncertain; needs further study. Threatened by road construction, trail construction, recreational activities, and vehicles. Possibly threatened by horticultural collecting. See *Proceedings of the California Academy of Sciences* II 4(4):88 (1894) for original description.

Current CNPS Inventory Record for *L. kelloggii* subsp. *hutchisonii*
Lewisia kelloggii Brandegee subsp. *hutchisonii* Dempster
Hutchison's lewisia
Montiaceae
CRPR 3.3
Butte, El Dorado, Plumas, Sierra, Siskiyou?, Trinity

Hull Creek (474D) 38120A1, Tragedy Spring (507B) 38120F2, Stump Spring, Calif. (508B) 38120F4, Peddler Hill (508D) 38120E3, Pyramid Peak (523C) 38120G2, Royal Gorge (539B) 39120B4, Duncan Peak (540A) 39120B5, Cisco Grove (556D) 39120C5, Alleghany (557A) 39120D7, Sierra City (572C) 39120E6, Mt. Fillmore (573A) 39120F7, La Porte (573B) 39120F8, American House (574A) 39121F1, Onion Valley (589C) 39120G8, Blue Nose Mtn. (589D) 39120G7, Haskins Valley (590C) 39121G2, Dogwood Peak (590D) 39121G1, Jonesville (607C) 40121A4, Pondosa (679B) 41121B6, Seven Lakes Basin (682B) 41122B4, Fish Lake (704C) 41123C6, Kangaroo Mtn. (736B)? 41123H2
Upper montane coniferous forest (openings, slate); elevation 1463-2365 meters.
Perennial herb. Blooms May to August.
In review. Move to List 1B? Occurrence from SIS Co. needs verification. Threatened by logging and vehicles. Referred to under *L. kelloggii* in *TJM* (1993). Need distributional information. See *Madroño* 43(3):415 (1996) for original description.

Revised CNPS Inventory Record for *L. kelloggii* subsp. *hutchisonii*
Lewisia kelloggii Brandegee subsp. *hutchisonii* Dempster
Hutchison's lewisia
Montiaceae
CRPR 3.2
Butte, Plumas, Sierra, Siskiyou?, Tuolumne, Alpine?, Amador?, El Dorado?, Humboldt?, Madera?, Placer?, Shasta?~~, Siskiyou?~~
Jonesville (607C) 4012114, Blue Nose Mtn. (589D) 3912077, American House (574A), Dogwood Peak (590D), Onion Valley (589C), La Porte (573B) 3912068, Prospect Peak (643D) 4012153, Quincy (589B) 3912088, Alleghany (557A) 3912047, Gold Lake (572B) 3912066, Sierra City (572C) 3912056, Mt. Fillmore (573A) 3912067, Hull Creek (474D) 3812011, Kangaroo Mtn. (736B)? 4112382, Fish Lake (704C)? 4112336, Seven Lakes Basin (682B)?, Whisky Bill Peak (683D)? 4112215, Pondosa (679B)? 4112126, Dead Horse Summit (680A)? 4112127, ~~Sierra City (572C)? 3912056,~~ Royal Gorge (539B)? 3912024, Foresthill (541D)? 3912017, Soda Springs (555C)? 3912034, Leek Spring Hill (508A)? 3812063, Pyramid Peak (523C)? 3812072, Tragedy Spring (507B)? 3812072, Bear River Reservoir (507C)? 3812052, Peddler Hill (508D)? 3812053, Caples Lake (507A)? 3812053, Carson Pass (506B)? 3811968, Shuteye Peak (417C)? 3711934
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