

Lupinus densiflorus

English name Dense-flowered Lupine

Scientific name *Lupinus densiflorus*

Family Fabaceae (Pea)

Other scientific names *Lupinus densiflorus*; *Lupinus densiflorus* var. *scopulorum*; *Lupinus microcarpus* var. *densiflorus*; *Lupinus microcarpus* var. *scopulorum*

Risk status

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

Canada: COSEWIC – Endangered (2005)

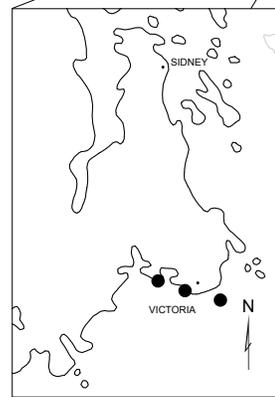
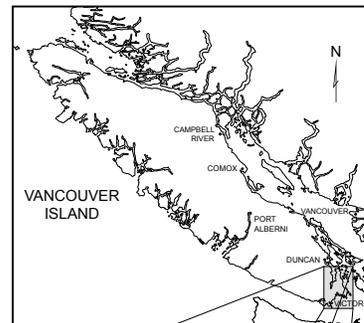
Global: apparently secure (G5T4)

Elsewhere: Washington – vulnerable (S3); California and Oregon – reported (SNR)

Range/Known distribution

Dense-flowered Lupine occurs in British Columbia only in the Victoria area. It is known from 4 occurrences, only 3 of which are still existing. Overall, Dense-flowered Lupine ranges from southeastern Vancouver Island and coastal areas of the Puget Trough, south on the east side of the Cascade Mountains in scattered populations to Baja California, where the species taxonomy is complicated by the presence of several varieties.

Dense-flowered Lupine plants found in British Columbia populations and the San Juan Islands in Washington state are sometimes considered a distinct endemic variety, *Lupinus densiflorus* var. *scopulorum*.



Distribution of *Lupinus densiflorus*
● Recently confirmed sites

Lupinus densiflorus

Field description

A greyish to green, densely soft-hairy annual herb from a taproot. Stems are erect to spreading, 10-30 cm tall, with a hollow base. They are often branched, and covered in soft, spreading (extending horizontally out from stem) brownish hairs. There are basal leaves, as well as leaves that are arranged alternately along the stem, with many of them clustered toward the top. The leaves are palmately compound (leaflet pattern like fingers around a palm) and are attached to the stems by very hairy leaf stalks that are several times as long as the leaf blades. The 5-10 elliptical leaflets are 1.5-3 cm long, and may have sharp-pointed or blunt tips. The leaflets are glabrous (smooth) above but bear soft, spreading hairs on the lower side. The flower head is a terminal raceme (flowers arranged on a single axis) of whorled pea-like flowers. Flowers are white to yellowish-white, often tinged with pink and 1-1.5 cm long. All flower parts tend to persist as dried membranes around the pod. The egg-shaped seedpod is 1.5-2 cm long, and covered in stiff hairs. There are generally two seeds per pod. Seeds are brownish and 4-6 mm long.

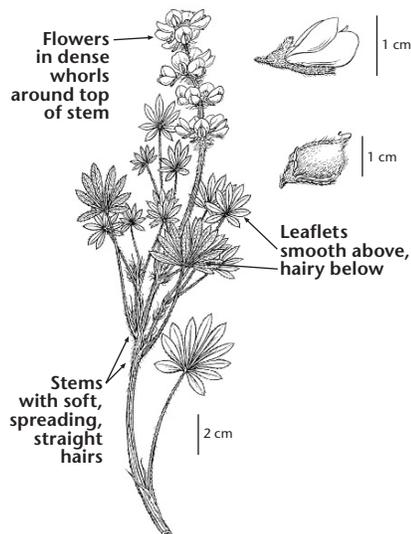
IDENTIFICATION TIPS

Dense-flowered Lupine is one of three annual lupines native to the Victoria area. The white to yellowish-white pea-like flowers and the whorled arrangement of the flowers along the axis distinguish this species from the other two annual lupines, Two-coloured Lupine (*L. bicolor*) and Small-flowered Lupine (*L. polycarpus*). The oval pods of Dense-flowered Lupine, with only 1-2 seeds, differ from those of the other two species which are



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Lupinus densiflorus



Species at Risk in Garry Oak and Associated Ecosystems in British Columbia

Lupinus densiflorus

cylindrical capsules and contain 4-8 seeds. The greyish to light green, densely hairy foliage of Dense-flowered Lupine stands out among most co-occurring herbaceous plants.

Life history

Dense-flowered Lupine is an annual species. Some seeds germinate in the fall and some seeds remain dormant on the soil surface to germinate in the spring. Plants that germinate in the fall over-winter either in the cotyledon (seed leaf) stage or develop a few emergent primary leaves. Germination begins as early as August and may extend into March, although most germination occurs between October and February. Most plants flower in late May or June. Fruits appear as early as late May or early June and most plants have ripe fruit by late June. Seeds of Dense-flowered Lupine have been shown to remain viable for up to four years. Most plants die at the same time as the fruits ripen.

Seeds are thought to be dispersed by gravity, but birds and small mammals, which consume the seeds, may assist in secondary dispersal. In Canada, Dense-flowered Lupine is pollinated by bees although elsewhere the species appears to be self-pollinated.

Dense-flowered Lupine populations in BC are fairly small and their size fluctuates widely. Most mortality occurs during the seedling stage. Dense-flowered Lupine is symbiotic with nitrogen-fixing *Rhizobium* bacteria which form nodules on its roots. This symbiosis may enhance its ability to survive in a habitat with low nutrient levels.

Habitat

Dense-flowered Lupine inhabits dry to moist grassy openings, clay cliffs, and gently eroding grassy banks above the seashore, usually with a south or west facing exposure. Shrubs on these upper eroding slopes include Nootka Rose (*Rosa nutkana*) and Common Snowberry (*Symphoricarpos albus*). Associated herbaceous native perennials include Nodding Onion (*Allium cernuum*), Thrift (*Armeria maritima*), Harvest Brodiaea (*Brodiaea coronaria*), Common Camas (*Camassia quamash*), California Oatgrass (*Danthonia californica*), Red Fescue (*Festuca rubra*), Puget Sound Gumweed (*Grindelia stricta*), and Beach Pea (*Lathyrus japonicus*). Introduced grasses are prevalent at all sites, especially Orchard-grass* (*Dactylis glomerata*), ryegrasses* (*Lolium* spp.), and bromes* (*Bromus* spp.). Dense-flowered Lupine is intolerant of shading and is absent from locations with a substantial cover of trees or shrubs. Elevations: to 13 m.



Lupinus densiflorus

Why the species is at risk

The primary threat to Dense-flowered Lupine in Canada is the loss and degradation of shoreline habitat on public lands in the Victoria area due to property development and recreational use. The three remaining populations persist on eroding seaside bluffs and meadows, two on federal lands, and one in a municipal park. These sites are susceptible to both soil erosion and trampling by humans; at the Dallas Bluffs and Macaulay Point populations, in particular, many plants are trampled and killed, and a trail network has accelerated soil erosion and destroyed significant amounts of habitat. As well, potential habitat for Dense-flowered Lupine is altered by park maintenance practices such as landscaping, fertilizing of lawns, thatching, and mowing.

Suitable habitat for this species is also severely limited in extent. Although seeds are produced abundantly by remaining populations, there appear to be limited suitable germination sites at localities such as Macaulay Point and Beacon Hill Park. Also, because of the steep slope position of some populations, many of the seeds fall to slope bottoms where germinating seedlings are flooded during winter high tides. Seeds that do land in suitable habitat face competition from other plant species. The availability of suitable germination sites is declining due to slope damage from visitor traffic and footpaths.

All three populations are threatened by encroachment of exotic shrubs, especially Scotch Broom* (*Cytisus scoparius*) and Gorse* (*Ulex europaeus*), and by thick swards of introduced grasses, predominantly Sweet Vernalgrass* (*Anthoxanthum odoratum*), bromes* (*Bromus sterilis* and *B. hordeaceus*), and Orchard-grass*. Dense shrub patches and thick exotic grass swards have substantially reduced habitat suitability for Dense-flowered Lupine.

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 must 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 managing human disturbance, removing invasive species, and limiting access to sensitive habitat. Regular inventories of known populations should be conducted to monitor their status and identify any negative impacts from land development, recreational pressure, and invasion by shrubs and non-native grasses.

Lupinus densiflorus

References

COSEWIC. 2005. Assessment and status report on the dense-flowered lupine *Lupinus densiflorus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON. vi + 21 pp.

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Fairbarns, M. 2005. Demographic and Phenological Patterns of *Lupinus densiflorus* (Dense-flowered Lupine). Aruncus Consulting, Funded by the Interdepartmental Recovery Fund. Victoria, British Columbia. 28 pp.

For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at: www.goert.ca.

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*Refers to non-native species.

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