

Conservation Evaluation of Pacific Rhododendron, *Rhododendron macrophyllum*, in Canada*

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In Canada, Pacific Rhododendron (*Rhododendron macrophyllum*) is restricted to the Skagit River drainage and southeastern Vancouver Island in southwestern British Columbia. These populations represent the northern limits of the species, which ranges south to northern California. In British Columbia, *Rhododendron macrophyllum* is usually associated with coniferous forests. Until recently this species was considered to be rare. Results of this study indicate that the populations in the Skagit River watershed are large, extensive and mostly contained in protected areas, thus the species is not considered to be at risk in Canada at this time.

Key Words: Pacific Rhododendron, *Rhododendron macrophyllum*, distribution, conservation evaluation, British Columbia.

The Pacific Rhododendron, *Rhododendron macrophyllum* D. Don ex G. Don[†], is a member of a genus of almost 1000 species occurring mainly in north-eastern Asia (Wallace 1993). It is one of three species occurring in British Columbia (Meidinger 1999) and four occurring in Canada (Scoggan 1979).

Rhododendron macrophyllum was first reported by naturalist Archibald Menzies in 1792 in his “Journal of Vancouver’s Voyage”, and subsequently described by David Don in 1834. Joseph Hooker also described plants collected during Vancouver’s voyages, and in 1855 he published a description of this rhododendron under the species name *californicum*. This name was in common use by botanists for close to a century.

Rhododendron macrophyllum is an erect to spreading, branched shrub, 1–8 m tall (Meidinger 1999; Figure 1). The evergreen leaves are alternate, often appearing whorled, ovate or elliptical, 8–20 cm long, 3–6 cm wide, leathery, dark green above, paler beneath and glabrous, or nearly so. The pale-pink to deep rose-purple corollas are tubular bell-shaped, spotted red-brown and 2.5–4 cm long and up to 5 cm across. The fruits consist of woody capsules 1.5–2 cm long with numerous minute seeds. It is easily separated from the other two *Rhododendron* species in British Columbia. Lapland Rosebay (*Rhododendron lapponicum*) is a northern plant with much shorter habit and smaller leaves, while White-flowered Rhododendron (*R. albiflorum*) is a higher elevation species with white flowers.

North American and Provincial Ranges

Rhododendron macrophyllum is restricted to coastal habitats from northern California north through Oregon and Washington to southwestern British Columbia (Hitchcock et al. 1959). In Canada, it occurs in southwestern British Columbia in the western Cascade Mountains (Skagit River valley) and on southeastern Vancouver Island (Shawnigan and Rhododendron lakes) [Meidinger 1999; Douglas et al. 2002; Figure 2].

Habitat

Skagit River Valley

The *Rhododendron macrophyllum* populations in the Skagit River valley occur on well-drained, coarse-textured, gravelly, dry soils overlain by fibremors. Elevations range from 500 to 870 metres.

About half of the *Rhododendron* populations in the Skagit River valley are within the Interior Douglas-fir (IDF) Zone while the remaining are within the Coastal Western Hemlock (CWH) Zone (Hope et al. 1991; Pojar et al. 1991). Summaries of all plant communities within these zones are taken from Desrosiers and Cadrin (1993*). The four plant communities within the Interior Douglas-fir (IDF) Zone are described below:

(a) Douglas-fir/Falsebox/Feathermoss (*Pseudotsuga menziesii*/ *Paxistima myrsinites*/*Pleurozium schreberi*) community.

Sites for this community are located in the dry, middle part of the Skagit River Valley, on the flats of the

* The field work for the *Rhododendron macrophyllum* project was funded by the British Columbia Conservation Data Centre and The Skagit Environmental Endowment Commission. The results appear in the British Columbia Conservation Data Centre database and a Skagit Environmental Endowment Commission report (Desrosiers and Cadrin 1993*). This information formed the basis for a Committee on the Status of Endangered Wildlife in Canada status report (Desrosiers and Douglas 1997*) and the current assessment of *not at risk* (COSEWIC 2006*).

† Taxonomy and nomenclature follows Douglas et al. (1998a, 1998b, 1999a, 1999b, 2000, 2001) and Schofield (1992).



FIGURE 1. Illustration of *Rhododendron macrophyllum*. (Line drawing by Lora May Richards)

valley floor. These are the driest IDF sites and were mid-range in terms of their nutrient regime. The 80-115 year old stands are dominated by *Pseudotsuga menziesii*, *Paxistima myrsinites*, and *Pleurozium schreberi*. Other important species include *Rhododendron macrophyllum*, Lodgepole Pine (*Pinus contorta*), White Hawkweed (*Hieracium albiflorum*), Heart-leaved Twayblade (*Listera cordata*) and Cow-wheat (*Melampyrum lineare* var. *lineare*). *Rhododendron macrophyllum* had an average cover of 27% in this community.

(b) Douglas-fir – Western Redcedar/Beaked Hazelnut (*Pseudotsuga menziesii*-*Thuja plicata*/*Corylus cornuta*) community.

The lowest elevations in the lower part of the valley contained these sites. They tended to be intermediate, both environmentally and floristically, for the IDF in this area. *Pseudotsuga menziesii*, *Thuja plicata*, and *Corylus cornuta* were dominants in these 80-100 year old stands. Cover values for *Thuja plicata*, Western Hemlock (*Tsuga heterophylla*), *Paxistima myrsinites*

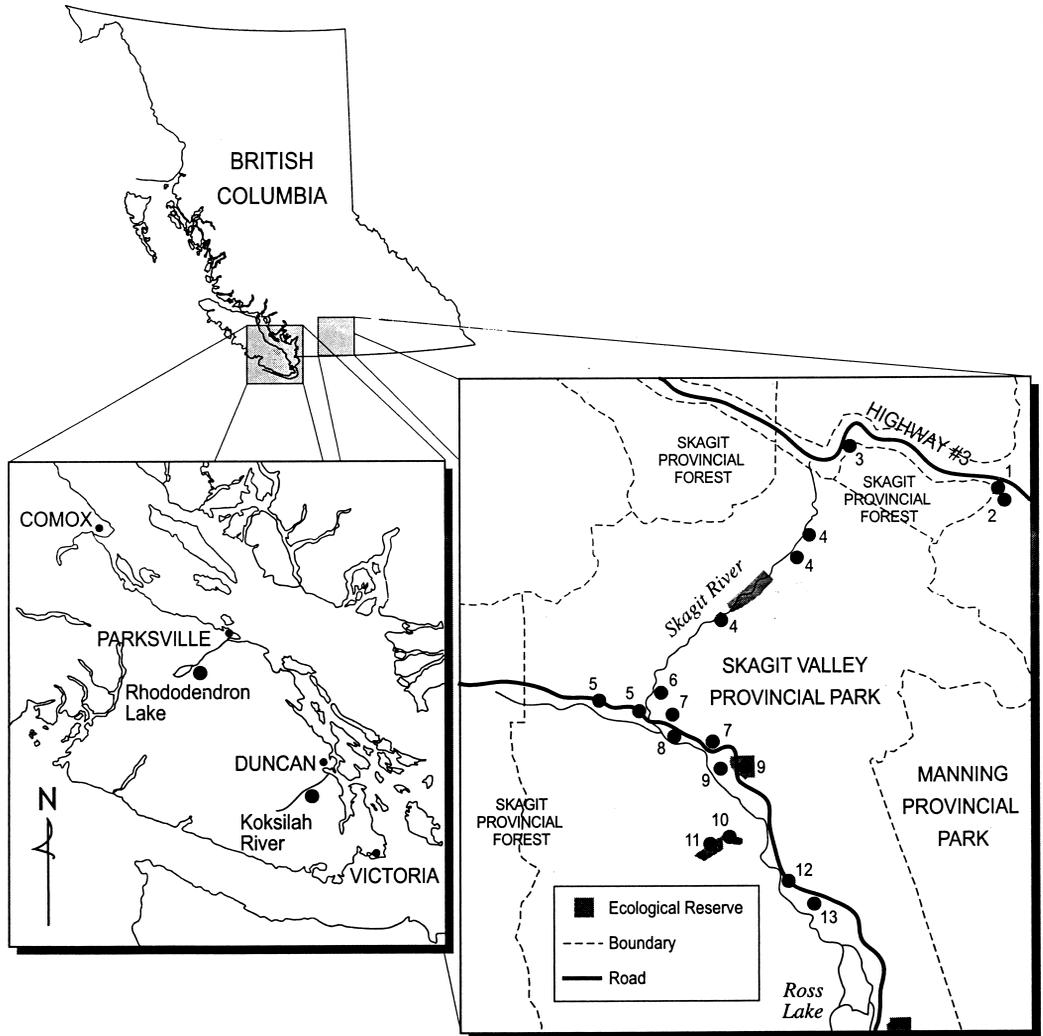


FIGURE 2. The location of *Rhododendron macrophyllum* sites in British Columbia.

and Dull Oregon-grape (*Mahonia nervosa*) were highest in these sites. Average cover of *Rhododendron macrophyllum* was 3%.

(c) Douglas-fir – Western Redcedar/Vine Maple (*Pseudotsuga menziesii*-*Thuja plicata*/*Acer circinatum*) community.

This community is found at a higher elevation than other IDF sites, on the east-facing slopes of the Rhododendron Ecological Reserve. The sites were mid-range in term of moisture regime and were nutrient-poor. *Pseudotsuga menziesii*, *Thuja plicata*, *Acer circinatum* and Step Moss (*Hylocomium splendens*) were the dominant species. Douglas Maple (*Acer glabrum* var. *douglasii*), Thimbleberry (*Rubus parviflorus* var. *parvi-*

florus), Oceanspray (*Holodiscus discolor*), Hooker's Fairybells (*Prosartes hookeri* var. *oregana*), Fireweed (*Epilobium angustifolium*), and Lanky Moss (*Rhizidiadelphus loreus*) were also important. *Rhododendron macrophyllum* had an average cover of 3%.

(d) Pacific Rhododendron/Western Tea-berry/Cladonia (*Rhododendron macrophyllum*/*Gaultheria ovatifolia*/*Cladonia*) community.

This *Rhododendron* community occurs on the eastern section of the Rhododendron Ecological Reserve as well as on the west side of the Skagit River. These sites were among the driest and most nutrient-poor of all sites sampled. The stands were 105-115 years old.

Tree cover in these plots was extremely low. *Pseudotsuga menziesii* had an average cover of 8% while Western White Pine (*Pinus monticola*) had an average cover of 7%. Average cover of *Rhododendron macrophyllum* was the highest of all plots at 70%. Species of importance in this community included Soopolallie (*Shepherdia Canadensis*), *Paxistima myrsinites*, Twinflower (*Linnaea borealis*), *Mahonia nervosa*, Kinnikinnick (*Arctostaphylos uva-ursi*) and species of lichen (*Cladonia* spp.).

All of the plots sampled in the northern half of the study area fell within a single community type in the Coastal Western Hemlock (CWH) Zone. This community may be summarized as follows:

Douglas-fir – Western Hemlock/Falsebox (*Pseudotsuga menziesii*-*Tsuga heterophylla*/*Paxistima myrsinites*) community.

Compared to IDF sites the CWH sites have higher moisture regimes, lower nutrient levels and higher tree cover values. In addition to *Pseudotsuga menziesii*, *Tsuga heterophylla* and *Paxistima myrsinites* other important species include Amabilis Fir (*Abies amabilis*), Grouseberry (*Vaccinium scoparium*) and *Hylocomium splendens*. The stands ranged from 80-150 years old. Average cover of *Rhododendron macrophyllum* was 18%.

Southeastern Vancouver Island

The *Rhododendron* sites on southeastern Vancouver Island are within the Coastal Douglas-fir Zone (Neuzdorfer et al. 1991). The populations east of Shawnigan Lake were found in the following plant community:

Western Redcedar/Pacific Rhododendron-Alaskan Blueberry/Step Moss (*Thuja plicata*/*Rhododendron macrophyllum*-*Vaccinium alaskense*/*Hylocomium splendens*) community.

This community was located on a moderate, southwest slope at an elevation of 490 m approximately 16 km west of Shawnigan Lake. The small (550 m²) area on which *Rhododendron* occurred was dominated by 40 m tall *Thuja plicata*. The shrub layer was well-developed with *Rhododendron macrophyllum*, *Vaccinium alaskense*, Red Huckleberry (*V. parvifolium*) and Salal (*Gaultheria shallon*) dominating. A dense layer of mosses and lichens was dominated by *Hylocomium splendens*.

At Rhododendron Lake three markedly different communities occur in bands around Rhododendron Lake. A very wet band of vegetation (about 3-5 m wide), dominated mainly by Sweet Gale (*Myrica gale*), occurs around the immediate edge of the lake. Adjacent to the latter band is another, slightly drier but still very moist 3-10 m band of vegetation containing *Myrica gale* and *Rhododendron macrophyllum*. This saturated habitat is atypical for *Rhododendron macrophyllum*. A wider band (5-25 m wide) of forested vegetation occurs upslope from the lakeside communities. Approximately nine ha was covered by *Rhododendron* plants in the latter two vegetation bands. The two communities containing *Rhododendron* may be summarized as follows:

(a) Pacific Rhododendron – Sweet Gale/Salal (*Rhododendron macrophyllum*-*Myrica gale*/*Gaultheria shallon*) community.

This community occurs in a 3-10 m wide band that extends for about 300 m along the south side of the lake. Soils are constantly wet with the presence of Skunk Cabbage (*Lysichitum americanum*) and *Sphagnum* sp. indicating the hydric nature of the site. This site had been logged many years earlier. It appears all trees cut were Yellow-cedar (*Chamaecyparis nootkensis*) and would have had about a 40-60% average cover. At the present time, *Rhododendron macrophyllum* has an average cover of 47% with only *Gaultheria shallon* being more abundant (average cover of 57%). Bracken Fern (*Pteridium aquilinum*), Labrador Tea (*Ledum groenlandicum*) and *Myrica gale* were also important species in the community.

(b) Western Hemlock/Pacific Rhododendron/Salal (*Tsuga heterophylla*/*Rhododendron macrophyllum*/*Gaultheria shallon*) community.

Upslope from the previous community is a forested community dominated by *Tsuga heterophylla*. The site has been partially logged and was previously dominated by *Thuja plicata*. Other coniferous species present, but in low numbers, include *Chamaecyparis nootkensis*, *Thuja plicata*, *Pinus monticola* and *Pseudotsuga menziesii*. Important understory species include *Gaultheria shallon*, *Rhododendron macrophyllum* and *Hylocomium splendens*. *Rhododendron* has an average cover of 61%.

Biology and Ecology

Research on the biology and ecology of *Rhododendron macrophyllum* has been limited. The majority (60%) of populations in the Skagit Valley showed good to very good vigour. One in three populations had young genets less than one metre in height. These appear, for the most part, to have germinated on rotten logs or thick moss mats. Asexual reproduction, by layering, appears to be much more common than sexual reproduction.

Many sites showed evidence of fire on the dominant trees and charcoal layers were often found in the soil profile. This history of fire and its importance to the maintenance of *Rhododendron macrophyllum* populations was also noted in an Olympic National Forest study (Henderson et al. 1989).

Population Attributes

Approximately 200 populations of *Rhododendron macrophyllum* have been observed at 15 ecosites in the Skagit River valley over a distance of 25 km (Figure 2). Of these, 92 were examined in detail at 13 ecosites for this study (Table 1). Populations ranged in size from 4 m² to about 200 000 m². The latter area (part of the Rhododendron Ecological Reserve) had an extrapolated count of approximately a million canes. Two populations on Vancouver Island were also examined. Counts at one of them (Rhododendron Lake) revealed 400 plants and approximately 9000 canes.

TABLE 1. Locations and population sizes of *Rhododendron macrophyllum* in south-western British Columbia.

Map Location Number(s)/ Ecosite Name	Number of Populations	Approximate Area of Populations (m ²)	Approximate Total Number of Canes ¹
Manning Provincial Park			
1. Cayuse Flats	1	300	1 000
2. Silverdaisy Trail	3	250	1 750
3. Rhododendron Flats	4	150	2 400
Skagit Valley Provincial Park			
4. Upper Skagit Area	3	12	600
5. Klesilkwa River	6	360	600
6. Valley Floor North	2	400	2 100
7. <i>Pinus contorta</i> Terrace North	53	3 450	no count
8. <i>Pinus contorta</i> Terrace South	4	920	4 000
9. Shawatum Area	4	140	300
10. Rhododendron Ecological Reserve, East	1	200 000	1 000 000
11. Rhododendron Ecological Reserve, West	3	40	550
12. Nepopekum area	6	60	1 000
13. Galene Lakes Trail	3	100	1 250
Vancouver Island			
1. Rhododendron Lake	1	90 000	9 000
2. Shawnigan Lake	1	550	no count

¹ Detailed counts of canes per plant were made for 50 plants at both Cayuse Flats and Rhododendron Lake. Numbers of canes per plant ranged from 18 to 24 at Cayuse Flats and 20 to 25 at Rhododendron Lake (Desrosiers and Douglas 1997*).

The intensive inventory work conducted by the British Columbia Conservation Data Centre resulted in the documentation of thousands of plants in the Skagit Valley (Table 1). Prior to this work the species had been reported as a rare plant in British Columbia (Straley et al. 1985; Argus and Prior 1990).

Locations of *Rhododendron macrophyllum* in the nearby Chilliwack River valley were mentioned by Slaney (1971*); however, no references or supporting information were provided in that document. It is possible that these populations could be extirpated due to development. In addition, *Rhododendron macrophyllum* was reported from Lightning Lake in Manning Park (Carl et al. 1952); this population was not verified by the authors or others working in that area.

Provincial, National and Global Ranks

Provincially *R. macrophyllum* is ranked S4 (Douglas et al. 2002) which indicates that it is "rare or uncommon (typically 21 to 100 occurrences); may be susceptible to large-scale disturbances; e.g., may have lost extensive peripheral populations". Since the species is restricted to British Columbia, the National rank is N1. Globally, *Rhododendron macrophyllum* is ranked G5. This ranking indicates that, on a global scale, the plant is considered "frequent to common or very common; demonstrably secure and essentially ineradicable under present conditions".

Threats and Protection

Habitat destruction, due to logging and road building, likely eliminated some populations of *Rhododendron macrophyllum*, especially in the Skagit River

area. The establishment of Manning Provincial Park and the more recent Skagit Valley Provincial Park has eliminated most threats to *R. macrophyllum*. On Vancouver Island, where the two populations are located within timber harvesting areas, small informal protected areas have been established.

In the Skagit River valley it was evident that fire had previously swept through most of the ecosites (Desrosiers and Cadrin 1993*). Whenever possible, natural fires are quickly extinguished in the Cascades Mountains. If this control is successful over long periods of time, fuel loads may build up resulting in extremely hazardous conditions. It is, therefore, possible that population sizes may be temporarily reduced from time to time after large burns.

Rhododendron macrophyllum receives protection since all but the Vancouver Island populations occur in provincial parks. The Vancouver Island populations have informal protection set up by the timber companies that own the properties.

Until recently there was formal protection under the *Dogwood, Rhododendron and Trillium Protection Act*. This act was repealed in 2002 due to our greater knowledge of the abundance of the species involved and the fact that sufficiently large numbers of their populations occur in protected areas.

Evaluation

Rhododendron macrophyllum was considered rare in Canada for many years (Straley et al. 1985; Argus and Pryor 1990). The present study, however, indicates that the species is not rare and is much more abundant than previously thought. Most of the extant sites

are secure since they are contained either within E. C. Manning Provincial Park, the adjacent Skagit Valley Provincial Park or in several ecological reserves.

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