Added to California Rare Plant Rank 4.3 of the CNPS Inventory on July 24, 2018

Rare Plant Status Review: *Iris thompsonii*
Proposed Addition to California Rare Plant Rank CBR 4.3, G3 / S3

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Background and Taxonomy

Iris thompsonii R.C. Foster is a perennial rhizomatous herb in the Iridaceae known from Del Norte and Siskiyou counties, California, as well as Curry County, Oregon, where it is recognized as a hybrid of *I. innominata* and *I. douglasiana*. It is not included in *The Jepson Manual* (Henderson and Cholewa 1993) or *Flora of North America* (Henderson 2002), but is included in *The Jepson Manual, Second Edition* (Wilson 2012) and *Jepson eFlora* (Wilson 2018). *Iris thompsonii* is most similar to *I. innominata*, but differs in having flowers that are generally lavender to blue, occasionally white (vs. flowers generally golden yellow), a triangular ovary (vs. a rounded ovary), and obovate petals (vs. elliptic petals in *I. innominata*) (Wilson 2018). *Iris thompsonii* was originally described in 1936 by R. Foster, who named it after the person that made the original collection, J. W. Thompson.

Iris thompsonii was described as a hybrid of *I. innominata* and *I. douglasiana* in 1958 by L. W. Lenz based on field work observations from both California and Oregon. In 1990, Wilson et al. looked into the status of *I. thompsonii* in an attempt to determine if it should actually be treated as a hybrid or not. In the study by Wilson et al., thirteen populations were chosen that included all three irises (*I. thompsonii* and its putative parents, *I. innominata* and *I. douglasiana*). Flora and vegetative parts were taken from 10 to 25 individuals from each population over an eight year period in order to perform a numerical study measuring sixteen phenotypic traits, including stem length, number of cauline leaves, leaf width, and number of flowers per inflorescence. For ten of the populations, petals, sepals, and stigmas were also collected from 10 to 20 individuals in order to extract flavonoids. The results of their study found that of the three species looked at, *I. innominata* is the most homogeneous, while *I. thompsonii* and *I. douglasiana* are both more variable. The numerical data suggests that *I. thompsonii* is more closely allied with *I. douglasiana*, whereas the flavonoid data suggests a closer relationship between *I. thompsonii* and *I. innominata*. The conclusion of their study indicates that there is not support for the hypothesis of a recent hybrid origin, but that speciation following a hybrid event is a possibility. Wilson (pers. comm. 2018) has done additional studies since and her work still indicates *I. thompsonii* is a distinct species (Wilson 1998, 2003, 2009).

In contrast to the research conducted by Wilson, *I. thompsonii* is considered to be a hybrid between *I. innominata* and *I. douglasiana* in the *Flora of Oregon* (Willyard 2015). Willyard (pers. comm. 2018) treated *I. thompsonii* as a putative hybrid based primarily on Young's (1996a) argument that a discriminant function method (such as the method used by Wilson et al. 1990) may not be appropriate where group membership is uncertain, and that the conflicting phylogenetic placement of *I. thompsonii* based on plastid and nuclear data may indicate reticulate evolution. In order to study two hybrid zones in the Pacific Coast irises, Young (1996a) developed chloroplast DNA (cpDNA) markers that were unique to a species or that delimited a large area within a species, and then followed the markers across the *I. douglasiana*/*I. innominata* hybrid zone. In order to explore the geographical range of each cpDNA haplotype, one to six (typically three) individuals were assayed at 72 localities. Twenty-five (25)

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populations in five transects were sampled for genetic markers and morphological measurements; three transects crossed the *I. innominata*/*I. douglasiana* hybrid zone, one crossed the *I. chrysophylla*/*I. tenax* hybrid zone (the second of the two hybrid zones studied by Young), and one transect crossed both zones. Young (1996a) found that the cpDNA cline was displaced relative to morphology in the three transects of the *I. innominata*/*I. douglasiana* hybrid zone, and provided that the most likely explanation was that the hybrid zone has moved recently, which facilitated introgression of the more slowly dispersing cpDNA. In summarizing the *I. innominata*/*I. douglasiana* hybrid zone, Young (1996a) proclaims "[i]t may be that this hybrid zone arose by secondary contact, in which case the clines were originally centered at the line where the two species contacted one another. However, a primary cline (parapatric speciation) cannot be ruled out in this case."

Two additional research studies on the Pacific Coast irises (*Iris* series *Californicae*; including *I. douglasiana* and *I. innominata*) were conducted by Young. In a study involving reciprocal transplant experiments, Young (1996b) determined that for the *Iris douglasiana*/*I. innominata* hybrid zone, 1) habitat association plays a major role in isolation between *I. douglasiana* and *I. innominata*, 2) each species survives best in its own habitat, and 3) differences in perianth-tube length and flowering time between *I. douglasiana* and *I. innominata* have not developed into significant genetic isolating factors. Two years later, Young (1998) found that fixed morphological differences among the five Oregon species of *Iris* series *Californicae*, revealed that they are good phylogenetic species. However, when applying the genealogical species concept, only one species can be identified as the whole series *Californicae*, and recommends that the phylogenetic species approach be used as the basis of taxonomic species in this group. A cpDNA haplotype network resulting from the parsimony analysis using three outgroups was developed by Young (1998). Within it, *Iris thompsonii* is present in two separate groups, one containing *I. douglasiana* and one containing *I. innominata*, further suggesting that *I. thompsonii* is the result of a hybrid between these two species.

Although it is apparent that *I. thompsonii* is of hybrid origin, it is unknown how long it has progressed enough to be recognized as a species. Additionally, since parapatric speciation has not been ruled out, we accept the recognition of *I. thompsonii* as a distinct species in California until/if more conclusive evidence indicates it is a recent hybrid that does not warrant species status.

Ecology

Iris thompsonii occurs in openings of lower montane and North Coast coniferous forests, usually in mesic conditions and often on serpentine. It often grows along edges of forests, and sometimes occurs along roadsides, trails, and streambanks; occurring at an approximate elevation of 90 to 600 meters (CalPhotos 2018, CCH 2018, CPNWH 2018, Google Inc. 2015, Zika pers. comm. 2018). It is recorded to flower from March to May in the *Jepson eFlora* (Wilson 2018), but observations and specimen records indicate it mostly blooms from May to June, and uncommonly blooms as early as March and as late as August (CalPhotos 2018, CCH 2018, CPNWH 2018, Zika pers. comm. 2018). Based on several collections, *Iris thompsonii* may be associated with *Pseudotsuga menziesii* var. *menziesii, Sequoia sempervirens, Pinus* spp., *Rhododendron* spp., *Viola* spp., *Brodiaea* spp., *Arbutus menziesii,* and *Notholithocarpus densiflorus* (CCH 2018: RSA39095, RSA135904, RSA78683, RSA78743).

Distribution and Abundance

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In California, *Iris thompsonii* is currently known from an estimated 24 occurrences in the northern portion of Del Norte and Siskiyou counties, with a concentration of occurrences in the vicinity of Gasquet, Del Norte County. Of the 24 occurrences, 17 (17/24, ~71%) are considered historical (occurrences not seen in over 20 years are considered historical by CNDDB); however, these occurrences are in areas that aren't being developed or in heavy use, and although they require surveys, they are expected to be extant. One occurrence is located in Klamath National Forest, 18 occurrences are located in Six Rivers National Forest, and the remaining five occurrences are located on land of unknown ownership. One collection is a cultivated plant grown in the Santa Ana Botanic Garden (UC1080391, CCH 2018), and has therefore been discounted from the occurrence estimate. *Iris thompsonii* has been described to be locally common in California (D. York pers. comm. 2018); two 1953 collections from Quentin Clarkson indicate the plant was common (*Clarkson 128*, *130*) with one (*Clarkson 128*) also indicating it was collected from a large colony. Another Clarkson collection (*Clarkson 132*) is described as being abundant. *Iris thompsonii* is described as being scattered or occasional in five other collection records; none of the other records indicate species abundance. In Oregon, *I. thompsonii* is only known from along the Rogue, Illinois, and Winchuck rivers in Curry County (CPNWH 2018).

Status and Threats

Iris thompsonii is currently globally Imperiled to Vulnerable (G2G3) and is unranked (SNR) in California and Oregon (NatureServe 2018). According to Dana York (pers. comm. 2018), *I. thompsonii* is locally common in California, but restricted to Del Norte County on serpentine soils, and recommends a California Rare Plant Rank of 1B.3 or 4.3 for this species. Although relatively restricted in Oregon, it is not eligible for ranking in that state due to its treatment as a hybrid between *I. innominata* and *I. douglasiana*.

There are currently no known threats to *Iris thompsonii*. Some potential threats based on where this species occurs in California may include development, logging, mining, off road vehicles, and road maintenance (S. Matson pers. comm. 2018; P. Zika pers. comm. 2018), but documentation of threats and impacts to this species are needed in order to determine whether such threats specifically apply to *I. thompsonii*.

Summary

Based on the available information, CNPS and CNDDB recommend adding *Iris thompsonii* to California Rare Plant Rank 4.3 of the CNPS Inventory. Although currently ranked G2G3, we recommend a global rank of G3 based on it being locally common in California and in not having any known threats in California or Oregon at this time. If knowledge on the taxonomy, distribution, threats, and rarity status of *I. thompsonii* changes in the future, we will re-evaluate its status at that time.

Recommended Actions

CNPS: Add *Iris thompsonii* to CRPR 4.3
CNDDB: Add *Iris thompsonii* to G3 / S3

Draft CNPS Inventory Record

Iris thompsonii R.C. Foster
Thompson's iris
Iridaceae

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CRPR 4.3
Oregon
Del Norte, Siskiyou
Cant Hook Mtn. (722B) 4112368, Klamath Glen (722C) 4112358, Happy Camp (737C) 4112374, Broken Rib Mtn. (738B) 4112386, Shelly Creek Ridge (739A) 4112387, Gasquet (739C) 4112378, Hurdygurdy Butte (739D) 4112377, High Divide (740A) 4112481, Hiouchi (740D) 4112471
Lower montane coniferous forest, North Coast coniferous forest/openings, usually mesic, often serpentinite, often edges, sometimes roadsides and streambanks; elevation 90-600 meters.
Perennial rhizomatous herb. Blooms (March–April) May–June (July–August).
Considered to be a hybrid of *I. douglasiana* and *I. innominata* in OR. See *Rhodora* 38(450):199-201 (1936) for original description, *Aliso* 4:1-72 (1958) and *American Journal of Botany* 83(12):1623-1629 (1996) for alternative taxonomic treatments as a hybrid, and *Madroño* 37(2):113-123 (1990) for taxonomic treatment as a species.

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