Species: *Tonestus lyallii* (A. Gray) A. Nelson, Lyall’s tonestus

Photo Source: Burke Museum Image Collection (Giblin and Legler 2003+)

Photo Credits: Upper left and right: Ben Legler (with permission); lower left: Carol Miltimore (with permission).
Status

Table 1 summarizes the current status of this species or subspecies/variety by various ranking entities and defines the meaning of the status.

<table>
<thead>
<tr>
<th>Entity</th>
<th>Status</th>
<th>Status Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NatureServe CA(^a)</td>
<td>G5, S1</td>
<td>G5: Demonstrably Secure — Common; widespread and abundant. S1: Critically Imperiled — Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the nation or state/province.</td>
</tr>
<tr>
<td>California Rare Plant Rank(^b)</td>
<td>2B.3</td>
<td>2B: Rare and endangered in California, more common elsewhere. 0.3: Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known). This taxon was added to the CNPS Inventory of Rare and Endangered Plants of California in 1974 and has undergone no changes since 2001 (CNPS 2021).</td>
</tr>
<tr>
<td>California State Listing(^c)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>USDA Forest Service(^d)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>USDI FWS(^e)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>USDI BLM(^f)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>NatureServe OR(^g)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>Oregon State Listing(^h)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>NatureServe NV(^i)</td>
<td>Not listed</td>
<td></td>
</tr>
<tr>
<td>Nevada State Listing(^j)</td>
<td>Not listed</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) California Natural Diversity Database, California Dept. of Fish & Wildlife [CNDDB 2021, 2021a]  
\(^b\) California Native Plant Society [CNPS 2021]  
\(^c\) California Department of Fish and Wildlife [CDFW 2020]  
\(^d\) US Forest Service Region 5 Forester’s List [USDA 2013] and Pacific NW Survey and Manage [USDA & BLM 2014]  
\(^e\) US Department of Interior Fish and Wildlife Service [USFWS 2021]  
\(^f\) US Department of Interior Bureau of Land Management [BLM 2020]  
\(^g\) Oregon Biodiversity Information Center [ORBIC 2019]  
\(^h\) Oregon Department of Agriculture [ODA 2018]  
\(^i\) Nevada Natural Heritage Program [NNHP 2020]  
\(^j\) Nevada Division of Forestry [NDF 2012]  

Note: Individual State Heritage Programs (CNDDB, ORBIC, NNHP) represent NatureServe and contain more up-to-date ranks for their state than NatureServe Explorer.
Distribution, abundance, and population trend on the planning unit

Table 2 summarizes the distribution and frequency of this species or subspecies/variety within National Forest System Lands in California. Table 4 in Appendix 1 lists all known occurrences of this species or subspecies/variety within California. Individual occurrences are defined as sites that contain an individual, population, or groups of populations of the plant that are located more than 1/4 (0.25) of a mile apart from each other as defined by the CNDDB.

<table>
<thead>
<tr>
<th>National Forest System (NFS) lands in California</th>
<th>Record #s (from Table 4)</th>
<th>CNDDB EOs</th>
<th>Non-CNDDB Records</th>
<th>Recent (seen in past 20 years)</th>
<th>Historical (not seen in past 20 years)</th>
<th>Most Recent Obs. Date</th>
<th>Total Records on NFS lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shasta-Trinity:</td>
<td>1, 2, 3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2-Aug-1981</td>
<td>3</td>
</tr>
<tr>
<td>Totals:</td>
<td>N/A</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>N/A</td>
<td>3</td>
</tr>
</tbody>
</table>

1 1909.12 Chapter 10, Section 12.53, components 2, 3, and 4.
Sources: Distribution: CNDDB 2021. Baselayers: 2013 National Geographic Society, i-cubed, Esri, Garmin, NOAA, NPS, USGS.
Lyall’s tonestus was last updated in the CNDDB on 23 September 2016 (CNDDB 2021), and therefore all Calflora, CCH, and/or NRIS records prior to this date are assumed to have already been reviewed and entered into the CNDDB for this plant. Accordingly, only records from Calflora, CCH, and/or NRIS reported after this date have been reviewed for potential new or updated occurrence information and are included in Table 4 in Appendix 1 as applicable.

In California, Lyall’s tonestus is only known from three records in the Salmon Mountains of Trinity County in the Klamath Ranges bioregion (KR). Outside of California, it is widespread in western North America, including British Columbia, Alberta, Washington, Oregon, Nevada, and the central Rocky Mountain states (FNA 1993+, NRCS 2021). The populations in Oregon, Washington, Nevada, and Idaho are situated on the western edge of the main geographic distribution of the species, which follows the Rocky Mountains from Canada to southern Colorado (SEINet 2021). In Nevada it is known from the Ruby Mountains of Elko County (FNA 1993+, SEINet 2021). The closest occurrence outside of California is from the Blue Mountains of Baker County, Oregon, which is approximately 230 air miles from the California locations (Ferlatte 1972, CPNWH 2021).

Lyall’s tonestus was first reported from California (as *Haplopappus lyallii*) in 1972 (Ferlatte 1972). The three California records are located on the Shasta-Trinity National Forest within the Trinity Alps Wilderness. All three records are historical and known only from herbarium specimens, two collected in 1970 and one in 1981 (CCH1 2021, CCH2 2021, CNDDB 2021). Botanists who currently hike on high-elevation trails in the region are not familiar with this species, and no observations for this species have been posted online (Calflora 2021, Kierstead 2021 pers. comm.). Only one location has a population estimate (Record #2, 24 plants seen in 1970). More information is needed about the distribution and abundance of this species in California.

**Brief description of natural history and key ecological functions**

Lyall’s tonestus is a loosely cespitose perennial herb from a branched caudex or short rhizomes; its showy heads of yellow flowers bloom from July to August. Plants are found in alpine boulder and rock fields and subalpine meadows, on wind-swept ridges, barrens, and talus, usually on dry decomposed granite at 2435–2700 m in elevation (Moretti and Brotherson 1982, FNA 1993+, CNPS 2021, CNDDB 2021, JEPS 2021). Associates include *Tsuga mertensiana*, *Pinus albicaulis*, *Lupinus lobbii*, *Hieracium gracile*, and *Draba howellii* (CNDDB 2021).

The genus *Tonestus*, with between four and nine species endemic to western North America (FNA 1993+, NRCS 2021) is not a monophyletic group (Roberts and Urbatsch 2004). Phylogenetic analyses performed to date have not clearly revealed the closest relatives of *Tonestus lyallii*, but it may be most closely related to species of *Acamptopappus*, *Amphipappus*, and *Chrysothamnus* (FNA 1993+, Roberts and Urbatsch 2004). As mentioned above, the California records of Lyall’s tonestus are over 230 air miles from the nearest Oregon populations (Ferlatte 1982, FNA 1993+). Annotation labels on herbarium specimens collected in Trinity County note that the disk flowers on the specimens are distinctly longer than is usual in this species.

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2 Basis for other 1909.12 Chapter 10, Section 12.53 components.
species (CCH1 2021). Therefore, it is possible that the California populations of Lyall’s tonestus are a different unnamed taxon.

The flowers in the heads of Lyall’s tonestus are of two kinds: bisexual disk flowers in the center of the head and pistillate ray flowers along the edges. Both types of flowers can produce fruit. The pollinators of Lyall’s tonestus have been studied outside of California and include butterflies in the genera *Argynnis*, *Chlosyne*, *Colias*, and *Lycaena* (Ezzadine and Matter 2008, CPC 2021). The indehiscent, dry fruits of Lyall’s tonestus (sometimes referred to as achenes or cypselae) contain one seed, and the fruit and seed are dispersed as a unit. The 35–52 pappus bristles on the tip of the fruits adapt the fruits for wind dispersal (FNA 1993+). Nothing is known about the growth and development of this species. Given the microhabitat requirements of this species, it is likely that the seedlings are most successful on barren, rocky soil with sparse vegetation. Lyall’s tonestus may be tolerant of fire and moderate disturbance that does not harm the caudex; it can regenerate from its caudex, although its tap root is not well-developed (FNA 1993+).

**Overview of ecological conditions for recovery, conservation, and viability**3 including Threats and Risk Factors

In California, this species is known from three records in high elevation, open, rocky habitats of the Klamath Ranges bioregion; the taxonomic identity of these populations needs more research, as they are disjunct from the rest of the species distribution. All three records are located in the Trinity Alps Wilderness. None of the records have occurrence rankings in the CNDDB database. Due to the remoteness of the locations of this species, it is unlikely to be disturbed by common threats, such as road building, and no threats are listed for this species in the CNDDB. The most likely threat is climate change which is predicted to have adverse effects on high-elevation species at the upper limits of their range, through changes in the timing of flowering, pollination, and seed germination (Brown et al. 2016, Gremer et al. 2020, Hülber et al. 2010, Mondoni et al. 2012). As Lyall’s tonestus is a perennial of unknown lifespan, its populations could persist for decades, even without continual replacement of individuals. However, there is also the danger of reduction of snowpack which could have a detrimental effect on water availability. To mitigate these threats, seed collection from the California populations for *ex situ* conservation is recommended. Seeds from this species have been seed-banked at the Denver Botanical Gardens, but these are from other areas of its distribution (Denver Botanic Gardens 2021).

**Taxonomy**4

Table 3 summarizes this species or subspecies/variety’s name status in key literature.

| **Table 3. Name status of Lyall’s tonestus** |
|-----------------|------------------|
| **Entity**      | **Name Status**  |
| CNNDB and CNPS  | *Tonestus lyallii* (Gray) G. Nesom |
| Jepson eFlora   | *Tonestus lyallii* (A. Gray) A. Nelson |

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3 1909.12 Chapter 10, Section 12.53, components 7, 9, 10, 11 and 12, as appropriate.
4 1909.12, Chapter 10, Section 12.53, component 1.
Synonymy: *Haplopappus lyallii* A. Gray [originally published as *Alopappus lyallii*] (Gray 1863, Tropicos 2021).


Type locality: Washington: Cascade Mountains to Fort Colville (*Lyall s.n. GH*) (Gray 1863, JSTOR 2021).

**Key literature**


**Literature cited**


Persons Contacted

Author(s) and Date:
Ellen A. Dean, California Native Plant Society, Assistant Rare Plant Botanist, 10 February 2021; finalized 13 October 2021.
Reviewer(s) and Date:
Aaron E. Sims, California Native Plant Society, Rare Plant Program Director, 27 September 2021; Julie Ann Kierstead, USDA Forest Service Region 5, Ecosystem Planning, 13 October 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.
# Appendix 1: Known Occurrences

Table 4. Known Occurrences of Lyall’s tonestus within California (NRIS, CNDDB, Calflora/CCH databases).

Duplicate records from the same site are given the same record number and are included in red. Rows containing questionable records are highlighted in pink.

<table>
<thead>
<tr>
<th>Rec. #</th>
<th>Locality</th>
<th>County</th>
<th>Quad</th>
<th>Ref. (Source)</th>
<th>Date Last Obs’d</th>
<th>Population Info</th>
<th>Threats</th>
<th>Land Mgr.</th>
<th>Elev. (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CREST BETWEEN CANYON CREEK AND RATTLENAKE CREEK, NORTH OF MOUNT HILTON.</td>
<td>Trinity</td>
<td>Mt. Hilton (4012381)</td>
<td>CNDDB, Feb 2021 (EO 2)</td>
<td>22-Jul-1970</td>
<td>ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1970 COLLECTION BY SAWYER. NEEDS FIELDWORK.</td>
<td></td>
<td>Shasta-Trinity NF</td>
<td>8400</td>
</tr>
<tr>
<td>2</td>
<td>RIDGE WEST OF THOMPSON PEAK SUMMIT.</td>
<td>Trinity</td>
<td>Thompson Peak (4112311)</td>
<td>CNDDB, Feb 2021 (EO 3)</td>
<td>11-Aug-1970</td>
<td>ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1970 COLLECTION BY FERLATTE AND HOWELL. ABOUT 24 PLANTS SEEN.</td>
<td></td>
<td>Shasta-Trinity NF</td>
<td>8800</td>
</tr>
<tr>
<td>3</td>
<td>EAST SIDE OF SAWTOOTH MOUNTAIN ABOVE DEVILS CANYON.</td>
<td>Trinity</td>
<td>Siligo Peak (4012288)</td>
<td>CNDDB, Feb 2021 (EO 1)</td>
<td>2-Aug-1981</td>
<td>ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1981 COLLECTION BY SAWYER AND SAWYER. NEEDS FIELDWORK.</td>
<td></td>
<td>Shasta-Trinity NF</td>
<td>8000</td>
</tr>
</tbody>
</table>
Appendix 2: Additional Considerations at the Forest Level

<This section, including the next 5 subheadings, would be filled out by Forest Service botanists.>

<Forest Name>

Geographic distribution within the Forest
   A. Scarce or isolated
   B. Patchy or gaps
   C. Contiguous

>Select a geographic distribution rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Abundance of the species on the Forest
   A. Rare – current abundance is low enough that stochastic and other factors could lead to potential imperilment.
   B. Uncommon – current abundance is large enough that demographic stochasticity is not likely to lead to rapid local extinction, but, in combination with highly variable environmental factors, could pose a threat.
   C. Common – current abundance is large enough that species persistence is not threatened by demographic stochasticity in combination with environmental variation.
   D. Insufficient information to draw inferences about criterion.

>Select a species abundance rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Population trend on the Forest
   A. Significant downward or suspected downward population trend.
   B. Stable population.
   C. Upward population trend.
   D. Insufficient information to draw inferences about criterion.

>Select a population trend rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Habitat trend on the Forest
   A. Decline in habitat quality or quantity.
   B. Stable amounts of suitable or potential habitat, relatively unchanged habitat quality.
   C. Improving habitat quality or increasing amounts of suitable or potential habitat.
   D. Insufficient information to draw inferences about criterion.

>Select a habitat trend rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>
Vulnerability of habitat on the Forest

A. Substantial modification of habitat has occurred or is anticipated with conditions departing from expectations based on NRV, and/or habitat is impacted by modern stressors such as drought, climate change, high intensity wildfire and wildfire suppression disturbances, loss of natural openings due to historical wildfire suppression, nonnative invasive species, water impoundments and diversions, and recreation, etc.

B. Habitat modification is likely to result in ecological patterns similar to the range of historical conditions, but is being impacted by modern stressors.

C. Habitat resilient, changes are similar in frequency and intensity to those expected from NRV, and modern stressors not significant.

D. Insufficient information to draw inferences about criterion.

<Select a habitat vulnerability rank and provide references or cite ‘specialist expertise, <name>’ where appropriate.>

Additional Forest specific information related to the SCC determination

<This section is provided for Forest botanists to add additional Forest specific information that is not captured in the section above, if necessary. Provide a narrative description here of the additional relevant information. State “No additional information” if this section is not used.>