Added to California Rare Plant Rank 1B.3 of the CNPS Inventory on December 15, 2015

Rare Plant Status Review: *Vaccinium shastense* subsp. *shastense*
Proposed New Add to California Rare Plant Rank 1B.3, G3 / S3

Aaron E. Sims (CNPS) and Roxanne Bittman (CNDDB)
November 10, 2015

Background

Vaccinium shastense J.K. Nelson & L. Lindstrand III subsp. *shastense* is a perennial deciduous shrub in the Ericaceae that is endemic to the southeastern Klamath Mountains of Shasta County, California. It was recently described by Nelson and Lindstrand (2015) and is therefore not included in *The Jepson Manual, Second Edition* (Wallace 2012). *Vaccinium shastense* subsp. *nevadense* was also described by Nelson and Lindstrand (2015) from the western slope of the Sierra Nevada. Although somewhat uncommon and irregularly distributed, subsp. *nevadense* is not recommended for any level of conservation status at this time due to its high number of occurrences, large range, and location of most occurrences in remote or fairly remote forest areas, including protected state and federal lands (Nelson and Lindstrand 2015). *Vaccinium shastense* subsp. *shastense* was first collected by Milo Baker in 1900 near Afterthought Mine, a location presently known as Ingot (see occurrence #8 in "Localities" tab of attached "NewAdd_VacciniumShastenseShastense" spreadsheet). It was collected 14 years later by James McMurphy from "hill above mine, Kennet." The town of Kennett was a location of a copper smelter that processed ore from the many mines around what is currently Shasta Lake. It is now under the lake's waters, not far from Shasta Dam (Nelson and Lindstrand 2015). "These collections represent the only two made before [J. Nelson] discovered the plant growing at Golinsky Mine, on the west side of Shasta Lake, on June 7, 1991" (Nelson and Lindstrand 2015).

Vaccinium shastense subsp. *shastense* is very similar to *V. parvifolium* based on "its deciduous habit, green angled twigs, and number and placement of flowers" (Nelson and Lindstrand 2015). Nevertheless, *V. shastense* subsp. *shastense* most obviously differs from *V. parvifolium* in fruit color (dark blue to purple, glaucous fruits vs. red translucent fruits without surface wax) and hypanthium scar dimensions (hypanthium scar >3/4 width of berry vs. ≤1/2 the width of berry in *V. parvifolium*). The berries of *V. shastense* subsp. *shastense* also drop quickly after ripening, with pedicels still attached (vs. persisting on shrub for at least two months in *V. parvifolium*; Vander Kloet 1988) (Nelson and Lindstrand 2015). Lastly, the seeds of *V. shastense* subsp. *shastense* have pitted surfaces (vs. longitudinal striations on *V. parvifolium* seeds). Besides fruit and seed characteristics, there are also vegetative differences between *V. shastense* subsp. *shastense* and *V. parvifolium*. Notably, the leaves of *V. shastense* have inrolled margins, are ciliate with forward-pointing bristles that are 0.2-0.6 mm long, and otherwise entire or barely serrate; whereas the leaves of *V. parvifolium* are not ciliate or occasionally ciliate only on the lower third, and if cilia are present they are only 0.1-0.14 mm long. *Vaccinium shastense* and *V. parvifolium* also appear to be allopatric, with *V. parvifolium* "restricted to the coastally influenced regions of California and the more

mesic parts of the western and high Klamath Mountains of Siskiyou County, extending northward, west of the Cascade Crest, through Oregon and Washington to British Columbia and Alaska", and *V. shastense* subsp. *shastense* restricted to inland California, from the southeastern Klamath Mountains (Nelson and Lindstrand 2015). *Vaccinium shastense* subsp. *shastense* differs from *V. shastense* subsp. *nevadense* in more subtle characters, yet they are genetically distinct and also geographically disjunct, with the southern Cascade Range lying between their distributions. According to Nelson and Lindstrand (2015), "[t]he combination of vegetative and fruiting characteristics and distinct geographic ranges make identification of *V. parvifolium*, *V. shastense* subsp. *shastense*, and *V. shastense* subsp. *nevadense* straightforward." See Nelson and Lindstrand (2015) for a taxonomic key differentiating *V. shastense* subsp. *shastense* from all other *Vaccinium* taxa known from California.

Vaccinium shastense subsp. *shastense* almost entirely occurs in areas with acidic soil or acidic water conditions within riparian forest and seeps and springs, as well as other mesic environments in cismontane woodland, lower montane coniferous forest, and chaparral. It often occurs along streambanks, but also occurs as an understory shrub in conifer forests, as well as in crevices and seeps and springs among rock outcrops or cliff features. It is also known from disturbed habitats, including roadside ditches and road-cuts, drainages and eroded slopes, streams characterized by acid mine discharge, and forested slopes that were formerly denuded of vegetation from copper smelting in the early 1900s. *Vaccinium shastense* subsp. *shastense* flowers from December through May, with peak flowering in March and April, and has been observed flowering through September contingent upon local weather conditions. It occurs at an approximate elevation of 325 to 1220 meters. The forest and chaparral habitats where *V. shastense* subsp. *shastense* occurs are dominated by the following taxa: *Arctostaphylos viscida*, *Cornus nuttallii*, *Notholithocarpus densiflorus* var. *echinoides*, *Pinus ponderosa*, *Pseudotsuga menziesii* var. *menziesii*, *Quercus chrysolepis*, *Q. kelloggii*, *Styrax redivivus*, and *Toxicodendron diversilobum*. Typical taxa associated with *V. shastense* subsp. *shastense* include: *Acer macrophyllum*, *Aruncus dioicus* var. *acuminatus*, *Calycanthus occidentalis*, *Alnus rhombifolia*, *Panicum acuminatum* var. *fasciculatum*, *Philadelphus lewisii*, *Polystichum californicum*, *Pteridium aquilinum* var. *pubescens*, *Rhododendron occidentale*, *R. columbianum*, *Rubus armeniacus*, *R. ursinus*, *Salix lasiandra* var. *lasiandra*, and *Woodwardia fimbriata* (Nelson and Lindstrand 2015).

Vaccinium shastense subsp. *shastense* is presently known from approximately 23 occurrences, ranging from several isolated plants to 1000+ plants. There are approximately six additional occurrences of *V. shastense* subsp. *shastense* on private, undisclosed lands; however, they do not represent range extensions, and there are known occurrences around and adjacent to all of the private locations (L. Lindstrand pers. comm. 2015). All known occurrences of *V. shastense* subsp. *shastense* are within a region historically known as the Copper Belt of Shasta County, and "are directly correlated to habitats with geological characteristics causing naturally occurring acidic conditions, or former copper mine sites and adjacent areas affected by those activities where acidic conditions occur and have been exacerbated" (Nelson and Lindstrand

2015). In addition to comprehensive surveys for *V. shastense* subsp. *shastense* throughout the past two and a half decades, J. Nelson and L. Lindstrand (pers. comm. 2015) went through all *V. parvifolium* (and some other *Vaccinium*) specimens at CAS/DS, CHSC, and UC/JEPS herbaria to determine if any were actually *V. shastense* subsp. *shastense*. They also reviewed all Consortium of California Herbaria records, and found that most everything at DAV, HUM, and RSA were duplicates at UC/JEPS and CAS or within the same general geographic locations, not warranting a special trip to review in addition to those already present in Bay Area herbaria. Earlier, A. Colwell had also gone through California *Vaccinium* specimens at Harvard, MO, RSA, Smithsonian, and UC/JEPS (J. Nelson and L. Lindstrand pers. comm. 2015); further elucidating that adequate herbarium review has taken place. Based on ongoing surveys, extensive herbarium review, and its specific microhabitat requirements, additional occurrences of *V. shastense* subsp. *shastense* are unlikely to be found outside of its currently defined, narrow range.

Threats to *V. shastense* subsp. *shastense* are considered minimal to non-existent at this time. It is known to be resilient to a variety of disturbances, is adapted to survive fire, and could be useful for mine reclamation on adequate sites within its range (Nelson and Lindstrand 2015). However, the taxon is “narrowly endemic and uncommon such that its status should be monitored”, and Nelson and Lindstrand (2015) recommend it to be considered for a California Rare Plant Rank of 1B.3.

Based on the available information, CNPS and CNDDB recommend adding Vaccinium shastense subsp. shastense to California Rare Plant Rank 1B.3 of the CNPS Inventory. If knowledge on the distribution, threats, and rarity status of *V. shastense* subsp. *shastense* changes in the future, we will re-evaluate its status at that time.

Recommended Actions
CNPS: Add to California Rare Plant Rank 1B.3
CNDDB: Add to G3 / S3

Draft CNPS Inventory Record
Vaccinium shastense J.K. Nelson & L. Lindstrand III subsp. *shastense*
Shasta huckleberry
Ericaceae
CRPR 1B.3
Shasta
Oak Run (646A) 4012261, Shasta Dam (647B) 4012264, Whiskeytown (648A) 4012265, Minnesota Mountain (664C) 4012272, Bohemotash Mountain (665C) 4012274
Chaparral, cismontane woodland, lower montane coniferous forest, riparian forest, seeps and springs, / acidic, mesic; often streambanks, sometimes rocky outcrops, sometimes roadsides and disturbed areas; elevation 325 to 1220 meters.
Perennial deciduous shrub. Blooms December to May (June to September).
Similar to *V. parvifolium.* See *Madroño* 62(3):167-180 (2015) for original description.

Literature Cited

Nelson, J.K. and L. Lindstrand III. 2015. A new species of *Vaccinium* (Ericaceae) from the southeastern Klamath Mountains and the Sierra Nevada, California, with two subspecies. Madroño 62(3):167-180. (Original description.)

Vander Kloet, S.P. 1998. The genus *Vaccinium* in North America Agriculture Canada, Research Branch, Publication 1828, Ottawa. (Not seen.)

Wallace, G.D. 2012. *Vaccinium*. Pp. 708-709 *in* B.G. Baldwin, 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, CA.