Retained as a California Rare Plant Rank 2B.1 species in the CNPS Inventory on September 13, 2013

Rare Plant Status Review: *Calamagrostis crassiglumis* Proposed Change from California Rare Plant Rank 2B.1 to 3.1, Retention as G3Q / S2?

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August 8, 2013

Changes made to the original document appear in blue text.

Background

Calamagrostis crassiglumis Thurb. is a California Rare Plant Rank (CRPR) 2B.1 plant that has been included in the CNPS Inventory since 1980 (2nd Edition). It was treated as a synonym of *C. stricta* subsp. *inexpansa* (A. Gray) C.W. Greene in *The Jepson Manual* (Greene 1993), *The Jepson Manual, Second Edition* (Peterson et al. 2012), and the *Flora of North America*, Vol. 24 (Marr et al. 2007). Past treatments have separated these two taxa using several different characters, noting that *C. crassiglumis* has hardened, rounded glumes (vs. keeled in *C. stricta* subsp. *inexpansa*) (Jepson 1925; Hitchcock et al. 1969; Hitchcock and Cronquist 1973), shorter ligules than *C. stricta* subsp. *inexpansa* (Munz and Keck 1973; Hitchcock et al. 1969; Hitchcock and Cronquist 1973), and mostly smooth leaves and culms (vs. scabrous in *C. stricta* subsp. *inexpansa*) (Munz and Keck 1973). Marr et al. (2007) examined many specimens in an attempt to determine if *C. crassiglumis* warranted taxonomic recognition. None of the characters that had been used to separate the two taxa consistently worked, but Marr et al. (2007) did note that *C. crassiglumis* plants were generally shorter, and that their culm leaves were broader and generally diverged from the stem at a lower angle. *Calamagrostis stricta* subsp. *inexpansa* reproduces primarily, if not entirely, by apomixis (Greene 1984), and the plants that have been called *C. crassiglumis* are probably also primarily apomictic (K. Marr pers. comm. 2013). The minor morphological differences that separate these two taxa could be perpetuated by this asexual method of reproduction (K. Marr pers. comm. 2013). Based on their study of the species, Marr et al. (2007) noted that further investigation into the taxonomic status of *C. crassiglumis* is warranted.

The types of *C. crassiglumis* and *C. inexpansa*, and additional collections of *C. crassiglumis* from California, Washington, British Columbia, and Alaska were studied by P. Peterson (pers. comm. 2013), and he was able to consistently distinguish *C. crassiglumis* from *C. stricta* subsp. *inexpansa* by the following characters: "*Calamagrostis crassiglumis* consistently has thickened glumes that are rounded towards the base (*C. stricta* ssp. *inexpansa* has membranous, not thickened glumes that are keeled towards the base), generally shorter ligules 1-3 mm long [verses 2-5.5(-6) in *C. stricta* ssp. *inexpansa*], and generally shorter panicles 3-8 cm long [(5-)8-15 cm long in *C. stricta* ssp. *inexpansa*]. Obviously the best character to recognized *C. crassiglumis* is the texture and shape of the glumes."

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In addition to the above-mentioned morphological differences, the two taxa apparently differ in chromosome number: *C. stricta* subsp. *inexpansa* has a chromosome number of about 2n=104 to 123 (Greene 1984), although Nygren's (1954) study reported a range of 2n=28 to 105. *Calamagrostis stricta* subsp. *inexpansa* can vary greatly in chromosome number within populations: for example, a single population in Colorado contained individuals with six different chromosome counts (Nygren 1954). *Calamagrostis crassiglumis* has a chromosome number of 2n=140, but this count was probably based on specimens from a single population at Point Reyes (Nygren 1954). It seems possible that other chromosome numbers could be found in *C. crassiglumis* if additional counts were made.

In California, *C. crassiglumis* is very restricted: it ranges from Point Reyes to coastal Del Norte County, but only occurs in approximately 12 coastal populations. The only recently-documented occurrences are at Point Reyes National Seashore (occurrences not "seen" in 20 years are considered historical by the CNDDB); little is known about the status of the other occurrences. There are an additional 96 specimens treated as *C. stricta* subsp. *inexpansa* in the Consortium of California Herbaria (CCH 2013), a few of them from the same locations as *C. crassiglumis* sites. There are two ~~three~~ additional specimens of *C. stricta* ~~*crassiglumis*~~ subsp. *inexpansa* collected within the range of *C. crassiglumis* (~~*D. Taylor 12276,*~~ *A. Chase 5687,* and *D. Kelch 97.16*) (CCH 2013) that could represent new occurrences of *C. crassiglumis*.

Calamagrostis crassiglumis plants at Point Reyes are threatened by grazing as well as shrub and weed encroachment (CNDDB 2013). Several of the Point Reyes populations may be declining, as older estimates of population size are greater than more recent estimates (EO# 4 and 10). Given the small number of occurrences, the threats to recently-documented occurrences, and the lack of data on other occurrences, *C. crassiglumis*, if taxonomically recognized, should still be considered highly threatened in California.

~~The current data are inconclusive as to whether *C. crassiglumis* should be recognized.~~ Morphological differences that had been previously used to separate the taxa do not seem to hold up, and more complete data on DNA sequence variability ~~chromosome numbers, as well as molecular data,~~ could help to further our understanding of their taxonomy ~~solve the taxonomic puzzle~~. We also questioned several botanists who are familiar with the Point Reyes area, and they did not have an opinion on the taxonomic status of *C. crassiglumis* (D. Smith and A. Ryan pers. comm. 2013). Based on the available data, CNPS and CNDDB recommend that the rank of *C. crassiglumis* be changed from 2B.1 to 3.1. If more information regarding the taxonomic status of *C. crassiglumis* becomes available in the future, CNPS and CNDDB will re-evaluate its rarity status at that time.

Recommended Actions
CNPS: Re-rank *Calamagrostis crassiglumis* from 2B.1 to 3.1
CNDDB: Retain at G3Q / S2?

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Current CNPS Inventory Record
Calamagrostis crassiglumis Thurb.
Thurber's reed grass
Poaceae
Rank 2B.1
Del Norte, Mendocino, Marin, Sonoma
Arkansas, Arizona, Colorado, Connecticut, Iowa, Idaho, Illinois, Indiana, Kansas, Massachusetts, Maine, Michigan, Minnesota, Missouri, Montana, North Dakota, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada, New York, Ohio, Oregon, Pennsylvania, South Dakota, Utah, Vermont, Washington, Wisconsin, West Virginia, Wyoming
Drakes Bay (485C) 3812218, Sebastopol (502A) 3812247, Inglenook (585D) 3912357, Crescent City (740C) 4112472
Coastal scrub (mesic), marshes and swamps (freshwater); elevation 10-45 meters.
Perennial rhizomatous herb. Blooms May to July.
In review. Undocumented in HUM Co.; need quads. Threatened by grazing at Pt. Reyes NS. See *C. stricta* ssp. *inexpansa* in *TJM* (1993) and *TJM 2*. See *Botany of California* 2:281 (1880) for original description.
Available online at http://www.rareplants.cnps.org/detail/370.html

Revised CNPS Inventory Record
Calamagrostis crassiglumis Thurb.
Thurber's reed grass
Poaceae
CRPR 2B.1 ~~3.1~~
Del Norte, Humboldt, Mendocino, Marin, Sonoma
Arizona, Colorado, Idaho, New Mexico, Nevada, Oregon, Utah, Washington, Wyoming
Drakes Bay (485C) 3812218, Sebastopol (502A) 3812247, Inglenook (585D) 3912357, Fern Canyon (706A) 4112441, Sister Rocks (723B) 4112462, Crescent City (740C) 4112472
Coastal scrub (mesic), marshes and swamps (freshwater); elevation 10-60 meters.
Perennial rhizomatous herb. Blooms May to August.
~~Previously CRPR 2B.1; none of the past characters used to differentiate this plant from *C. stricta* ssp. *inexpansa* work. May differ from *C. stricta* ssp. *inexpansa* in plant height, angle of culm leaf divergence from the stem, and chromosome number; needs further study.~~ Threatened by grazing at Pt. Reyes NS. A synonym of *Calamagrostis stricta* ssp. *inexpansa* in *TJM* (1993) and *TJM* 2; distinguished from this taxon in glume texture and shape: *C. crassiglumis* has thickened glumes that are rounded towards the base (vs. membranous, not thickened glumes that are keeled towards the base), generally shorter ligules (1-3 mm long vs. 2-5.5(6) mm long), and generally shorter panicles (3-8 cm long vs. (5)8-15 cm long in *C. stricta* ssp. *inexpansa*). See *Botany of California* 2:281 (1880) for original description.

Literature Cited

Consortium of California Herbaria (CCH). 2013. Data provided by the participants of the Consortium of California Herbaria. Regents of the University of California, Berkeley. Accessed on 29 July 2013. Available online at: http://ucjeps.berkeley.edu/consortium/

Greene, C.W. 1984. Sexual and apomictic reproduction in *Calamagrostis* (Graminae) from eastern North America. American Journal of Botany 71(3): 285-293. (only abstract seen).

Greene, C.W. 1993. *Calamagrostis*, reed grass. Pp. 1243-1246 in Hickman, J.C. (ed.), The Jepson Manual: Higher Plants of California. University of California Press, Berkeley.

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle. 730 pp.

Hitchcock, C.L., A. Cronquist, and M. Ownbey. 1969. Vascular Plants of the Pacific Northwest Part 1: Vascular Cryptograms, Gymnosperms, and Monocotyledons. University of Washington Press, Seattle. 914 pp.

Jepson, W.L. 1925. Manual of the Flowering Plants of California. University of California Press, Berkeley and Los Angeles.

Marr, K., R.J. Hebda, and C.W. Greene. 2007. *Calamagrostis*. Pp. 706-732 in Flora of North America Editorial Committee (eds.), Flora of North America North of Mexico, Vol. 24. New York and Oxford.

Munz, P.A and D.D. Keck. 1973. A California Flora with Supplement. University of California Press, Berkeley and Los Angeles. 1681 pp. and 224 pp.

Nygren, A. 1954. Investigations on North American *Calamagrostis*. I. Hereditas 40(3-4): 377-397.

Peterson, P.M., J.M. Saarela, and C.W. Greene. 2012. *Calamagrostis*, reed grass. Pp. 1431-1433 in Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.), The Jepson Manual: Vascular Plants of California (2nd ed.). University of California Press, Berkeley and Los Angeles.