

13. *PARVISEDUM LEIOCARPUM* (LAKE COUNTY STONECROP)

a. Description and Taxonomy

Taxonomy.—Lake County stonecrop is in the stonecrop family (Crassulaceae) and is one of only three (Moran 1997) or four (Clausen 1946, Denton 1993) species in the genus *Parvisedum*, depending on individual interpretations by taxonomists. The original scientific name for Lake County stonecrop was *Sedella leiocarpa* (Sharsmith 1940). The type locality was cited as “6.5 miles north of Lower Lake, Lake County, California” (Sharsmith 1940:193). Clausen (1946) changed the name of this species to *Parvisedum leiocarpum* because the genus name *Sedella* already had been applied to another group of plants. However, Moran (1997) returned to using the name *Sedella leiocarpa* for Lake County stonecrop, after another taxonomist determined that the genus name *Sedella* had been used improperly for the other group of plants. We originally listed the species as endangered under the name *Parvisedum leiocarpum* (U.S. Fish and Wildlife Service 1997b) and we have not yet formally changed our nomenclature for the species, so in this recovery plan we continue to refer to it by the scientific name *Parvisedum leiocarpum*.

Description and Identification.—*Parvisedum leiocarpum* (**Figure II-17**) is a tiny, fleshy, annual herb. The reddish, hairless stems are at most 5 centimeters (2.0 inches) tall and may or may not be branched. Leaf arrangement is opposite at the base of the plant and alternate on the upper stem. The 2 to 5 millimeter-long (0.08 to 0.20 inch-long) leaves are entire, fleshy, and green with red streaks; the bracts are similar but smaller. The leaves fall off the stem before the flowers open, but the bracts persist. On each branch of the inflorescence, the flowers are crowded together in two rows, which are both on the same side of the branch. The individual flowers are 3 to 4 millimeters (0.12 to 0.16 inch) wide and about the same length. Flowers typically have five petals and other parts (sepals, pistils, and stamens), but occasionally have four of each flower part. The petals range in color from pale yellow to chartreuse, have reddish streaks on the back, and are about 2.6 to 3.8 millimeters (0.10 to 0.15 inch) long with light fusing at the base. Each petal has a flattened, reddish nectar-producing gland at its base; the glands are 0.5 to 0.8 millimeter (0.02 to 0.03 inch) in length. Each pistil develops into a dry, hairless fruit 1.5 to 2.5 millimeters (0.06 to 0.10 inch) long, which contains a single seed. The narrow seeds are light brown and 1 to 1.5 millimeters (0.04 to 0.06 inch) long (Sharsmith 1940, Clausen 1975, Denton 1993, Moran 1997). *Parvisedum leiocarpum* has a diploid chromosome number of 18 (Moran 1997), as do all other species in the genus (Clausen 1975, Denton 1993). The species most likely to be confused with *P. leiocarpum* is *P. pentandrum* (Mt. Hamilton stonecrop), which overlaps in range. However, the

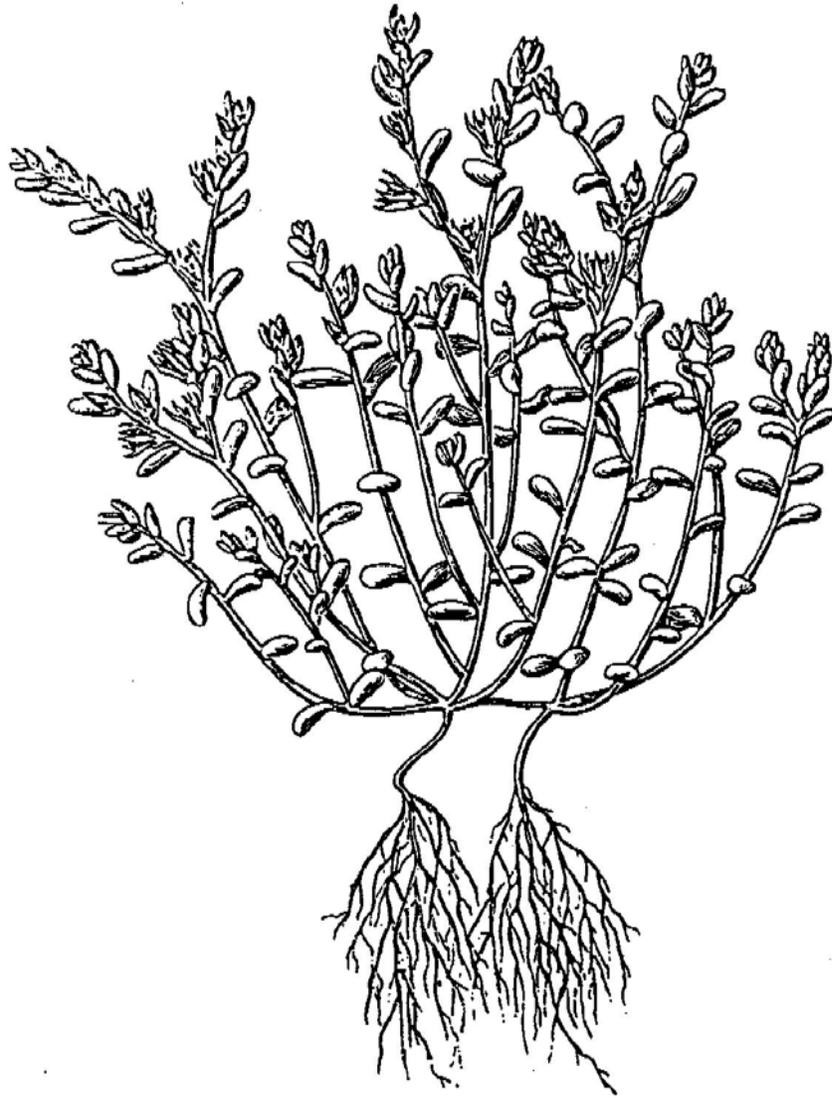


Figure II-17. Illustration of *Parvisedum leiocarpum* (Lake County stonecrop). Drawing by Elfriede Abbe, reprinted from R.T. Clausen, *Sedum of North America North of the Mexican Plateau*. Copyright © 1975 by Cornell University. Used by permission of the publisher, Cornell University Press.

latter is a taller plant with smaller flowers, nectaries, fruits, and seeds; the petals do not have red streaks on the back; and the fruits are glandular-hairy.

Other species of *Parvisedum* have 10 stamens. *Crassula connata* (pygmy stonecrop), another inconspicuous annual species in the same family, has strictly opposite leaves that are fused at the base and very tiny flowers in the leaf axils. Other genera in the family are perennial or have more seeds per pistil (Sharsmith 1940, Clausen 1975, Denton 1993).

b. Historical and Current Distribution

Historical Distribution.—Current evidence indicates that this species always has been restricted to southeastern Lake County, and to the Lake-Napa Vernal Pool Region (Keeler-Wolf *et al.* 1998) (**Figure II-5**). *Parvisedum leiocarpum* was known historically from six to eight occurrences west and south of Clear Lake, where it was collected repeatedly between 1936 and 1961. The exact number of sites is uncertain because several vague location descriptions may or may not refer to the same site. All collections were from the area roughly bounded by Kelseyville, Lower Lake, and Middletown (Patterson 1986). Manning Flat, which is along Highway 29 west of Lower Lake, apparently represents the type locality (Moran 1997). Although it is west rather than north of Lower Lake, Clausen (1975:597) noted that the type specimen was collected “on Kelseyville Highway,” which apparently refers to Highway 29. *Parvisedum leiocarpum* was not observed between 1963 (Clausen 1975) and the late 1980s, when it was rediscovered at three of the historical localities (Patterson 1986, 1988; California Natural Diversity Data Base 2003). A sixth population was discovered in 1995 near Snows Lake in Lake County (Moran 1997), but is not catalogued by the California Natural Diversity Data Base (2005).

Current Distribution.—The four occurrences of *Parvisedum leiocarpum* last seen in the 1980s and 1990s are assumed to be extant, although they have not been revisited. Two others not seen since the 1940s also are assumed to remain extant because suitable habitat remained in the vicinity of those collections as of 1986. Three of those six occurrences, including Manning Flat, are along Highway 29. The other three occurrences include one farther south near Whispering Pines, one southeast of Lower Lake in Little High Valley (Patterson 1986, 1988; California Natural Diversity Data Base 2005), and one at Snows Lake (Moran 1997). All known occurrences are in the Boggs Lake-Clear Lake Core Area in the Lake-Napa Vernal Pool Region.

c. Life History and Habitat

Reproduction and Demography.—Relatively little is known about the life history and demography of *Parvisedum leiocarpum*. It is an annual that flowers in April and May (Clausen 1975, California Department of Fish and Game 1990b, Skinner and Pavlik 1994, Moran 1997). The presence of conspicuous nectaries suggests that the flowers are insect-pollinated. Seed dispersal is likely very limited in extent. The seeds normally remain inside the fruits and the fruits remain on the plants even after the growing season (Moran 1997). Water is one possible dispersal mechanism because the fruits can float if detached (Moran 1997). *Parvisedum leiocarpum* typically occurs in dense patches with few other plants (Clausen 1975), although Patterson (1988) found one colony that was very sparse. The number of individual plants in a population can be high, even when it occupies a very small area due to the high density and the small size of each plant.

Habitat and Community Associations.—*Parvisedum leiocarpum* occurs on more or less level sites in shallow depressions that retain water seasonally. Known microhabitats include Northern Basalt Flow and Northern Volcanic Ashflow vernal pools (Sawyer and Keeler-Wolf 1995), low areas in meadows and gravelly flats, and hollows in exposed rocks. A few plants were found on a man-made berm within a flat that supported a large population. The occupied habitats occur adjacent to oak woodland, chaparral, or grassland. Substrates on which *P. leiocarpum* occur frequently are of volcanic origin and often are gravelly (Patterson 1986). Soil pH at one site ranged from 6.2 to 6.4 (Clausen 1975). Soil types are not known for all historical sites, but this species grows on at least the Glenview-Bottlerock complex, the Konocti-Benridge complex, the Konocti Variant-Konocti-Hambright complex and the Speaker-Sanhedrin-Maymen association.

Extant and historical localities ranged in elevation from 518 to 792 meters (1,700 to 2,600 feet) (Moran 1997, California Natural Diversity Data Base 2003). Plants that frequently grow in the same vernal pools and meadows with *Parvisedum leiocarpum* include *Mimulus tricolor*, *Lasthenia fremontii*, and *Plagiobothrys stipitatus*. The only immediate associate in the rock pools at the Little High Valley site is an unidentified moss (class Musci). Two other plants featured in this recovery plan co-occur with *Parvisedum leiocarpum*: *Navarretia leucocephala* ssp. *pauciflora* co-occurs at three sites, and *Gratiola heterosepala* is present at one of the three. *Lasthenia burkei*, an endangered plant that is not addressed in this recovery plan, occurs at Manning Flat, but is found across the road from the *Parvisedum leiocarpum* population (Patterson 1986, California Natural Diversity Data Base 2003).

d. Reasons for Decline and Threats to Survival

Most species addressed in this recovery plan are threatened by similar factors because they occupy the same vernal pool ecosystems. These general threats, faced by all the covered species, are discussed in greater detail in the Introduction section of this recovery plan. Additional, specific threats to *Parvisedum leiocarpum* are described below.

Land conversion for housing and agriculture, highway widening, and road maintenance continue as specific threats to *Parvisedum leiocarpum* habitat at five of the historical localities (Patterson 1986, California Department of Fish and Game 1990b). At each of the presumed extant occurrences, *P. leiocarpum* occupies no more than 0.04 hectare (0.1 acre), so even small habitat losses to any of these factors could easily extirpate an entire population (Patterson 1986). Also, the extremely small populations are highly vulnerable to elimination from random fluctuations in environmental conditions, natural catastrophes, and genetic bottlenecks (Menges 1991); the restricted range of the species means that a regional catastrophe could drive the entire species to extinction.

e. Conservation Efforts

Parvisedum leiocarpum was federally listed as an endangered species on June 18, 1997 (U.S. Fish and Wildlife Service 1997b). *Parvisedum leiocarpum* was previously State listed as endangered in 1990 (California Department of Fish and Game 1991). The California Native Plant Society has recognized this species as rare and endangered since its first list was published (Powell 1974); it is still on the California Native Plant Society List 1B, assigned the highest endangerment rating possible (California Native Plant Society 2001).

The California Department of Fish and Game funded a status survey of *Parvisedum leiocarpum* in 1986 (Patterson 1986). Patterson conducted additional surveys in 1987, then petitioned the California Fish and Game Commission to list *P. leiocarpum* as an endangered species (Patterson 1988). None of the localities for this species are in public ownership, and no conservation measures have been implemented by any of the landowners.