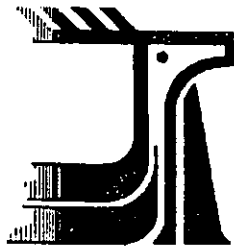


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COMMITTEE ON THE
STATUS OF ENDANGERED
WILDLIFE IN CANADA

OTTAWA, ONT. K1A 0H3
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COMITÉ SUR LE STATUT
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DE DISPARITION AU
CANADA

OTTAWA (ONT.) K1A 0H3
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**STATUS REPORT ON THE WATER-PLANTAIN BUTTERCUP
RANUNCULUS ALISMAEFOLIUS VAR. *ALISMAEFOLIUS***

IN CANADA

QL
88
573
1996

BY

JEANNE M. ILLINGWORTH

AND

GEORGE W. DOUGLAS

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RANGE THREATENED BY RECREATIONAL ACTIVITIES AND
COMPETITION FROM EXOTIC PLANTS.**

OCCURRENCE: BRITISH COLUMBIA

COSEWIC - A committee of representatives from
federal, provincial and private agencies which
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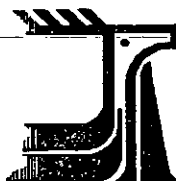
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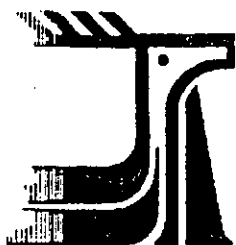


Water-plantain Buttercup
Ranunculus alismaefolius var. *alismaefolius*

COSEWIC
COMMITTEE ON THE STATUS
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IN CANADA



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COMITÉ SUR LE STATUT
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DE DISPARITION AU CANADA



COMMITTEE ON THE
STATUS OF ENDANGERED
WILDLIFE IN CANADA

OTTAWA, ONT. K1A 0H3
(819) 997-4991

COMITÉ SUR LE STATUT
DES ESPÈCES MENACÉES
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JUNE 1994

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VULNERABLE: (V)	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
THREATENED: (T)	A species likely to become endangered if limiting factors are not reversed.
ENDANGERED: (E)	A species facing imminent extirpation or extinction.
EXTIRPATED: (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
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**STATUS REPORT ON THE WATER-PLANTAIN BUTTERCUP
RANUNCULUS ALISMAEFOLIUS VAR. *ALISMAEFOLIUS***

IN CANADA

BY

JEANNE M. ILLINGWORTH

AND

**GEORGE W. DOUGLAS
CONSERVATION DATA CENTRE
BRITISH COLUMBIA MINISTRY OF ENVIRONMENT, LANDS AND PARKS
VICTORIA, BRITISH COLUMBIA
V8V 1X4**

**STATUS ASSIGNED IN 1996
ENDANGERED**

Executive Summary

Description

Ranunculus alismaefolius var. *alismaefolius* is an erect, non-stoloniferous yellow buttercup with simple basal leaves that are broadly lanceolate and often toothed. It is distinguished from *R. flammula* and *R. glaberrimus* by its tall, erect stature and lack of deeply 3-lobed leaves respectively.

Distribution

Ranunculus alismaefolius var. *alismaefolius* is known in North America from the southeast tip of Vancouver Island, southward through Washington, Idaho and western Montana to Oregon and northeastern California. Of the five varieties of *R. alismaefolius* known to exist in the Pacific Northwest, only var. *alismaefolius* is known from BC and is limited in Canada to the southeastern tip of Vancouver Island. Considered the northern-most limit, only one location has been recently verified. [One additional new site is now known. E. Haber, Sept. 1996]

Population Size and Trends

Of the three [historical] locations in which *Ranunculus alismaefolius* var. *alismaefolius* has been collected in Canada, only one is extant [one new site is also known]. Information for the remaining two [historic] sites is too general to determine if the described areas are distinct from the extant location. Information indicates a slight decrease in individual plants between 1991 and 1994, but the data is too limited to determine, with much certainty, if the populations are declining. Given the limited habitat in which this variety is now found, it is likely that the populations have declined over time.

Habitat

Ranunculus alismaefolius var. *alismaefolius* is restricted to a lowland *Quercus garryana* - *Bromus* meadow. These meadows, limited to southeastern Vancouver Island and some of the adjacent islands, are characterized by deep brunisolic soils and dotted periodically by rock outcrops. The large meadow, in which *Ranunculus alismaefolius* var. *alismaefolius* is found, is usually flooded during winter but experiences drought conditions during summer. It contains open stands of *Quercus garryana* but tends to be dominated by grasses such as *Dactylis glomerata*, *Anthoxanthum odoratum*, and several species of *Bromus*. Associated species include *Triteleia hyacinthina*, *Ranunculus occidentalis* and *Camassia quamash*. Some stands are dominated in the understorey by shrubs, in particular, *Symphoricarpos albus* and *Cytisus scoparius*.

General Biology

Little information exists regarding the biology and ecology of *Ranunculus alismaefolius* var. *alismaefolius*, although it likely shares many of the traits typical of the genus. Vegetative growth occurs in muddy areas in early spring with flowers emerging in April and May. Floral colour and the presence of a pocket-like nectary gland indicates that insects are the principal pollinators. Seed maturation occurs in June, with each head producing 30 to 50 achenes. This variety does not appear to reproduce by other means. During July, when drought conditions are prevalent in the meadow, the plants are senescent and remain dormant until the following year.

Limiting Factors

Habitat destruction is the greatest threat to the *Ranunculus alismaefolius* var. *alismaefolius* populations. Park maintenance, trampling by pedestrians and bicycles, and competition from other species jeopardize the present locations alongside footpaths. The availability of potential sites is decreasing due to the development of unprotected *Quercus garryana* stands and meadows. Fire suppression appears to have resulted in vegetative changes, allowing the expansion in area of both native and introduced species at the expense of other less aggressive plants.

Protection

There is no specific legislation for the protection of rare and endangered vascular plants in BC. The existing populations of *Ranunculus alismaefolius* var. *alismaefolius* are protected to a certain extent by their location on public property where there is a reduced risk of development within park boundaries. Park maintenance, however, appears to continue with little concern for the effects on rare species. Signs posted at the park entrances prohibiting the use of bicycles seem to go unheeded due to little, if any, enforcement.

Conclusions

Ranunculus alismaefolius var. *alismaefolius* is currently known from only two locations in Canada, restricted to southeastern Vancouver Island and totalling fewer than 70 individuals. Given the rarity of suitable habitats where this variety may become potentially established, and the current threats at the existing site, this variety is vulnerable to extirpation. Current attempts to protect the fragile ecosystem from human use, and mis-use at the park locality, are ineffectual due to the absence of enforcement through legislation. It is recommended that *R. alismaefolius* var. *alismaefolius* be considered an endangered species.

ADDENDUM: A new locality for this species was found subsequent to the preparation of the status report. The site is on Ballenas Island, in the Nanoose area on the east coast of Vancouver Island. A specimen was collected by A. Ceska, 2 April 1996. The population consisted of 15-20 plants within an area of 5 x 10 m square in an ephemeral pool. This represents the second extant population known in Canada. The existence of this new site was known when status was designated by COSEWIC.

Erich Haber, Chairman, Subcommittee for Vascular Plants, Mosses and Lichens. Sept. 1996.

TABLE OF CONTENTS

I. SPECIES INFORMATION

1. Classification and Nomenclature	1
2. Description	2
3. Biological and Economic Significance	3
4. Distribution	4
5. Climate	4
6. Habitat	4
7. Population Size and Trends	7
Canadian Populations	7
United States Populations	8
8. General Biology	8
9. Limiting Factors	9
Specific Threats	9
Changes in Populations	11
10. Protection	11
Regulatory Measures	11
Rehabilitation Efforts	12

II. STATUS ASSESSMENT

11. Comments on Status	12
12. Status Recommendation	13
13. Prognosis	13

III. INFORMATION SOURCES

14. References	14
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LIST OF FIGURES

Figure 1. Distribution of <i>Ranunculus alismaefolius</i> var. <i>alismaefolius</i> in Canada.	5
Figure 2. Average annual rainfall in the Victoria region	6

LIST OF TABLES

Table 1. Locations of <i>Ranunculus alismaefolius</i> var. <i>alismaefolius</i> in Canada.	7
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I. SPECIES INFORMATION

1. Classification and Nomenclature

Scientific name:

Ranunculus alismaefolius Geyer ex Benth. var. *alismaefolius*

Bibliographic citation:

Pl. Hartweg. 295. 1848.

Type specimen:

Geyer 306, Coeur d'Alene, Idaho

Pertinent synonyms:

Ranunculus alismifolius var. *typicus* L. Benson

Common names:

Water-plantain buttercup
Plantain-leaved buttercup

Family name:

Ranunculaceae

Common family name:

Buttercup Family

Major plant group:

Angiosperm, dicotyledon

History of taxon:

Ranunculaceae consists of approximately 60 genera with 1700 species known worldwide, particularly in the northern temperate zones and tropical mountains (Wilken 1993). The genus *Ranunculus* comprises over 250 species, and while *Ranunculus alismaefolius* is distinct, the variation within the latter species has resulted in several proposed varieties by some taxonomists.

Hitchcock *et al.* (1964) recognized five varieties of *R. alismaefolius* consisting of var. *alismaefolius*, var. *montanus* Wats., var. *hartwegii* (Greene) Jeps., var. *davisii* Benson and var. *alismellus* Gray. These authors noted that var. *montanus* appeared somewhat intergradient to var. *alismellus*, while the varieties *montanus*, *hartwegii* and *davisii* were especially intergradient and only slightly dissimilar. In a checklist of *Ranunculus* of the United States, Canada and Greenland, Benson (1980) recognized the preceding five varieties and an additional variety, *lemmonii*. Wilken (1993), however, also noted that the varieties tended to intergrade and chose to treat var. *hartwegii*, and var. *lemmonii* (A. Gray) L. Benson as var. *alismaefolius*.

Of these varieties, only var. *alismaefolius* is reported to occur in British Columbia (BC) (Douglas 1991).

2. Description

Taxonomic Description

Ranunculus alismaefolius var. *alismaefolius*

[Description from Hitchcock *et al.* (1964), Lackschewitz (1991) and Wilken (1993)]

- General:** Perennial from fibrous to slightly tuberous-based, non-tomentose roots; 30-60 cm tall.
- Stem:** Erect, generally 3-5 from the base, somewhat hollow, not rooting at the nodes.
- Leaves:** Simple; basal ones broadly lanceolate or ovate, often toothed, 4-12 cm long, mostly 1-3 cm wide, usually narrowed to distinct petioles; cauline leaves alternate or opposite, entire, linear to narrowly lanceolate; short-petiolate to sessile in the inflorescence.
- Flowers:** Yellow, petals 5, 8-10 mm long, sepals 5, solitary and terminal at ends of stalks.
- Fruit:** Smooth, usually glabrous achenes, 10-60 with straight, stout beaks.

Illustrations

- 1) see p. 376 in Hitchcock *et al.* (1964).
- 2) see p. 927 in Wilken (1993).
- 3) see p. 138 in Brayshaw (1989).

Diagnostic Features

Ranunculus alismaefolius var. *alismaefolius* is distinguished from most of the other *Ranunculus* species in BC by its simple, lanceolate leaves. *Ranunculus flammula* and *R. glaberrimus* also have lanceolate leaves but the former is a much smaller, prostrate plant while the latter always has some deeply 3-lobed leaves. Although *Ranunculus cymbalaria* also has simple leaves, these are cordate and deeply crenate-toothed to shallowly 3-lobed at the tips.

Considered the tallest of the varieties, *R. alismaefolius* var. *alismaefolius* grows from 30-60 cm tall (Hitchcock *et al.* 1964). It also usually has toothed leaves while the other varieties always have entire leaves.

The basal leaves of *R. alismaefolius* superficially resembles those of *Plantago lanceolata*. If flowers are lacking then initial recognition in a densely vegetated meadow is sometimes difficult. After flowering, however, the foliage of *R. alismaefolius* turns yellow-green and becomes distinctive.

3. Biological and Economic Significance

There is no economic significance for this variety. Information gathered by the Horticultural Advisory Council in California indicated use as a horticultural species may be difficult given the need for special care. A cursory study by this Council showed the plant to have complex requirements but felt the testing was insufficient and worth pursuing further (Hickman 1993).

While *R. alismaefolius* var. *alismaefolius* does not appear to have been specifically tested, Taylor and MacBryde (1977) indicated that this variety was known to cause dermatitis in humans, and that it was also considered toxic to livestock. It is thought that all *Ranunculus* species contain the same toxic principle, although the amount is dependent on the stage of growth and on the particular species (Kingsbury 1964). The presence of a blistering irritant, protoanemonin can cause reactions of varying intensities including redness and blistering of the skin, or if swallowed, inflammation of the mouth, throat and digestive tract (Brayshaw 1989, Pojar and MacKinnon 1994). While severe cases in livestock have reported convulsions and death, this type of poisoning is rare since *Ranunculus* are strongly distasteful to most grazing animals (Kingsbury 1964). This harmful chemical is also unstable, and is rendered harmless when the hay is cured (Kingsbury 1964, Pojar and MacKinnon 1994).

Given the very limited number of populations in existence within Canada, however, there appears to be little biological interest in this variety other than taxonomic study and recognition of its rarity.

4. Distribution

Ranunculus alismaefolius var. *alismaefolius* is known in North America from the southeast tip of Vancouver Island, southward through Washington, Idaho and western Montana to Oregon and northeastern California (Douglas 1991, Hitchcock *et al.* 1964, Wilken 1993). Wilken (1993) has also extended the range to Wyoming although this remains unsubstantiated. The variety grows in elevation from sea level to 2300 m.

Of the five varieties of *R. alismaefolius* known to exist in the Pacific Northwest, only var. *alismaefolius* is known from BC (Douglas 1991). The range is limited to the southeastern tip of Vancouver Island and is found nowhere else in Canada (Fig. 1). Considered the northernmost limit, the range consists of three possible locations, of which only one has been recently verified.

5. Climate

The west coast of BC is exposed to an oceanic climate typified by high rainfall and mild temperatures. The southeastern side of Vancouver Island, however, lies in a rainshadow created by mountains, to the west on Vancouver Island and to the south on the Olympic Peninsula. Typical of the Coastal Douglas-fir zone, this region is therefore characterized by mild wet winters and warm dry summers (Meidinger and Pojar 1991). Annual precipitation is particularly low in the southeastern corner of Victoria, which receives about one-third of the rainfall to that west of the city (Fig. 2). More hours of bright sunshine have also been recorded for this area than for any other station in BC. Since the bulk of the rainfall (95%) occurs during the winter months, the high temperatures and limited precipitation during the summer period cause moisture deficiencies (McMinn *et al.* 1976).

6. Habitat

As a result of the unique climate, vegetation on the southeastern side of Vancouver Island is markedly different to that found elsewhere along the west coast and other locations in Canada. Moisture deficiencies during the summer preclude those plants not adapted to drought (McMinn *et al.* 1976). On mesic sites the vegetation is dominated by *Pseudotsuga menziesii*, a dominant fire-climax species. In drier areas, where rainfall is low or soils are shallow, the vegetation is characterized by open stands or discontinuous clumps of *Quercus garryana* mixed with grass-dominated meadows or rock outcrops.

In North America *Ranunculus alismaefolius* var. *alismaefolius* is known to inhabit open moist sites ranging from muddy ditches, pond margins and streambanks to swales and moist alpine meadows (Benson 1952, Douglas 1991, Wilken 1993).

In Canada, the only location in which this variety has been found is a lowland *Quercus garryana* - *Bromus* meadow. This large meadow, characterized by deep brunisolic soils and dotted periodically by rock outcrops, is usually flooded during winter, muddy in the spring

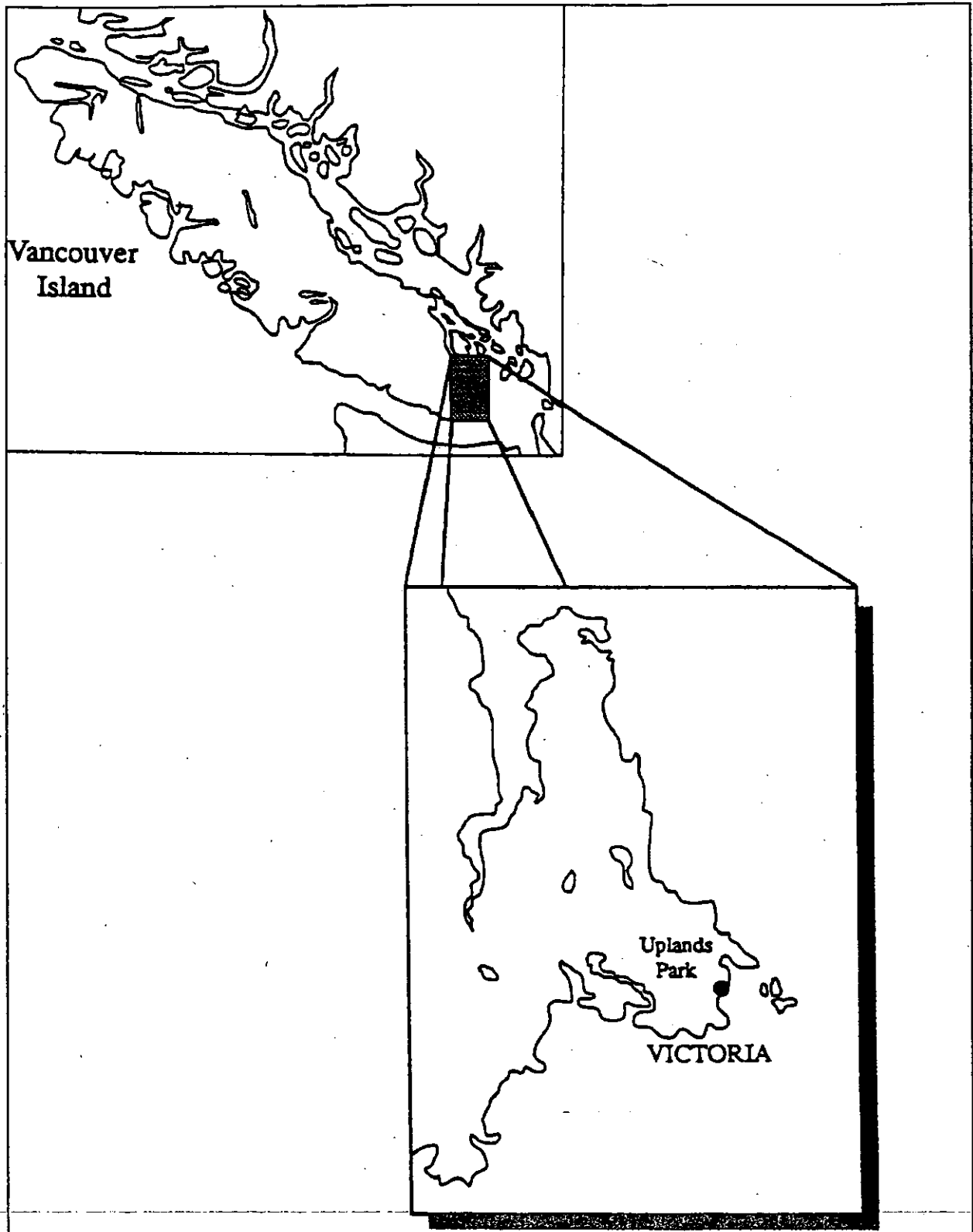


Figure 1. Distribution of *Ranunculus alismaefolius* var. *alismaefolius* in Canada.

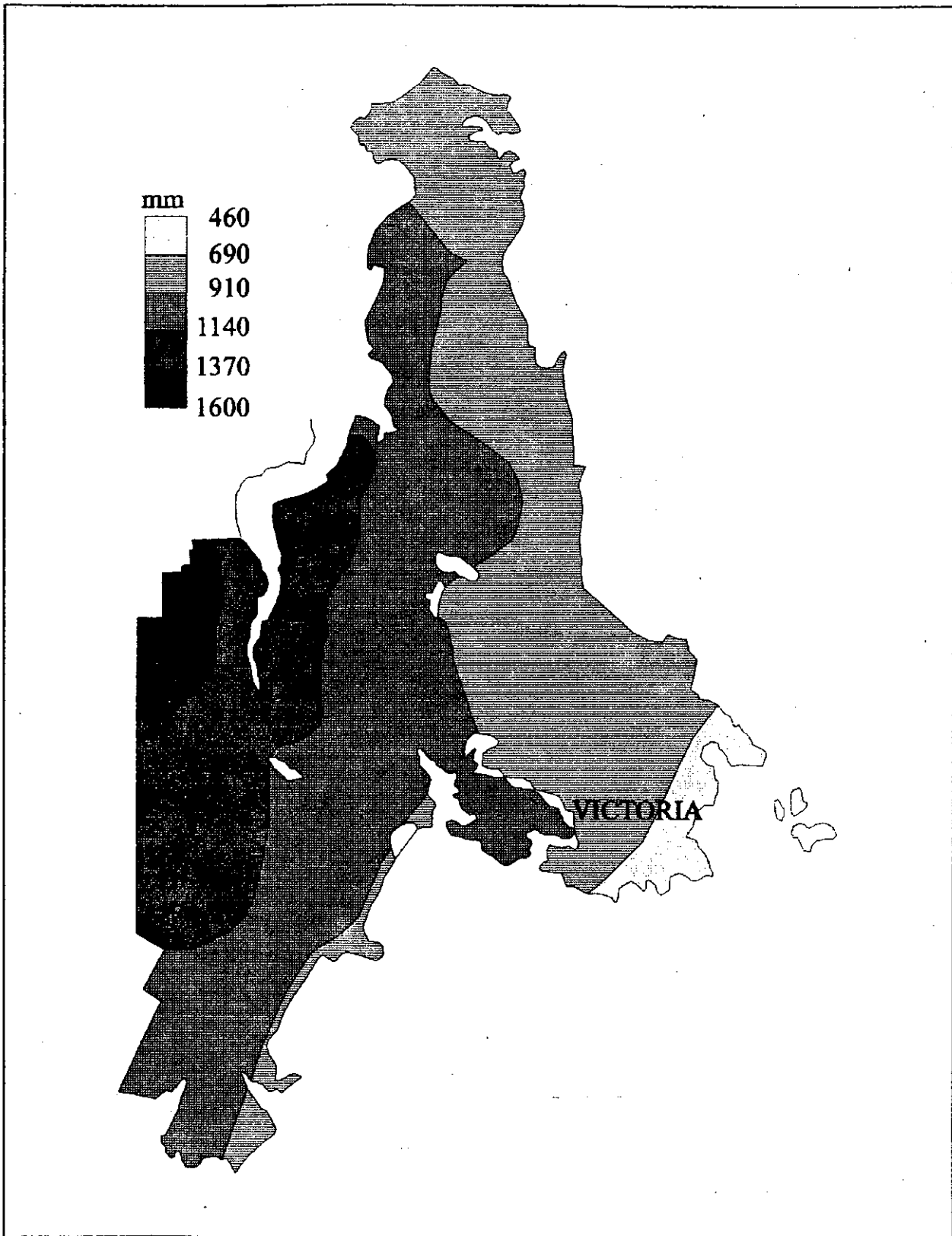


Figure 2. Average annual rainfall in the Victoria region. Redrawn from McMinin et al. (1976).

and dry during summer. The site contains open stands of *Quercus garryana* with a substantial variety of forbs including *Triteleia hyacinthina*, *Ranunculus occidentalis* and *Camassia quamash* but tends to be dominated by grasses such as *Dactylis glomerata*, *Anthoxanthum odoratum*, and several species of *Bromus*. Some stands are dominated in the understorey by shrubs, in particular, *Symphoricarpos albus* and *Cytisus scoparius*, which effectively shade out many herbaceous species.

7. Population Size and Trends

Canadian Populations

Table 1 identifies those locations in which *Ranunculus alismaefolius* var. *alismaefolius* has been collected in Canada. All populations have been found within a very limited area on southeastern Vancouver Island, on the east side of Victoria. Of the three locations, only one is extant. The locations cited on the herbarium labels for the other two areas are too general to determine if the described sites are distinct from the extant location.

Table 1. Locations of *Ranunculus alismaefolius* var. *alismaefolius* in Canada.

Collection Site	Last Observation	Collector	Population (no./area)
Oak Bay (Victoria)	1890	Newcombe	
Cadboro Bay Road (Victoria)	1900	Anderson	
Uplands Park (Victoria)	1994	Douglas	50/5 m ²

Recently verified populations

Uplands Park

Approximately 50 plants were recently verified in 1994 from two populations within Uplands Park. The larger group, 32 plants in 4 m², was located alongside a muddy track on the southern side of a meadow, centrally located within the park. This meadow, bordered by open stands of *Quercus garryana*, was dominated by grass species, primarily *Agrostis capillaris*, but also included *Dactylis glomerata* and *Holcus lanatus*. Associated herbaceous species included *Plantago lanceolata*, *Potentilla* sp. and *Camassia quamash*. Scattered groups of *Cytisus scoparius* were near the population and became more frequent and much denser towards the meadows perimeter. A total of 40 individuals were verified at this site in 1991.

The second group, 18 plants in 1 m², was located approximately 200 m westward, near the southwest corner of the park in a grassy swale alongside a path. Again dominated by grass species, the associated species in this disturbed area also included *Potentilla gracilis*, *Crataegus monogyna* and an introduced *Lupinus*. This population totalled 17 individuals in 1991.

This park also supports a number of other rare species including *Viola praemorsa* ssp. *praemorsa*, *Psilocarphus elatior*, *Aster curtus* and *Limnanthes macounii*.

Status Unknown

Several herbarium records, dating from 1887 to 1896, indicated collections made in "Oak Bay". Two such records described the area as "swamp". An additional collection, dated 1900, recorded the site location as "Cadboro Bay Road", which is situated near the border of Uplands Park. Since both Cadboro Bay Road and Uplands Park, the site of the existing populations, are in the Municipality of Oak Bay, and since portions of the park are often flooded during the winter, it is possible that the historic records are all referring to the sites described previously in Uplands Park.

United States Populations

Although the distribution of *Ranunculus alismaefolius* var. *alismaefolius* in the United States appears to be limited to the western states, the populations appear to be abundant, with no concern of its rarity in these regions. The variety was considered for listing in Montana as sensitive, threatened and endangered, but this was later rejected following a review of the population size and distribution (Lesica *et al.* 1984, Lesica and Shelly 1991). There is no record of any other state, in which *R. alismaefolius* var. *alismaefolius* is known to occur, tracking this plant as threatened or endangered.

8. General Biology

Other than general habitat information, there are few details in the literature regarding the biology and ecology of *Ranunculus alismaefolius* var. *alismaefolius*. This includes many aspects of the population dynamics such as the average life-span of the variety, the frequency and requirements for seed germination, and the competitive ability of *R. alismaefolius* var. *alismaefolius* with other species. It is likely, however, that this plant shares many of the same traits that are typical of the genus.

Like many other herbs which occur in grass-dominated meadows, this perennial appears to take advantage of the high light levels and warm, moist conditions found during spring. Surrounding vegetation, particularly the grasses, are also shorter during this period allowing the herbs full benefit of the light levels and greater space. Vegetative growth occurs in muddy areas in early spring with flowers of *R. alismaefolius* var. *alismaefolius* emerging in April and May. Seed maturation occurs in June, with each head producing 30 to 50 achenes.

During July, when drought conditions are prevalent in the meadow, the plants are senescent and remain dormant until the following year.

Since *Ranunculus alismaefolius* var. *alismaefolius* does not appear to reproduce by other means, seed production is likely to be of critical importance to the maintenance and spread of this species into new habitats. Given the bright yellow appearance of the flower, and the presence of a pocket-like nectary gland, it is likely that insects are the principal pollinators. Leppik (1964) indicated that flowers of *Ranunculus* were visited by a wide variety of insects including bees, flies, butterflies, beetles and ants. The resulting seeds do not appear to be easily dispersed. Although not specifically documented, the size and shape of the achenes indicate dispersal is probably achieved by birds and small animals.

9. Limiting Factors

Specific Threats

The most direct and immediate threat to the extant populations of *Ranunculus alismaefolius* var. *alismaefolius* is habitat destruction. In spite of the mandate followed by park administrators to treat Uplands Park as a "natural" habitat, with little active management, there are several examples of park maintenance resulting in the destruction of native, and sometimes rare, plant species. These park "improvements" include the addition of fire hydrants, the planting of exotic trees (*Pinus sylvestris*) and gravel deposited in areas deemed excessively muddy.

While introduced grasses and forbs may pose an immediate threat to *Ranunculus alismaefolius* var. *alismaefolius*, this is difficult to judge since nothing is known of the competitive interactions of this species with others. The continued existence of both populations of *R. alismaefolius* var. *alismaefolius* alongside pathways, where other plants are reduced in size, indicates that this species is a poor competitor.

Conversely, the sites alongside footpaths may also prove detrimental due to the constant risk of being trampled. The municipal park is used heavily by pedestrians, particularly those with dogs, and mountain-bike enthusiasts.

Elsewhere, habitat destruction is of particular concern in the grass-dominated meadows often associated with *Quercus garryana*-*Bromus* stands that are limited to the southeastern side of Vancouver Island and some of the adjacent Gulf Islands. Both types of vegetation are believed to have been much more common before colonization by European settlers. Although few records indicate the extent of these communities prior to, and during, colonization by European settlers, it is likely they once encompassed much of the area now occupied by the city of Victoria (see map pp. 9-10 in McMinn *et al.* 1976). In fact, Roemer (1972) believed that the attractiveness of *Quercus garryana* vegetation was one of the reasons for the establishment of Fort Victoria. Their destruction has continued to the present resulting in the elimination of almost all sites occurring outside parks or ecological reserves.

These sites are the most vulnerable to destruction because of their location on gentle slopes near the most populated and climatically-favourable areas on Vancouver Island making them particularly susceptible to agricultural and residential development. The BC Conservation Data Centre (BC Ministry of Environment, Lands, and Parks) has assigned a rank of S1 to *Quercus garryana*-*Bromus* vegetation which indicates this vegetation is, "critically imperiled because of extreme rarity (5 or fewer extant occurrences or very few remaining individuals) or because some factor(s) making it especially vulnerable to extirpation or extinction". Although grass-dominated meadows have not been ranked, they may be even more limited in area and just as much at risk as *Quercus garryana*-*Bromus* vegetation.

At this time, pressures to develop unprotected *Quercus garryana* stands and meadows for the expansion of the urban infrastructure of Victoria, and other population centres on Vancouver Island, are intense. Currently a number of *Quercus garryana* stands are threatened, or are in the process of being destroyed, as a result of residential development and the expansion of services associated with it. Loss of these habitats severely limits the availability of suitable sites for the establishment of *Ranunculus alismaefolius* var. *alismaefolius*.

Historically, *Quercus garryana* communities and grass-dominated meadows have always been heavily influenced by human activity. Aboriginal peoples set fire to these stands to maintain them as an important habitat for wildlife and for harvesting *Camassia*, a member of the Liliaceae whose bulbs were an important source of starch in the diet of aboriginal people (Roemer 1972, Turner and Bell 1971). Roemer (1972) believed that without human interference some of these stands would have eventually been replaced by *Pseudotsuga menziesii* forests.

The suppression of fire within the past century may have contributed to the demise of *Ranunculus alismaefolius* var. *alismaefolius* populations. All of the sites in which this species has been collected were likely maintained in the past as a result of periodic episodes of fire. This would have destroyed much of the competing vegetation resulting in newly-created habitats where *R. alismaefolius* var. *alismaefolius* might have become established. However, since that time, these sites have experienced little disturbance, resulting in the invasion and expansion of other species at these sites including the shrubs *Symphoricarpos albus* and *Cytisus scoparius*.

The herbaceous vegetation observed today in *Quercus garryana*-*Bromus* stands and grass-dominated meadows has been drastically altered with the introduction of European species. Although a number of native species persist, much of the vegetation is composed of introduced grasses which likely make up greater than 90% of the biomass of the herb layer. These species include *Anthoxanthum odoratum*, *Dactylis glomerata*, *Cynosurus echinatus*, *Aira praecox*, and several species of *Bromus*. As noted by Roemer (1972) with respect to *Quercus garryana* vegetation, it is not possible to know which native species and to what extent they have been displaced because all sites are now composed primarily of introduced species and there are no longer any examples of "pre-European" vegetation. What impact these species may have on the growth and establishment of *Ranunculus alismaefolius* var.

alismaefolius remains unclear but it is likely that the dense turf formed by grasses prevents the establishment of this herb from buried viable seed.

Fortunately, shrub species do not appear to be an immediate threat to known *R. alismaefolius* var. *alismaefolius* populations in Canada but their abundance at other meadow sites signifies a loss of potential habitats in which this species may be established and further imposes limits on the longterm survival of this species.

Changes in Populations

Although *Ranunculus alismaefolius* var. *alismaefolius* has been known in Uplands Park since 1918, few details have been provided, particularly regarding the demographics of this community. The most recent observation of these populations, in 1994, showed a total of 50 individuals between the two groups (32 and 18 respectively). The only other detailed study, in 1991, reported a total of 57 plants (40 and 17 respectively). While a slight decrease between these two studies is indicated, the data is too limited to determine, with much certainty, if these populations are declining.

An examination of pollen in soil cores sampled on southeastern Vancouver Island suggests that *Quercus garryana* stands, and grass-dominated meadows, were much more extensive several thousand years ago (R. Hebda pers. comm). If these are the only habitats in this area that provide the requirements necessary for the establishment and subsequent growth of *R. alismaefolius* var. *alismaefolius*, then it is possible that existing populations of this herb represent remnants of a more contiguous distribution along the southeastern portion of Vancouver Island.

10. Protection

Regulatory Measures

There is no specific legislation for the protection of rare and endangered vascular plants in BC. Existing populations, however, are protected to a certain extent by their location on public property.

Located along the eastern shoreline of Victoria, Uplands Park is surrounded by residential development. Because it has been established as a municipal park, under the jurisdiction of the Municipality of Oak Bay, there is reduced risk of development within the park boundaries. The area is not actively managed, however, due to the mandate followed by park administrators to treat the site as a "natural" habitat, therefore, nature is allowed to take its course. Conflict over this mandate has arisen since much of the native vegetation has been eliminated, or is currently threatened, as a result of aggressive introduced species, in particular *Cytisus scoparius*.

Efforts have been made to prevent the destructive impact of bicycles within the park by posting signs at the various entrances along the parks perimeter prohibiting the use of bicycles. Because there is little enforcement of this regulation, however, the signs appear to go unheeded.

Rehabilitation Efforts

No attempts have been made to introduce *Ranunculus alismaefolius* var. *alismaefolius* to suitable habitats or to increase the numbers of individuals at the current locations. Since it appears that specific requirements are needed for the successful establishment of this variety within a site, biological and ecological research is necessary. To date, there are no records of such studies being done.

The Canadian location of *Ranunculus alismaefolius* var. *alismaefolius* represents its northern range limit thus it is possible that climatic factors, such as frost hardiness, or drought tolerance, combined with the limited availability of meadow habitats, may severely limit the ability of this variety to grow in BC. It is also possible that the site in which this forb is currently found represents a marginal habitat.

Quercus garryana-*Bromus* habitats are typically dry, and possibly too dry in this region for the establishment of new *Ranunculus alismaefolius* var. *alismaefolius* populations. It is also possible that because of difficult seed dispersal, or very specific requirements for germination and plant growth, few seeds land in regions acceptable to the plant.

Fire, as it was used by native people before European settlers arrived in coastal BC, may have benefited the habitats in which *R. alismaefolius* var. *alismaefolius* occurred by reducing, or eliminating, dense shrub thickets, and thus maintaining the herb-rich meadows. Today, because of the close proximity to residential areas, and the likelihood of uncontrolled burning due to the buildup of potential fuels, fire does not appear to be a viable management option.

II. STATUS ASSESSMENT

11. Comments on Status

Globally, *Ranunculus alismaefolius* var. *alismaefolius* is currently ranked as G5T? by The Nature Conservancy (U.S.). This ranking indicates that, at the species level, the plant is considered "common to very common; demonstrably secure and essentially ineradicable under present conditions" but that limited information is available for this particular variety.

In BC, *R. alismaefolius* var. *alismaefolius* is ranked by the Conservation Data Centre (BC Ministry of Environment, Lands and Parks) as S1 which indicates this variety to be "critically imperiled because of extreme rarity (5 or fewer extant occurrences or very few remaining individuals) or because of some factor(s) making it especially vulnerable to

extirpation or extinction". This is the most critical status which can be applied to a species at the provincial level.

12. Status Recommendation

Ranunculus alismaefolius var. *alismaefolius* should be ranked as an endangered species in Canada for the following reasons:

- 1) Only one extant site is known in BC, and Canada, comprising of 50 individuals divided between two populations.[an additional site of 15-20 plants has been located]
- 2) Suitable habitats for *R. alismaefolius* var. *alismaefolius* are extremely rare and limited to southeastern Vancouver Island and adjacent islands. The potential of this species to become established at other sites is therefore extremely limited and seriously limits its longterm survival.
- 3) *R. alismaefolius* var. *alismaefolius* in BC represents the northern limits of this taxon and may represent populations that are genetically distinct to those found elsewhere.

13. Prognosis

The prognosis for this species is poor. With only [two] known extant location in Canada, limited to [70] individuals, and with little knowledge of the plants biological and ecological requirements, this variety is vulnerable to extirpation. Without research on the growth requirements, and further demographic information, the stability of the present populations will remain unknown. The limited number of individuals also reduces the potential for genetic variation which may be necessary to respond to environmental changes in the future.

The site in Uplands Park is also in jeopardy. The composition and structure of the meadow is changing, largely due to the encroachment of introduced shrubs and grasses. With no form of active management, the risk of *R. alismaefolius* var. *alismaefolius* being out-competed is high.

Bordering footpaths, both groups run a much higher risk of being trampled by pedestrians and bicycles, or of being unwittingly destroyed during path improvements by park staff. Current attempts to protect the parks fragile ecosystem from human use, and mis-use, are ineffectual due to the absence of enforcement through legislation.

III. INFORMATION SOURCES

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