

COSEWIC
Assessment and Status Report

on the

Tall Bugbane
Cimicifuga elata

in Canada



ENDANGERED
2001

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA



COSEPAC
COMITÉ SUR LA SITUATION DES
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COSEWIC 2001. COSEWIC assessment and status report on the tall bugbane *Cimicifuga elata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 15 pp.

Penny, J.L., and G.W. Douglas. 2001. COSEWIC status report on the tall bugbane *Cimicifuga elata* in Canada, *in* COSEWIC assessment and status report on the tall bugbane *Cimicifuga elata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-15 pp.

Production notes:

Most of the information appearing in this report was published previously by Penny and Douglas (1999). Nomenclature follows Douglas *et al.* (1994, 1998b, 1998c, 1999a, 1999b, 2000).

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Également disponible en français sous le titre Rapport du COSEPAC sur la situation de la cimicaire élevée (*Cimicifuga elata*) au Canada

Cover illustration:

Tall bugbane — Jane Lee Ling in Douglas *et al.* (1998).

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Catalogue No. CW69-14/126-2002E-IN
ISBN 0-662-32034-4



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**COSEWIC
Assessment Summary**

Assessment Summary – May 2001

Common name

Tall bugbane

Scientific name

Cimicifuga elata

Status

Endangered

Reason for designation

A perennial herb of mature forests occurring naturally as very small populations at scattered sites throughout a single river valley and adjoining mountain slopes where logging continues to impact populations and to reduce its preferred forest habitats.

Occurrence

British Columbia

Status history

Designated Endangered in May 2001.



COSEWIC Executive Summary

Tall Bugbane *Cimicifuga elata*

Description

Cimicifuga elata (Tall Bugbane) is a perennial, large-leaved understorey plant that stands 1 to 2 m tall. Stems are branched above and leaves are bi-ternate with 9 to 17, cordate to ovate, often palmate leaflets, which are usually 3-lobed. This species has a dark, tuberous, horizontal rhizome. The inflorescence is a simple to compound raceme with 50 to 900 small, white, closely-crowded flowers. Individual flowers are radially symmetrical and apetalous, and sepals are white or pinkish, falling off at once. Fruits are follicles, 9 to 12 mm long, sessile, appearing singly in the upper flowers, but in two's, and rarely, three's in the lower ones of the raceme. Follicles each contain approximately 10 red to purple-brown seeds.

Distribution

Cimicifuga elata occurs from southwestern Oregon and western Washington north to southwestern British Columbia. In British Columbia, *C. elata* is only found sporadically in the Chilliwack River valley. *Cimicifuga elata* occurrences are all west of the Coast-Cascade Mountains in British Columbia and Washington, but within the mountain range in southwestern Oregon.

Habitat

Cimicifuga elata grows in shady, moist, mixed, mature western red cedar-hemlock and Douglas-fir, but also in predominately deciduous stands. The deciduous component is extremely important, providing the perfect balance of shade and light, and moisture retention. Common associated species include *Rubus parviflorus*, *Oplopanax horridus*, *Acer circinatum*, *Dryopteris expansa*, *Tolmeia menziesii*, *Sambucus racemosa*, *Circaea alpina*, and *Asarum caudatum*.

Biology

There is no information available on the biology of *Cimicifuga elata* in British Columbia, however, studies related to pollination ecology, and population genetic structure have been conducted in Washington and Oregon. There have also been

studies on the presence of active compounds of pharmacological use in species of *Cimicifuga*. Percentage germination is low and seeds are heavy with no special dispersal mechanism in *C. elata*.

Population Sizes and Trends

There are seven extant, recently verified, 1 historic and 2 unverified populations of *Cimicifuga elata* in the Chilliwack River valley. Populations are relatively small, ranging from a single plant to 63 plants. *Cimicifuga elata* has likely been extirpated from the Liumchen mountain site, which has been extensively converted to young forest. In addition, only a single plant was observed on Cheam Mountain, also an area extensively clearcut several years ago; the first observation at this site reported several plants in a clearcut. Other than this association with forest practises, no other population trends are known.

Limiting Factors and Threats

Cimicifuga elata has both intrinsic biological limitations, and an uncertain future under current logging regimes in the Pacific Northwest. *Cimicifuga elata* occurs in small populations that are sporadically distributed over the landscape, is relatively much less attractive to pollinators than other flowering plants, and lacks any specialized seed dispersal mechanism. Extremely small populations exist which are susceptible to low genetic diversity, and imminent extirpation. In addition, the increasingly fragmented landscapes of the forests of the Pacific Northwest threaten the continued persistence of this species. Populations of *C. elata* are notably absent from young 15-30 year-old managed stands, and re-colonization into these sights may be unlikely due to the low reproductive success and the poor dispersal ability of this species.

Existing Protection

There is currently no legislation that specifically protects *Cimicifuga elata* in Canada. However, the British Columbia Ministry of Environment, Lands, & Parks has recognized rare vascular plants as 'wildlife,' and *Cimicifuga elata* is considered 'red-listed,' or rare and threatened/endangered. None of the populations of *C. elata* occur in protected areas, with the exception of two small British Columbia Forest Service reserves on Mt. Vedder, one a small 'wildlife tree patch,' and the other, a 'visual landscape' reserve.



COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

| | |
|------------------------|--|
| Species | Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora. |
| Extinct (X) | A species that no longer exists. |
| Extirpated (XT) | A species no longer existing in the wild in Canada, but occurring elsewhere. |
| Endangered (E) | A species facing imminent extirpation or extinction. |
| Threatened (T) | A species likely to become endangered if limiting factors are not reversed. |
| Special Concern (SC)* | A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events. |
| Not at Risk (NAR)** | A species that has been evaluated and found to be not at risk. |
| Data Deficient (DD)*** | A species for which there is insufficient scientific information to support status designation. |

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.



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COSEWIC Status Report

on the

Tall Bugbane *Cimicifuga elata*

in Canada

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2001

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SPECIES INFORMATION

Name and classification

Scientific name: *Cimicifuga elata* Nutt
Common name: Tall Bugbane, Western Bugbane, or Black Cohosh
Family name: Ranunculaceae; Buttercup family
Major plant group: Dicot flowering plant

Fifteen species of *Cimicifuga* are known globally (Hay & Beckett, 1978), and the genus is circumboreal. Six of these species occur in North America, two on the west coast, including *C. elata*, and three on the east coast and the southern U.S. (Evans, 1992). *Cimicifuga elata* was the first member of the genus to be found in western North America (Ramsey, 1965). It was first observed and collected on the Lewis and Clark Expedition in 1805 in Oregon. The other nine species of *Cimicifuga* occur in Europe and the Far East. All of the North American species are endemics or are at least, infrequently distributed, except for *C. racemosa*, which is common in the east.

Description

Cimicifuga elata is a perennial, understory plant that stands 1 to 2 m tall (Fig. 1; Hitchcock *et al*, 1964). Stems are branched above with glandular swellings at leaflet and stem joints, and leaves are large, thin, and bi-ternate. The 9 to 17 leaflets are cordate to ovate, often palmate, and 5 to 7-lobed (usually 3-lobed) with serrate to dentate margins. Leaves are rough-hairy on top, and smooth below. The plant is finely pubescent, and somewhat glandular above with a dark, tuberous, horizontal rhizome, up to 10.2 cm long and 2.5 cm in diameter. The inflorescence is a simple to compound raceme (sometimes paniculate) with 50 to 900 small, white, closely-crowded flowers (Pellmyr, 1986). Individual flowers are radially symmetrical and apetalous. Pedicels are shorter than the flowers, and sepals are white or pinkish, falling off at once. When the sepals fall away, only the stamens and pistils remain, and the inflorescence appears like a bottle brush. Fruits are follicles, 9 to 12 mm long, subsessile, appearing singly in the upper flowers, but in two's, and rarely, three's in the lower ones of the raceme. Follicles each contain approximately 10 red to purple-brown seeds. *Cimicifuga elata* may be confused with a few other understory plants in the vegetative form, such as *Actaea rubra*, however, when flowering, it is very distinctive.

DISTRIBUTION

Global Range

Cimicifuga elata occurs in western Oregon and Washington, and south-western British Columbia (Fig. 2).

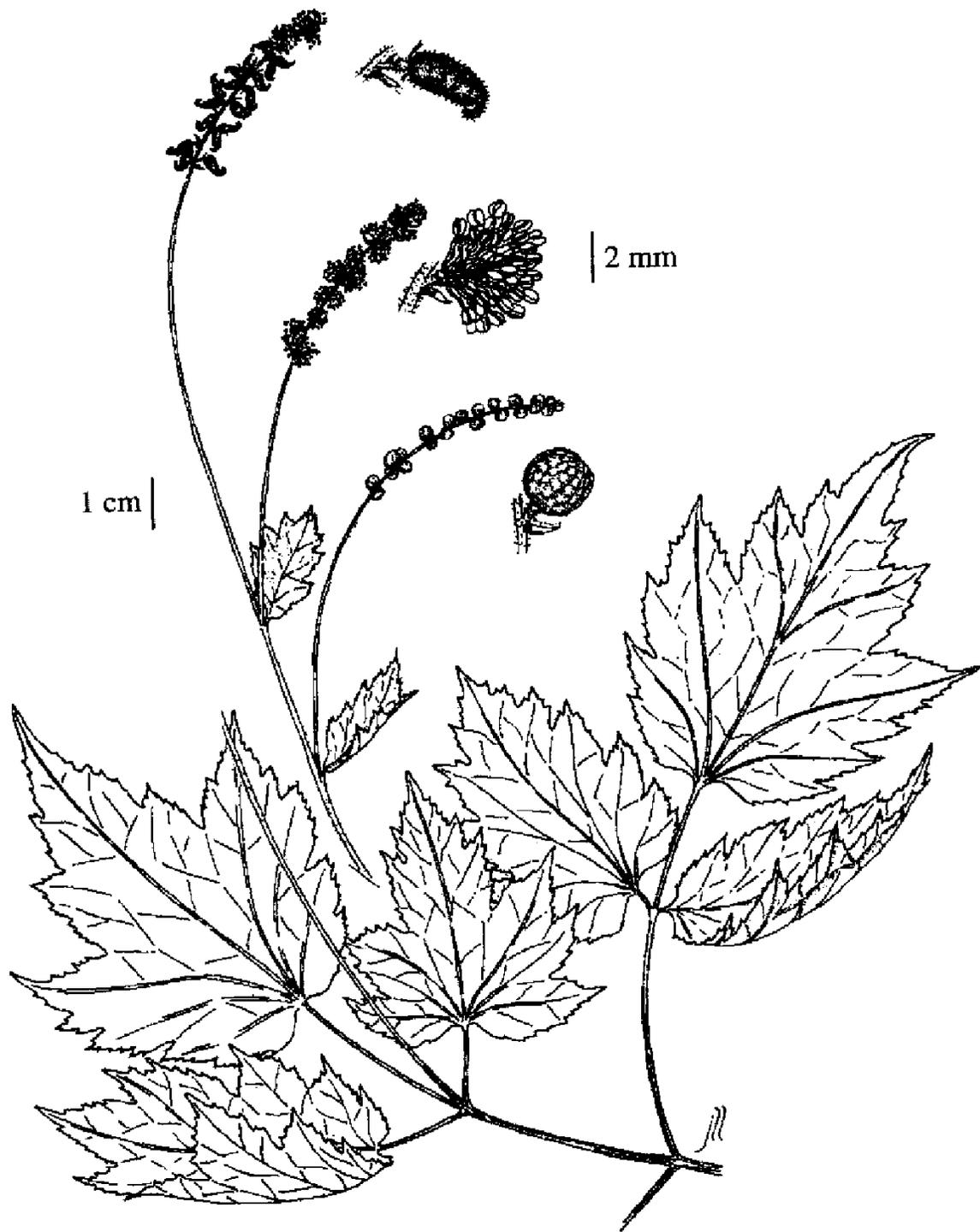


Figure 1. Illustration of *Cimicifuga elata* Nutt. Line drawing by Jane Lee Ling in Douglas *et al.* (1998).

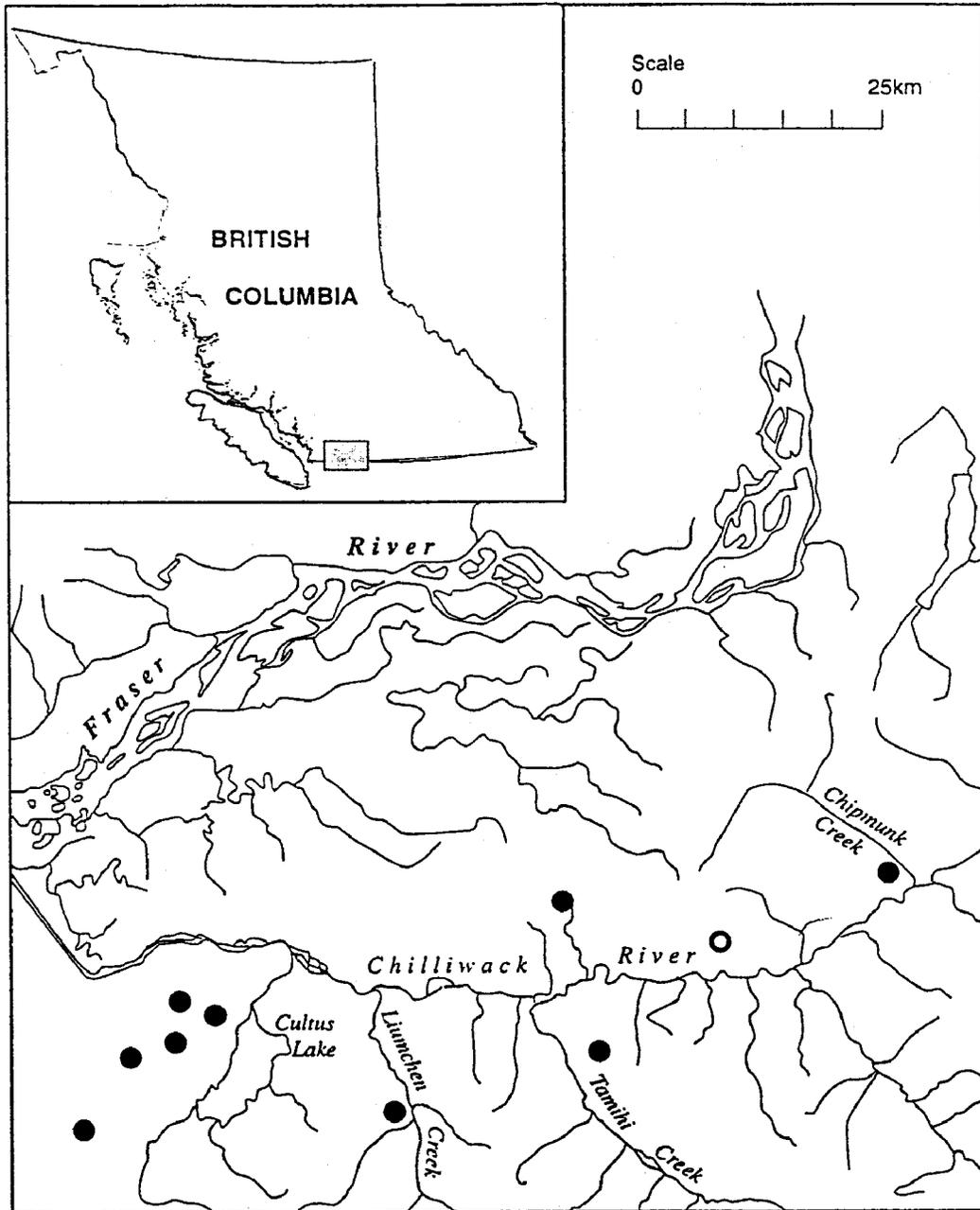


Figure 2. Distribution of *Cimicifuga elata* in British Columbia.

Canadian Range

In British Columbia, *C. elata* is only found sporadically in the Chilliwack River valley. Localities range from British Columbia to as far south as approximately forty-two degrees and five minutes North in latitude, near Ashland in southwestern Oregon. *Cimicifuga elata* occurs entirely west of the Coast-Cascade Mountain range in British Columbia and Washington, but within that mountain range in southern Oregon.

HABITAT

In the Pacific Northwest, *C. elata* occurs over a large geographic and elevation range. In addition, the herb and shrub layer varies greatly depending on the region. The main habitat type is moist, mixed, lowland forest with a fairly closed canopy of Douglas-fir or cedar-hemlock, however, *C. elata* also occurs in relatively open *Abies grandis* forest at mid-elevation in south-western Oregon. *Cimicifuga elata* never represents a dominant in the vegetation cover, and is usually found in relatively sparse understories. Elevations range from 30 m to 1600 m. This species occurs on gentle to steep slopes, requires some sub-surface moisture, often provided by creeks or rivers, and generally, aspects on northerly slopes.

In the Chilliwack River valley, *Cimicifuga elata* grows in shady, moist, mixed, mature (70-150 yr. old) western red cedar-hemlock forest, commonly in *Thuja plicata*-*Polystichum munitum*-*Achlys triphylla* communities. *Cimicifuga elata* also occurs in mixed Douglas-fir-*Acer macrophyllum*, and predominately deciduous stands. This species is associated with both *Acer macrophyllum* (big-leaf maple) and *Alnus rubra* (red alder), the prior being the more common associate. The deciduous component is extremely important, providing the perfect balance of shade and light, and moisture retention. Common associated species include *Rubus parviflorus*, *Oplopanax horridus*, *Acer circinatum*, *Dryopteris expansa*, *Tolmeia menziesii*, *Sambucus racemosa*, *Circea alpina*, and *Asarum caudatum*. Sites are characterized by 15-35° slopes with north, south-west, and south aspects. *Cimicifuga elata* also occurs in managed stands. It has been observed on road cuts and in clearcuts where there is increased light availability, and freshly disturbed mineral soil increasing the chances for seedling establishment. Plants growing on road cuts and clearcuts display increased vigor. Road cuts and clearcuts mimic natural canopy openings that are likely important to the flowering, fruiting and establishment of *C. elata* into new sites. Road cut habitats may be initially favorable for *C. elata* establishment, but unlike small natural openings in the canopy, may have numerous disruptions that may further restrict recruitment. Roadside maintenance activities such as mowing and spraying could reduce seed production of those plants that were initially able to establish or cause the death of seedlings (Kaye and Kirkland, 1999). Another habitat unsuitable for *C. elata* in managed forests is the dense shrub growth that prevails several years following clearcuts (Kaye and Kirkland, 1994). Individuals will likely not persist in sites that are extensively clearcut for this reason. During field work conducted by the Conservation Data Centre in 1997, *C. elata* was found to be more common in areas that were not extensively clearcut, but instead, had a balance of mature mixed-forest, deciduous stands, small clearcuts, and road cuts. In Washington, this species is likewise, mainly associated with mature or old-growth coniferous or mixed-forest, but is also observed at forest margins and on road cuts. Originally, it was thought that *C. elata* was a mature to old-growth dependant, but now Kaye and Kirkland (1999) describe *C. elata* as “light flexible” (Collins *et al*, 1985) rather than old-growth dependant and shade restricted.

BIOLOGY

There is no information available on the biology of *Cimicifuga elata* in British Columbia. However, research has been conducted on populations in Washington and Oregon, where it

is relatively more abundant. Their studies have focused on pollination ecology, including evolutionary implications (Pellmyr, 1985; Pellmyr, 1985a; Pellmyr, 1986), and population genetic structure, including implications associated with its rarity (Evans, 1993). There have also been studies on the presence of active compounds of pharmacological use in species of *Cimicifuga*, particularly in the Far East (Shibata *et al.*, 1980).

Phenology

Young plants of *Cimicifuga elata* emerge in the spring, produce buds in late spring, and flower mid-late June, July, or even into August. In experiments done by Kaye and Kirkland (1994) seeds appear to require cold-stratification for germination and percentage germination was low. Seeds are heavy and no special dispersal mechanism is known (Kaye and Kirkland, 1994). In growth experiments on *C. elata* using ample light (Anonymous, 1996), plants grew to reproductive size in three years. Under less ideal conditions, time to reproductive size could be six years. Plants growing in mature forest were rarely observed flowering, whereas plants in openings had large inflorescences.

Pollination Biology

This species is pollinated by bumblebees, solitary bees, the introduced honeybee, and syrphid flies. Flowers of *C. elata* have also been visited by beetles, and small, pollen-foraging flies (Pellmyr, 1986). Evans (1992) observed solitary bees more than any other pollinator on the flowers of *C. elata*. *Cimicifuga elata* is poorly adapted to out-crossing, is a poor competitor for pollinators, and is self-compatible. Flowers of *C. elata* have no nectar offering little reward, and resulting in few visits from pollinators. Furthermore, corollas are not showy, there are no markings to guide pollinators, and no special structures to apply pollen to bodies of pollinators, all features that tend to lead to self-pollination (Evans, 1992). A reduced number of staminodia also lends itself to selfing (Pellmyr, 1985a). Usually staminodia are completely absent from this species (Evans, 1992). In addition, *C. elata* occurs in habitats that contain few attractive-flowering species, and therefore, it cannot benefit from their increased ability to attract pollinators. Pollination is geitonogamous, or flower to flower on the same plant (self-pollination), ensuring success in a single visit (Pellmyr, 1986). Flowering occurs sequentially within the raceme, with individual flowers blooming at different times, extending the flowering period, which, unlike previously mentioned characteristics, maximizes the chance of cross-pollination. Evans (1992) found that the blooming period varied from 19 to 47 days, and that 10 out of every 23 flowers was the average flowering ratio. A larger floral display does not appear to incur greater success in cross-pollination for *C. elata*; it is more likely that density of flowers in a population has a greater effect on reproductive success (Pellmyr, 1986).

POPULATION SIZES AND TRENDS

There are 7 extant, or recently verified (>1950), populations of *Cimicifuga elata* in Canada in the Chilliwack River valley. Populations are relatively small, ranging from a single plant to 63 plants (Table 1). Two records for this species have not been verified; the

Chilliwack River valley, an historic record, is too vague to verify, and the Liumchen Mountain site, which has been extensively converted to young forest, likely represents an extirpated site for *C. elata*. In addition, only a single plant was observed on Cheam Mountain, also an area extensively clearcut several years ago (Table 1); the first observation at this site reported several plants in a clearcut. *Cimicifuga elata* is not known to occur in dense populations, but rather, is only sparsely distributed over a limited.

Table 1. Localities and Population Data for *Cimicifuga elata* in Chilliwack, British Columbia

| | Location | Year | Collector | Number of Plants/area |
|----|---|------|---------------------|-----------------------|
| 1 | Chilliwack River | 1901 | Macoun | unknown |
| 2 | Liumchen Mt. ¹ | 1957 | Beamish | unknown |
| 3 | Vedder Mt., NW slope, Parmenter Road junction | 1997 | Penny & Hartwell | 12 /0.1 ha. |
| 4 | Vedder Mt., N slope | 1997 | Fontaine & Hartwell | 29 /0.5 ha. |
| 5 | Vedder Mt., NE end, above N end of Cultus Lake | 1996 | Douglas & Penny | 54 /5-6 ha. |
| 6 | Vedder Mt., SE slope, above S end of Cultus Lake | 1997 | Fontaine & Hartwell | 63 /4 ha. |
| 7 | Vedder Mt., SW slope | 1988 | Scagel | unknown |
| 8 | Elk Mt. | 1997 | Penny & Hartwell | 15 /0.25 ha |
| 9 | Tamihi Creek, E of | 1997 | Penny & Hartwell | 7 /0.1 ha. |
| 10 | Cheam Mt./Chipmunk Creek | 1997 | Fontaine & Hartwell | 1 |

LIMITING FACTORS AND THREATS

Cimicifuga elata has both intrinsic biological limitations, and an uncertain future under current logging regimes in the Pacific Northwest. This combination of limiting factors raises ample concern for its conservation.

Populations of *C. elata* are small, and sporadically distributed over the landscape. Small populations are susceptible to low genetic diversity and imminent extirpation. In addition, *C. elata* is relatively much less attractive to pollinators than other flowering plants, and therefore, receives fewer visits, and has less reproductive success. Further limiting this species is the lack of a specialized seed dispersal mechanism.

In addition to these biological concerns, the increasingly fragmented landscapes of the forests of the Pacific Northwest threaten the continued persistence of *C. elata*. All of the sites in which *C. elata* occurs are managed stands. Natural processes, such as fire and tree disease, that create small canopy gaps and that likely allow *C. elata* to flower and get established in new sites are less frequent events in managed forests (Anonymous, 1996). Instead, managed forests contain small to large clearcuts and roads, which may or may not adequately mimic the natural gaps. On road cuts and in clearcuts there is increased light availability and freshly disturbed mineral soil increasing

¹ *Cimicifuga elata* has likely been extirpated from this site.

the chances for flowering, fruiting, and seedling establishment. Plants growing on road cuts and in clearcuts benefit from the high light levels and display increased vigor. However, road cut habitats may be initially favorable for *C. elata* establishment, but unlike small natural openings in the canopy, may have numerous disruptions that may restrict further recruitment. Roadside maintenance activities such as mowing and spraying could reduce seed production or cause the death of new seedlings (Kaye and Kirkland, 1999).

In addition, short-term survival of adult plants in clearcuts is questionable as forest succession takes place. Kaye and Kirkland (1994) found that populations of *C. elata* were notably absent from young 15-30 year-old managed stands, which was corroborated by field work done by the Conservation Data Centre in British Columbia. In one site where *C. elata* had previously been sighted, the forests have been extensively clearcut several years ago and the current structure was apparently unsuitable. Furthermore, re-colonization back into these sites may be unlikely due to the low reproductive success and poor dispersal ability of this species. In addition, populations on steep slopes may not respond well to clearcutting initially as it disturbs the forest floor and upper soil horizons (Kaye and Kirkland, 1999). Herbivory also increased on plants in clearcuts, along edges and in selectively thinned stands in United States populations.

Cimicifuga elata responds well to the increased light levels of managed forest activities, but may also be threatened by those activities and is definitely threatened by conditions of early forest succession. Therefore, it is likely to be more common in areas that are not extensively clearcut, but instead, have a balance of mature mixed-forest, deciduous stands, small clearcuts, and road cuts, representing a high diversity of different habitats, one of which may be suitable for it during various stages of its life cycle. However, the long-term viability of this species even under the best management regime possible has not been studied and therefore, is an unknown.

SPECIAL SIGNIFICANCE OF THE TAXON

Cimicifuga elata populations in British Columbia represent the northern-most limit of the species in its overall distribution in the Pacific Northwest. A genetic study currently being undertaken in which British Columbia specimens, in addition to United States specimens, will be analyzed may reveal that populations in the north are distinct from populations in the center of the distribution of this species. A genetic study done on seven populations of *C. elata* in Washington and Oregon revealed that the population representing the most southern extent of this species was genetically distinct from the rest of the localities (Evans, 1993). Populations of *C. elata* are relatively small and sporadically distributed, so that the possibility of low genetic diversity and in-breeding depression remain a threat to the long-term persistence of this species. Concern about this issue led to a study on allozyme variation (Evans, 1993). However, Evans (1993) found that allozyme variation was not as low as suggested by principles of genetic theory.

As is the case with other species of *Cimicifuga* being investigated pharmacologically (Shibata *et al.*, 1980), *C. elata* apparently contains active medicinal ingredients. 'Western

black cohosh,' as it is known in the herbal trade, is considered one of the most useful medicinal plants of the Pacific Northwest (Moore, 1993). It is used as an anti-inflammatory, a peripheral vasodilator, an antispasmodic, a sedative, and an estrogenic. *Cimicifuga elata* is known in the horticultural trade, from a limited number of sources; two nurseries, one in Salem, Oregon, and the other one in Clinton, Washington are selling seed.

From an evolutionary standpoint, *Cimicifuga* species represent a relatively primitive and taxonomically isolated genus within the Ranunculaceae (Pellmyr, 1985a). Studies on the plant and pollinator interactions in *Cimicifuga* species can help reveal some information on the evolution of the earliest, herbaceous flowering plants. *Cimicifuga elata* was likely part of the flora of the Pacific Northwest in the Miocene Epoch, 7 to 26 million years before present (Alverson, 1986). Within the genus, *Cimicifuga*, *C. elata* is one of the four nectarless American species (Pellmyr, 1985a). To lack nectar is an ancestral characteristic. The ancestor to this subgrouping was likely similar to *C. elata*, however, it would not have been geitonogamous (selfing). Both out-crossing and selfing characteristics are present in *C. elata*, however, the overall evolutionary trend appears to be toward selfing.

EVALUATION AND PROPOSED STATUS

Existing Protection or Other Status

International status

Cimicifuga elata has been globally ranked by The Nature Conservancy of the US as "G2," or imperiled because of rarity (typically with 6-20 extant sites) or because of some factor(s) making it vulnerable to extirpation or extinction.

National and provincial status

The British Columbia Conservation Data Centre considers *Cimicifuga elata* a Ministry of Environment "Red-listed," or a threatened/endangered taxon (Douglas *et al.*, 1998). This taxon is ranked as an "S2," in British Columbia, or imperiled because of rarity, typically 6-20 extant occurrences or few remaining individuals, or because of some factor(s) making it vulnerable to extirpation or extinction.

Assessment of Status and Authors' Recommendation

Cimicifuga elata has an extremely restricted range in Canada. It is known only from seven extant sites (5 of which are on the same mountain) in the Chilliwack valley in British Columbia where populations are relatively small, consisting of few to 63 plants. In addition, *Cimicifuga elata* is rare throughout its entire range. Over its range it is under heavy logging pressure and it is not known how vulnerable *C. elata* is to forest practices over the long term. For these reasons, in an earlier paper (Penny & Douglas, 1999), the authors recommended that *C. elata* be considered as endangered in Canada. This recommendation remains unchanged for the present status report.

TECHNICAL SUMMARY

DISTRIBUTION

Extent of occurrence: **2075 km²**

Area of occupancy: **<0.11 km²**

POPULATION INFORMATION

Total number of individuals in the Canadian population: **18**

Number of mature reproducing individuals in the Canadian population: **148**

Generation time: **3-6 years to flowering**

Total population trend: **stable**

Rate of decline (if appropriate) for total population: ____% in 10 years or three generations (whichever is longer)

If data are only available for a period shorter than 10 years or three generations, ____% decline in ____ years.

Number of known populations: **8**

Is the total population fragmented? **YES**

number of individuals in smallest population: **1**

number of individuals in largest population: **63**

number of extant sites: **8**

number of historic sites from which species has been extirpated: **1**

Does the species undergo fluctuations in numbers? **unknown**

If yes, what is the maximum number? _____

minimum number? _____

Are these fluctuations greater than one order of magnitude? **YES** **NO**

LIMITING FACTORS AND THREATS

***Cimicifuga elata* occurs in small populations that are sporadically distributed over the landscape, is relatively much less attractive to pollinators than other flowering plants, and lacks any specialized seed dispersal mechanism; habitats are within heavily logged area, much fragmented; Populations of *C. elata* are notably absent from young 15-30 year-old managed stands, a common forest type within its range, and thus likely threatened by some forest management activities.**

RESCUE POTENTIAL

Does the species exist outside Canada? **YES**

Is immigration known or possible? **YES**

Would individuals from the nearest foreign population be adapted to survive in Canada? **YES**

Would sufficient suitable habitat be available for immigrants? **YES**

ACKNOWLEDGEMENTS

We thank Jane Wentworth, King County Noxious Weed Control Program for coming to Canada in September 1996 and re-locating the first plants of *Cimicifuga elata* to be seen in British Columbia since 1957. We also thank Sharon Hartwell and Marie Fontaine for their participation in locating new sites of *C. elata* during 1997 field work. Funding provided by the BC Conservation Data Centre, British Columbia Ministry of Environment, Lands and Parks.

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Collections Examined

Two specimens of *Cimicifuga elata* are housed at the Canadian Museum of Nature (CAN) and one specimen is at the University of British Columbia herbarium (UBC). Nine new collections were made in 1996 and 1997 that have been deposited at the Royal British Columbia Museum (V).

ADDENDUM: Scientific name change for Tall Bugbane

Systematic studies published in 1998 by Compton, Culham and Jury on the reclassification of *Actaea* to include *Cimicifuga* and *Souliea* (Ranunculaceae), as in the paper in *Taxon* 47: 593-634, indicated that species of *Cimicifuga* are best included within the genus *Actaea*. This conclusion is now being widely accepted by taxonomists and horticultural societies. The name *Actaea elata* (Nutt.) Prantl in *Bot. Jahrb.* 9: 246. 1888 is now recognized as the accepted name for *Cimicifuga elata* Nutt.