English name: Dense-flowered Lupine

Other English names: Chick Lupine, Whitewhorl Lupine, Shaggy-haired Chick Lupine

Scientific name: *Lupinus microcarpus* var. *microcarpus* Sims

Other Scientific names: *Lupinus densiflorus* var. *scopulorum* C.P. Sm.; *Lupinus microcarpus* var. *scopulorum* (C.P. Sm.) C.P. Sm.; *Lupinus microcarpus* var. *densiflorus* (Benth.) Jeps.; *Lupinus densiflorus* var. *densiflorus* Benth.

Family: *Fabaceae* (Pea)

Risk status

BC: critically imperilled (S1); red-listed

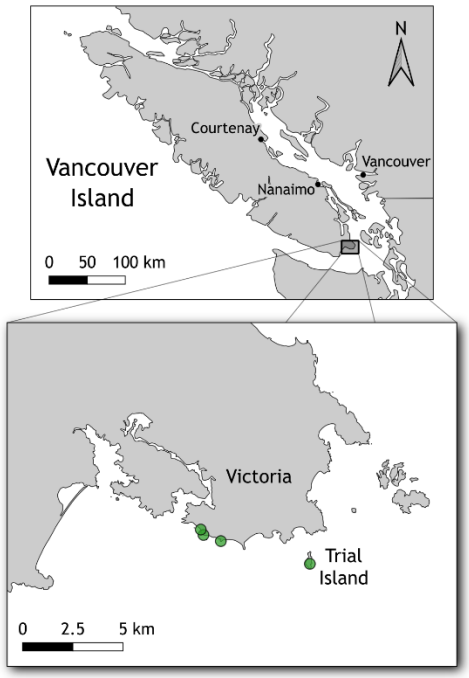
Canada: endangered (N1)

Global: stable/apparently secure (G5T4)

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

Taxonomic complications: There is a long history of disagreement on whether there is one or several different entities in what this fact sheet refers to as *Lupinus microcarpus* var. *microcarpus*. At one end of the spectrum, Charles Piper Smith and others described 27 subspecies or varieties *of Lupinus densiflorus*, including the variety *scopulorum* whose type locality is from the Victoria area. In contrast, Sholars and R. Riggins consider *Lupinus densiflorus* to be the same species as *Lupinus microcarpus* (described from South America) and use the name *L. microcarpus* because it was published first. Sholars and Riggins - who hypothesized that the Canadian and South American populations in this complex were introduced by Spanish settlers bringing forage from California - only recognize three infraspecific elements within *Lupinus microcarpus*, all native to California. They are not the only scholars to suggest European settlers established disjunct Victoria-area populations of species generally found far to the south, but the evidence is fairly weak and the fact that these disjunct populations occur in precisely the same places as some endemic Canadian plant species suggests they arrived before European settlement. Genomic studies could clarify these questions by determining how long ago the California and British Columbia populations diverged.

Range/Known distribution: In Canada, Dense-flowered Lupine only occurs in the Victoria area. It is found in northwest Washington State and in Oregon, California, and Baja California. In British Columbia, there are currently three known occurrences (Trial Islands, Dallas Bluffs, Macaulay Point) and two unconfirmed historic localities.

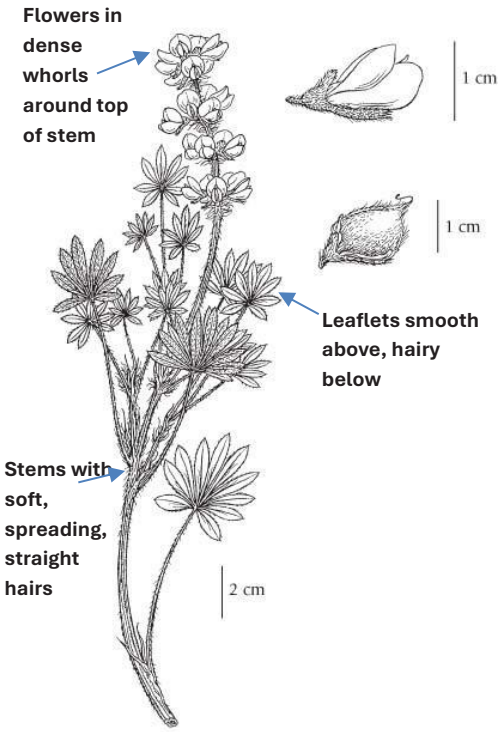


Distribution of *Lupinus microcarpus var. microcarpus*
● Confirmed Sites

Field description: A white to yellowish annual herb from a taproot. The stems are erect to spreading, 20-30 cm tall, with a hollow, cylindrical base. They are generally branched, and the foliage is covered in soft-spreading hairs. There are basal and stem leaves that alternate along the stem, with many of them clustered toward the top. The leaves are palmately compound and are attached by the very hairy leaf stalks that are several times as long as the leaf blades. The leaves have 8 to 10 elliptical leaflets, which are 1.5-3 cm long, and have sharp-pointed to blunt tips. The leaflets are glabrous (smooth) above but bear soft- spreading-hairs below. The flower head is a terminal raceme (flowers arranged on a single axis) of whorled pea-like flowers. The flowers are white to yellowish-white, often tinged with pink and 1-1.5 cm long. The flower parts tend to persist as dried membranes around the pod. The fruit is a pod, 1.5-2 cm long, egg-diamond-shaped, covered in stiff hairs. There are generally two seeds per pod although one is often small and aborted. Seeds are brownish and 4-6 mm long.

Identification tips: The white to yellowish-white pea-like flowers and the whorled arrangement of the flowers along the axis distinguish this species from the other annual lupines found in Garry Oak and associated ecosystems, such as Two-coloured Lupine (*L. bicolor*). The hairiness of this plant gives it an overall greyish to light green colour such that it stands out among other herbaceous plants. The cotyledons of Dense-flowered Lupine fuse to form a distinctive shield or disk.

Lupinus microcarpus var. microcarpus



Life history: Dense-flowered Lupine is an annual species. Some seeds usually germinate in the fall and some seeds remain dormant over winter on the soil surface to potentially germinate in the spring. It is not clear whether some seeds can remain viable in the soil seed bank for extended periods, but this is not usual among lupine species. The seeds that germinate in the fall may over-winter in the cotyledon stage or develop a few emergent primary leaves, but most or all will die if there is a sharp winter cold snap with temperatures below -5˚C. Overwintering seedlings are also prone to attack by invertebrate herbivores, which are attracted to the fleshy, nutrient-rich cotyledons.

Most flowering occurs in May and June. By late June or early July the plants have usually died. In unusual years, there may be sporadic showers throughout the summer, allowing the soil to remain moist enough to allow a few of the plants to remain green and continue flowering until the first autumn frost. But for most plants, their seeds have set, and the parent plant and pods have dried out by late June. The pods contort as they dry out, building up tension that releases when the pods split along their lines of dehiscence – flinging the seeds up to a metre from the parent plant. Seeds may be further dispersed by gravity, but birds and small mammals (which consume the seeds) may assist in secondary dispersal. Dense-flowered Lupine may be self-pollinated or cross-pollinated by bees, wasps, and hoverflies.

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. It favours sites with few if any shrubs, although it may grow intermixed with stunted Nootka Rose (*Rosa nutkana*). Its habitat is sometimes invaded by shrubby Scotch Broom* (*Cytisus scoparius*).

The meadows and eroding slopes where Dense-flowered Lupine occurs often have a rich mix of native herbaceous species including Sea Thrift (*Armeria maritima*), Harvest Brodiaea (*Brodiaea coronaria*), Common Camas (*Camassia quamash*), Gumweed (*Grindelia*), California Oatgrass (*Danthonia californica*), and Beach Red Fescue (*Festuca rubra* subsp. *pruinosa*).

Elevations: to 20 m.

Why the species is at risk: Dense-flowered Lupine gets trampled and its habitat gets eroded by informal trails running through its habitat at Dallas Road bluffs and Macaulay Point. Invasive species also pose a severe problem at both of these sites, where the remaining populations persist as small patches within a matrix of exotic plants such as Scotch Broom* (*Cytisus scoparius*), Gorse* (*Ulex europaeus*), English Ivy* (*Hedera helix*), Sweet Pea* (*Lathyrus latifolius* and *L. odoratus*), Old World vetches* (particularly *Vicia sativa* and *V. hirsuta*), Orchard Grass* (*Dactylis glomerata*), Sweet Vernal Grass* (*Anthoxanthum odoratum*), Perennial Ryegrass* (*Lolium perenne*), Sterile Brome* (*Bromus sterilis*), Ripgut Brome* (*Bromus diandrus* ssp. *rigidus*), and Soft Brome* (*Bromus hordeaceus*). Many of these species also grow within the Trial Island population of Dense-flowered Lupine although competition there from invasive species is less intense.

The eroding slopes of the Dallas Bluffs are being stabilized where they threaten transportation infrastructure above, using geotechnical materials that are unsuited to Dense-flowered Lupine.

Fire suppression may be affecting some populations of Dense-flowered Lupine. Illegal beach fires below the Dallas Bluffs occasionally climb upslope, consuming dense patches of invasive species. Dense-flowered Lupine has been observed growing in these sites, apparently recruited from persistent seed banks, only to disappear after a year or two once the invasive vegetation reclaims the openings. It is quite possible that natural and indigenous burning maintained much more habitat for Dense-flowered Lupine in the past.

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.

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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.