Plant Species Evaluation Form

_Sedum citrinum_ Zika

**BLUE CREEK STONECROP**

**Family:** Crassulaceae  
**PLANTS Symbol:** SECI6  
**Calif. Endemic:** Yes

(CNPS 2018)  
(USDA 2018)  
(CNPS 2018)

**Synonyms/Other Names:** _Sedum citrinum_ was described by P. Zika in 2014, from specimens collected in the Klamath Mountains of southern Del Norte County, California. The name is accepted, and no synonyms exist (Tropicos 2018).

**Identification Issues:** _Sedum citrinum_ is distinguished from other sedums in the section _Gormania_ by a combination of open rosettes, leaves that are widest above the middle, a flat-topped inflorescence, and yellow flowers with spreading petals (Zika et al. 2018).

**Taxonomy:**

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Species In Genus: +- 450 species: temps, tropical mountains, North America, Mexico, Central America, Europe, Asia, northern and eastern Africa, Atlantic islands, Indian Ocean islands; cultivated as ornamental, green roofs. Etymology: (Latin: to assuage, from healing properties of houseleek, to which _Sedum_ was sometimes applied). Note: _Sedum roseum_ moved to _Rhodiola_.

Habit: Plant 5--27.5 cm, rhizomed; rosettes open, 2--7 cm diameter, internodes generally visible. Leaf: rosette leaves 8--31 mm, 6--22 mm wide, oblanceolate to obovate, wedge-shaped, apex obtuse or notched. Inflorescence: panicle-like, generally flat-topped, 10--95-flowered; bracts opposite, 5--7 mm, 2--3 mm wide, base truncate, narrowly obovate, tip obtuse, rarely notched. Flower: petals 6--9 mm, deep yellow, lanceolate and +- mucronate. Fruit: fused at base, 5.2--6.5 mm, erect. Seed: 1.2--1.5 mm. eFlora Treatment Author: Steve Boyd & Melinda F. Denton (to be replaced in 2022 by a new eFlora treatment based on Zika et al. 2018).

**Status:**

Note: Federally recognized Endangered, Threatened, Proposed, or Candidate species under the Endangered Species Act are omitted as they do not meet the definition of a Species of Conservation Concern (FSH 1909.12 § 12.52).

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Expanded abbreviations and citations: State Listing=California Endangered Species Act Listing (CDFW 2018b), Nevada Division of Forestry Fully Protected Plant Species (NAC 527) (NDF 2012), Oregon Department of Agriculture Listed Plants (ODA 2014); G-rank=Global Conservation Status (CDFW 2018a; NatureServe 2018); S-rank=Subnational (state or province-level) Conservation Status (CDFW 2018a; NatureServe 2018; NNHP 2017; ORBIC 2016); CRPR=California Rare Plant Rank
Sedum citrinum Zika

Sedum citrinum was added to California Rare Plant Rank 1B.2 of the CNPS Inventory in 2015, when known from approximately six occurrences (Slakey et al. 2015; CNPS 2018).

**Distribution:** This species is a California endemic, known from just three populations within the North Coast Coniferous Forest bioregion of the Klamath Mountains, in Del Norte County (Zika 2014). Populations tend to be small and relatively isolated from one another. All eleven occurrences of this species occur within Six Rivers National Forest, with one occurrence (EO 6) also occurring on private property (CNDDB 2017).
Sedum citrinum Zika

Locations within California:
Record numbers indicate sites that contain an individual, population, or groups of populations located within ¼ mile of each other, per the California Natural Diversity Database (CNDDB 2017) definition of Element Occurrences (EOs) in California. Official EO numbers for plants in California are determined solely by the CNDDB and are included within the Reference (Source) column for CNDDB data. Duplicate records from the same site are given the same record number and included in red. The Population Info column includes total number of individuals and total number and size of populations/sub-populations when provided. Elevations provided in meters from source have been converted to feet. If not provided in original source, Land Manager information was obtained using the California Protected Areas Database (CPAD 2016) and Quad information was obtained using 24K Quads, SDE Feature Class (CDFG 2013). All other information is directly from the Reference (Source) unless additional citation is given.

Redacted for conservation purposes.
**Sedum citrinum** Zika

**Distribution on National Forest System (NFS) Lands:**
(Please see Reference column of Locations table above for references pertaining to Record Numbers indicated on NFS lands.)

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**Demographic and Population Trends:** There are 11 occurrences of *Sedum citrinum*, of which five provide population size estimates. All five indicate that 300-500 ramets were present within the survey site. Only one record is more than six years old—and that record comes from an observer’s recollection, offered after *S. citrinum* was described in 2014. None of the occurrences have year-on-year demographic data, so nothing can be inferred about persistence or population change within sites (CNDDB 2017). Given the recent description of this species, it is probable that undetected populations exist; additional field work is necessary for an accurate description of demography and population structure in *S. citrinum*. 
**Life History:** *Sedum citrinum* is a succulent, perennial herb favoring rocky ultramafic sites. It has been observed to bloom in June (CNPS 2018). *Sedum* species are known to be pollinated by an array of bees, beetles, and butterflies, as well as a limited number of fly species (CPC 2018). Members of Section *Gormania* retain a generalist pollination syndrome, and are visited by the Hymentopteran families Apidae, Andrenidae, Megachilidae, Nomadidae, and Formicidae; the Dipteran families Bombylidae and Syrphidae; and the Coleopteran families Chrysomelidae and Mordellidae (Denton 1979). The principal pollinators for *S. citrinum* are unknown, but likely include some or all of these groups.

**Diversity:** *Sedum* is the most species-rich and taxonomically problematic genus within Crassulaceae, encompassing about 420 species showing an immense diversity of form—much of it homoplastic—that makes it impossible to characterize the genus phenotypically. Crassulaceae are also difficult to preserve in herbaria, owing to their delicate structure and succulent tissues. A recent molecular phylogenetic analysis shows that the genus is grossly polyphyletic, but that there are some coherent higher-level taxa within Crassulaceae. The majority of *Sedum* species fall within the tribe Sedeeae, comprising the large Acre clade and a paraphyletic grade, the *Leucosedum* cluster. Below the genus level, some structure has been teased apart: subgenus *Sedum* has 320 species occurring mainly in Asia and the Americas, while subgenus *Gormania* contains 110 species distributed through Europe, the Mediterranean and North America. *Sedum citrinum* falls within the latter group (Nikulin et al. 2016). Section *Gormania* is restricted to western North America, with taxa occurring on rocky outcrops between 55 and 3,700 meters in elevation. Species in this group form a ploidal series, beginning with a haploid number of fifteen; however, polyploidization alone is believed to be an effect of diversification, rather than the cause. The Klamath region is especially rich in taxa of Section *Gormania*, as physical isolation, substrate specialization and divergence in reproductive morphology has promoted diversification of narrow endemics. These recently evolved species are characterized by extensive vegetative reproduction, morphological variability, polyploid genomes, and self-incompatibility; relictual species in the same area are usually diploid, morphologically homogeneous, self-compatible and restricted to a single substrate type—mostly at lower elevations (Denton 1979).

**Habitat:** *Sedum citrinum* occurs within rock crevices, on talus and scree slopes, and sometimes along road-cuts, from 1,050 to 1,280 meters in elevation. The species favors ultramafic substrates, often growing on serpentinite (CNPS 2018). Taxa belonging to *Sedum* section *Gormania* frequently specialize on a single substrate type (Denton 1979); it is not known to what extent *S. citrinum* is limited by edaphic conditions.

**Habitat Status or Trend:** The Klamath region has played host to a remarkable diversification in plant species, as a consequence of its complex geology and long history of isolation (Whittaker 1960). The region is one of six globally important temperate forest biodiversity hotspots, having served as a climatic refugium during the Pleistocene. More than a century of land use (including logging, mining, grazing, and modification of fire regimes) has significantly altered much of the region. Only 28% of the old-growth forest remains, and ongoing human impacts continue to degrade wild communities, especially in mesic lowland and mid-elevation areas, partly encompassing the elevation range of *S. citrinum*. The scale and speed of anthropogenic climate change might exceed the capacity of the Klamath region to provide
refugia for taxa of low mobility and narrow ecological requirements, though careful management may partially mitigate this risk (Olson et al. 2012).

**Capacity for the Species to Disperse:** As a recently-evolved member of Section *Gormania*, *Sedum citrinum* is likely characterized by extensive vegetative reproduction and a low level of self-compatibility (Denton 1979). This mix of traits favors local persistence and colonization, while rendering long-distance dispersal via resistant diasporas somewhat less likely. No data exist to evaluate these hypotheses.

**Threats:** Several potential threats to *Sedum citrinum* have been noted by Zika (2014) and D. Brainerd (pers. comm. 2015), including road-widening, road maintenance, off-road vehicles, and mining (due to evidence of past mining at once site). However, Darington (pers. comm. 2015) suggested that these threats are over-stated, given that the deteriorating state of the access road to *S. citrinum* populations discourages use, and that the very rugged terrain and lack of water prevent use by off-road riders and campers. Darington mentioned instead that climate change and fire suppression are the only significant threats to *S. citrinum* (Slakey et al. 2015; CNPS 2018).

Horticultural collecting is also a potential threat to *Sedum citrinum* (CNPS 2018), and poaching for decorative purposes ought to be considered as a potential threat with regards to the recent poaching of *Dudleya* spp. off the north coast of California (CDFW News 2018; Krieger 2018). Lastly, as a narrow endemic with few known occurrences and relatively small population sizes, *Sedum citrinum* is vulnerable to acute disturbance at local scales, as well as more chronic regional pressures.

**Literature Cited**


[CDFG] California Department of Fish and Game. 2013. 24K Quads, SDE Feature Class. Index for 1:24,000-scale (24K), 7.5-minute by 7.5-minute, paper U.S. Geological Survey maps in California.


[CNDDB] California Department of Fish and Wildlife, Natural Diversity Database. 2017. RareFind 5 [Internet application] and CNDB Maps and Data. Available at: https://www.wildlife.ca.gov/Data/CNDB/Maps-and-Data [Government Version, May 2017].


[CDF] California Department of Forestry and Fire Protection. 2009. 1:24,000 County Boundaries (cnty24k09_1_poly) [shapefile]. California Department of Forestry and Fire Protection, California Department of Fish and Game. Berkeley Library Geodata. Available at: https://geodata.lib.berkeley.edu/catalog/ark28722-s73w23 [10 December 2017].


Sedum citrinum

Zika


Sedum citrinum Zika


Persons Contacted:


Author(s) and Date:
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Aaron E. Sims, Rare Plant Botanist, California Native Plant Society, (916) 324-3816, asims@cnps.org. July 20, 2018.

Ellen Dean, Associate Rare Plant Botanist, California Native Plant Society, edean@cnps.org. January 26, 2022.

**Reviewer(s) and Date:**
David Magney, Rare Plant Program Manager, California Native Plant Society, (916) 447-2677 ext. 205, dmagney@cnps.org. July 20, 2018.

Julie Ann Kierstead, USDA Forest Service Region 5 Ecosystem Planning, 8 December 2021.

**Formatting:** Form is set up as 508 compliant. Please use the “styles” if further formatting is necessary.

**Purpose:** This is to maintain the best available science on a species that could be used by the Forest Service in a variety of functions. Specifically, there would be additional steps and evaluations to determine whether or not this species would be considered a Species of Conservation Concern under the 2012 Planning Rule or a Sensitive Species under the 1982 Planning Rule.

**Additional Considerations at the Forest Level:** Habitat amount and juxtaposition of both the species and habitat locations.