

## *Epilobium densiflorum*

**English name** Dense Spike-primrose

**Scientific name** *Epilobium densiflorum*

**Family** Onagraceae (Evening-primrose)

**Other English names** Denseflower Willowherb

**Other scientific names** *Boisduvalia densiflora*, *Oenothera densiflora*

### **Risk status**

BC: critically imperilled (S1); Red-listed; Conservation Framework Highest Priority – 1 (Goal 3, Maintain BC diversity)

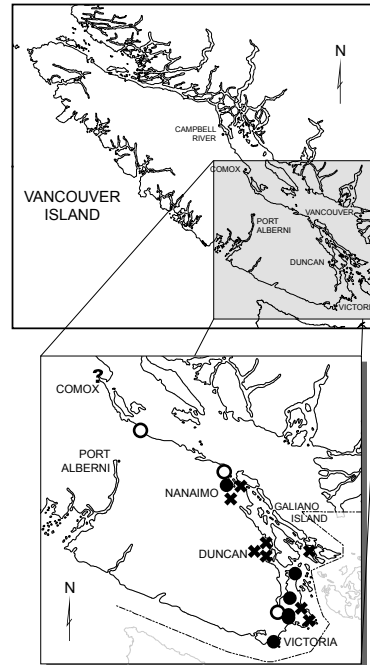
Canada: critically imperilled (N1); COSEWIC: Endangered (2005)

Global: vulnerable (G5)

Elsewhere: Utah – critically imperilled (S1); Arizona, California, Idaho, Nevada, Oregon, Washington – reported (SNR); Montana – historical (SH)

### **Range/Known distribution**

Dense Spike-primrose ranges from Vancouver Island south to northern Baja California and east to Idaho and Nevada. In Canada, it is restricted to southeastern Vancouver Island from Victoria north to Nanaimo, and east to the Gulf Islands where it appears to have been extirpated. Six extant populations have been documented and as many as 27 documented populations have been lost. Many undocumented Canadian populations were probably lost when suitable habitat was converted for agricultural or residential use, before botanical surveys could be conducted.



### **Distribution of *Epilobium densiflorum***

- Recently confirmed sites
- ✕ Extirpated sites
- Historical sites
- ? Questionable site (occurrence is suspect)

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### Field description

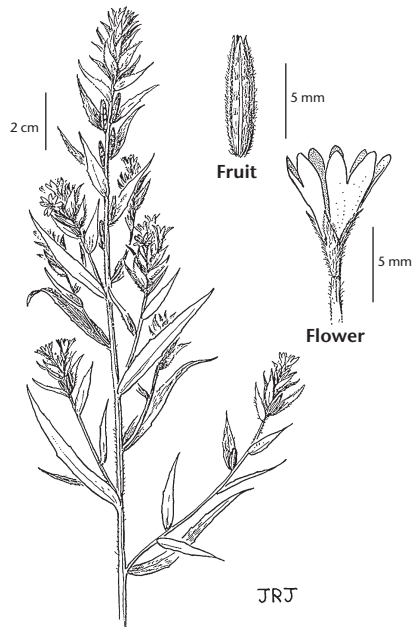
Dense Spike-primrose is an annual herb with a taproot. Its stems are 15-100 cm tall and well branched on larger individuals. The plants are somewhat hairy, and some of the hairs may bear tiny resinous glands visible with magnification. The unstalked, 1-8.5 cm long leaves have entire or sparsely-toothed margins, are alternate except near the base, and lance-shaped except in and near the inflorescence where they are **egg-shaped**. The flowers are in a **crowded inflorescence of densely leafy**, terminal and lateral spikes. The rose-purple or whitish petals (four per flower) are 3-10 mm long and **notched at the tip**. The sepals are 2-9 mm long. The fruits are 0.4-1.1 cm long, spindle-shaped capsules, which are 4-chambered and covered in long hairs. Each capsule contains 3-6 seeds, which are 1.2-2.0 mm long, **hairless**, and brown.

### IDENTIFICATION TIPS

This plant is often small and easily overlooked although it is tall and robust in optimal habitats. Dense Spike-primrose could be confused with Brook Spike-primrose (*Epilobium torreyi*), another annual spike-primrose that occurs in similar habitats. The latter species has shorter petals (1-3 mm) and its flowers are less crowded. Several annual species of willowherb (e.g., *Epilobium minutum*) are superficially similar but the seeds of spike-primroses lack the tuft of hairs found on one end of willowherb seeds.



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### **Life history**

Dense Spike-primrose is an annual that germinates in the winter (often while shallowly submerged) and flowers from June through August. Pollination is thought to be predominately by bees, and to a lesser extent by syrphid flies. During the summer drought, as it withers and dies, its desiccating capsules split open to release the seeds. Its seeds lack the tuft of hairs that allow many other species in this genus (such as the fireweeds) to float long distances in the air. Instead, most seeds fall near the parent plant although they may be redistributed short distances as the habitat floods during the winter. Dense Spike-primrose's poor powers of dispersal may contribute to its rarity. The number of Dense Spike-primrose plants in a population often peaks in years with reliable moisture throughout the winter and spring and drops sharply in years when there is unusually low rainfall for extended periods, particularly in the late spring. Unusually late, deep frosts may also kill many seedlings leading to a decline in the number of flowering plants. The average size of plants in a population may be low in years with unusually low moisture levels in the late spring.

### **Habitat**

Dense Spike-primrose usually occurs in open, seasonally wet depressions and vernal pools with bare mineral soil, usually less than 60 m above sea level. Such sites are moist to wet in the winter and spring, providing conditions necessary for germination, growth, and maturation. The sites become very dry in the summer, which prevents more robust native perennial competitors from dominating the vegetation. The mix of species growing with Dense Spike-primrose varies greatly among sites but most are small grasses and forbs, often annual, which provide relatively weak competition. A number of other rare species have been found near one or more populations of Dense Spike-primrose, including Bog Bird's-foot Lotus (*Hosackia pinnata*), Macoun's Meadowfoam (*Limnanthes macounii*), Needle-leaved Navarretia (*Navarretia intertexta*), Spanish-clover (*Acmispon americanus* var. *americanus*), Foothill Sedge (*Carex tumulicola*), and Green-sheathed Sedge (*Carex feta*).

### **Why this species is at risk**

A number of factors threaten Dense Spike-primrose populations in Canada. One population is mowed regularly. The most widespread and serious threats to Dense Spike-primrose, however, arise from impacts to its habitat. Much habitat has been lost with development, and the soil of the remaining habitat is often rutted and compacted by vehicles. The largest Canadian population, at Rocky Point, occurs in a large depression which appears to have once formed an exceptional vernal pool system. This site has been tilled for many years to maintain a firebreak. If tilling were discontinued, the site would likely develop into a weedy wetland unsuited to Dense Spike-primrose rather than revert to its pristine condition. At another site, fire suppression is allowing woody species to encroach

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into the meadow where Dense Spike-primrose persists in small numbers. As an annual species of moist openings, Dense Spike-primrose is more likely to be affected by climate change than many other species. Climatic fluctuations which affect annual temperature and rainfall patterns may affect factors such as moisture availability, germination timing, and seedling survival, potentially leading to population declines. While the moist depressions that Dense Spike-primrose favours may be unsuited to native competitors, they provide favourable habitat for a large number of invasive species including English Hawthorn\* (*Crataegus monogyna*), Scotch Broom\* (*Cytisus scoparius*), Himalayan Blackberry\* (*Rubus armeniacus*), hair-grasses\* (*Agrostis gigantea*, *A. stolonifera*, *Aira caryophyllea*, and *A. praecox*), Sweet Vernal Grass\* (*Anthoxanthum odoratum*), Soft Brome\* (*Bromus hordeaceus*), Hedgehog Dogtail\* (*Cynosurus echinatus*), Common Velvet Grass\* (*Holcus lanatus*), Common St. John's-wort\* (*Hypericum perforatum*), Hairy Cat's-ear\* (*Hypochaeris radicata*), English Plantain\* (*Plantago lanceolata*), Creeping Buttercup\* (*Ranunculus repens*), and Common Vetch\* (*Vicia sativa*). These and other invasive species tend to outcompete Dense Spike-primrose, particularly in microhabitats with bare mineral soil.

### **What you can do to help this species**

Management practices should be tailored to the needs of the site. Potential management tools will depend on the specific circumstances and may require experimentation prior to implementation. **Before taking any action, expert advice should be obtained, and no action taken without it. Please refer to the introductory section of this manual.**

Public and private landowners should be made aware of new populations of this species if they are discovered, and appropriate management practices suggested. Management needs include protecting the natural hydrology of occupied sites, limiting access to sensitive habitat, and removing invasive species. Regular inventories of known populations should be conducted to monitor their status and identify any negative impacts. Efforts should also be undertaken to search for new populations.

### **References**

COSEWIC 2005. COSEWIC assessment and status report on the dense spike-primrose *Epilobium densiflorum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 26 pp.  
[www.sararegistry.gc.ca/status/status\\_e.cfm](http://www.sararegistry.gc.ca/status/status_e.cfm).

For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at: [www.goert.ca](http://www.goert.ca).

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\*Refers to non-native species.

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