

TALL BUGBANE

Cimicifuga elata

Original prepared by Jenifer L. Penny

Species Information

Taxonomy

Tall bugbane is in the Ranunculaceae (buttercup) family. It is one of six *Cimicifuga* species in North America. There are no recognized infraspecific taxa. The taxonomy of the *Cimicifuga* genus is currently under review and may be included under the genus *Actaea*, in which case tall bugbane would be referred to as *Actaea elata*.

Description

Perennial, large-leafed understorey plant that stands 1–2 m tall. Stems are branched above and leaves are bi-ternate with 9–17, cordate to ovate, often palmate leaflets, which are usually three-lobed. This species has a dark, tuberous, horizontal rhizome. The inflorescence is a simple to compound raceme with 50–900 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, 9–12 mm long, sessile, appearing singly in the upper flowers, but in two's, and rarely, three's on the lower raceme. Follicles each contain approximately 10 red to purple-brown seeds.

Distribution

Global

Occurs from extreme southwestern British Columbia south to southwestern Oregon. It is rare throughout its entire range in the Pacific Northwest, but is particularly rare in British Columbia.

British Columbia

Only known from 10 sites near Chilliwack, British Columbia.

Forest region and district

Coast: Chilliwack

Ecoprovince and ecosection

COM: EPR, NWC

Biogeoclimatic units

CWH: dm, ms1

Broad ecosystem units

CD, FR

Elevation

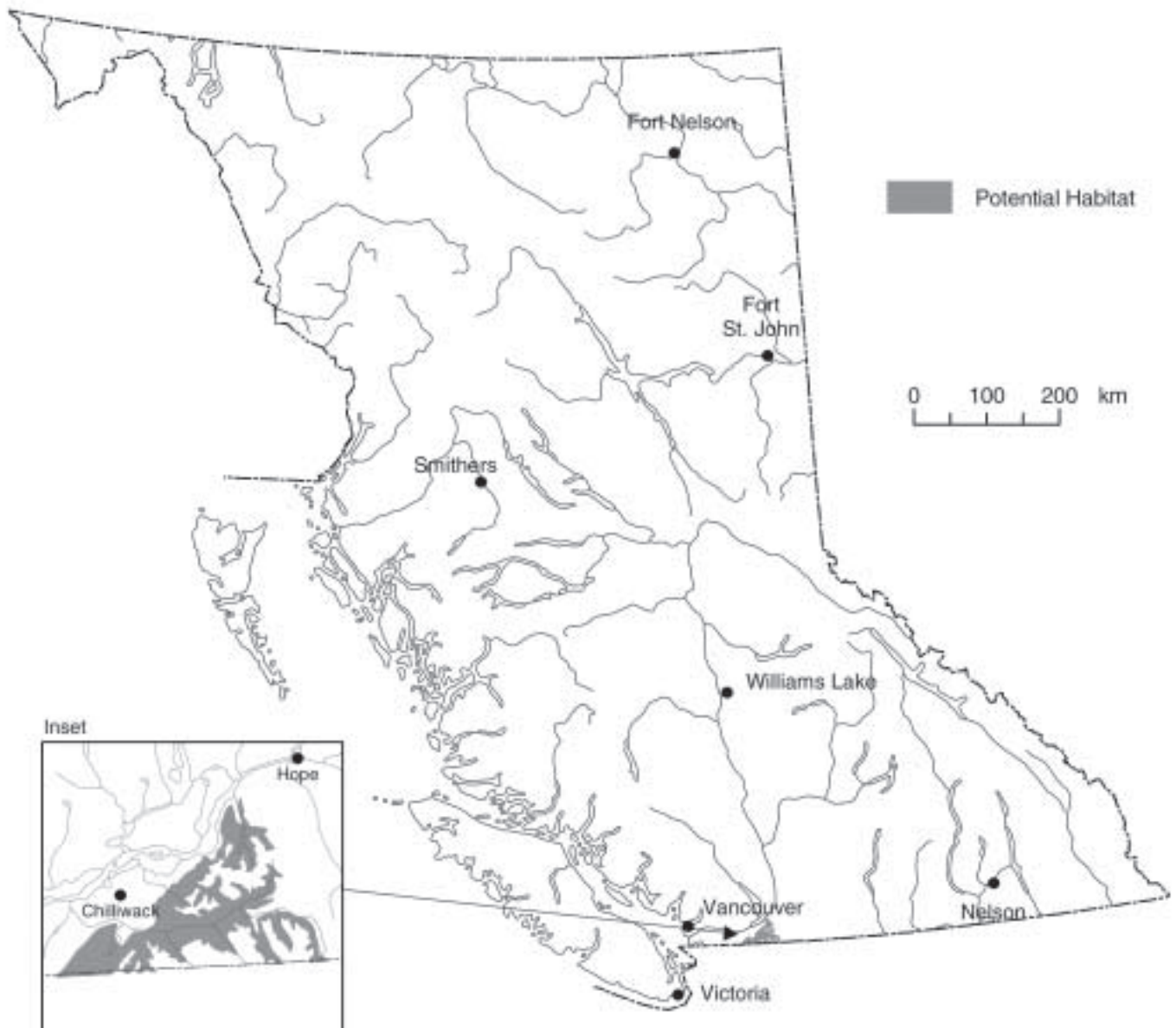
300–1300 m

Life History

Reproduction

Tall bugbane is a herbaceous long-lived perennial understorey plant. Young plants emerge in the spring, produce buds in late spring, and flower mid-June to August. In experiments, Kaye and Kirkland (1994) showed that seeds required cold-stratification for germination and that percentage germination was low. In growth experiments on tall bugbane using ample light, plants grew to reproductive size in 3 years (USDA For. Serv., USDI BLM, and U.S. Army Corps of Engineers 1996). Under less ideal conditions, time to reproductive size could be up to 6 years.

Tall Bugbane (*Cimicifuga elata*)



Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion and Biogeoclimatic) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated.

Dispersal

Seeds are heavy, have no special dispersal mechanism, and are dispersed within a few metres of the parent plant (Kaye and Kirkland 1994; Wentworth 1996).

Habitat

Structural stages

- 1–3: non-vegetated to tall shrub (<15 yr)
- 4–6: pole/sapling to mature forest (70–150 yr)

Important habitats and habitat features

In British Columbia, this species grows in shady, moist, mature (70–150 yr) western redcedar forest, commonly in *Thuja plicata*-*Polystichum munitum*-*Achlys triphylla* communities. This species is nearly always associated with bigleaf maple (*Acer macrophyllum*). In Washington and Oregon, it generally requires a hardwood component in the canopy, subsurface moisture (often provided by creeks or rivers), and occurs on northerly slopes (Kaye and Kirkland 1994). In British Columbia, it has been found on road-cuts, in clearcuts, and in mature forests with strong deciduous components. Plants have also been observed in deciduous stands. Kaye and Kirkland (1999) describe tall bugbane as “light flexible” rather than old growth dependent and shade restricted (Collins et al. 1985).

The deciduous component of mixed forest is important in maintaining optimal light conditions for this species. Deciduous trees species that occur with tall bugbane include bigleaf maple (*Acer macrophyllum*), vine maple (*A. circinatum*), and Douglas maple (*A. glabrum* var. *douglasii*). Bigleaf maple is the most important as it occupies the forest canopy, increasing forest floor light during the spring. Natural canopy gaps provide the opportunity for flowering and establishment of progeny.

In British Columbia, known sites occur on 15–35° slopes with north, southwest, and south aspects. In southern populations (Oregon and Washington), this species nearly always occurs on northern slopes from east to west aspects. This may be an important distinction between northern and southern populations but needs to be confirmed.

Conservation and Management

Status

The tall bugbane is on the provincial *Red List* in British Columbia. It is considered *Endangered* in Canada (COSEWIC 2002).

Summary of ABI status in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	WA	OR	Canada	Global
S1	S2	S2	N2	G2

Trends

Population trends

No long-term studies on population trends have ever been undertaken in British Columbia. However, two of the 10 populations in the Chilliwack River Valley (one of which has not been observed since 1957) appear to have been reduced due to extensive logging at the sites. One population was lost due to the development of a helicopter landing pad. All of the populations are small and sporadically distributed (Penny and Douglas 1999). The southern populations in Oregon tended to be larger (i.e., several hundred to several thousand plants) and have larger and more reproductive plants than northern populations (Kaye 2000). In British Columbia, the largest population is 63 plants (Penny and Douglas 1999).

Habitat trends

The forests of the Pacific Northwest have become increasingly fragmented due to past logging practices. A high proportion of the mature to old forest in the Chilliwack forest district have been converted to young forest, disturbing natural conditions for tall bugbane. Initially, plants respond favourably after logging (clearcuts), but there are several risks to its continued persistence following the initial disturbance.

Threats

Population threats

Populations are small, and sporadically distributed over the landscape. Small populations are susceptible to low genetic diversity and imminent extirpation. In addition, tall bugbane is relatively much less attractive to pollinators than other flowering plants, and therefore, receives less visits, and has less reproductive success. Further limiting this species is the lack of a specialized seed dispersal mechanism. Due to this species' reproductive limitations, colonization into new sites or recolonization into former sites may be limited.

Habitat threats

The main threats to this species are forest harvesting, road construction, and lack of reproductive potential and recruitment (Penny and Douglas 1999; Kaye 2000). This species has been found in both mature forest and clearcuts, but it likely naturally grows in mature to old forest with canopy gaps (Kaye and Kirkland 1994). Clearcuts can provide the necessary conditions for seedling establishment, but the early stages of forest growth may overcome the plants due to intense competition. Thus, although tall bugbane responds favourably to removal of the forest canopy (Kaye and Kirkland 1999), the longer term impacts are unknown.

Plants may also grow on road cuts due to the favourable conditions for seedling germination but these plants may be threatened by roadside maintenance activities such as mowing and spraying which could kill adult plants, reduce seed production, or cause mortality of new seedlings (Kaye and Kirkland 1999).

Tall bugbane has reproductive limitations that make colonization into new sites difficult. It is relatively much less attractive to pollinators than other flowering plants, and lacks any effective seed dispersal mechanism.

Other potential threats include competition with invasive species.

Legal Protection and Habitat Conservation

There is currently no legislation that specifically protects tall bugbane in British Columbia. None of the populations are found in protected areas. However, one population on Vedder Mountain is partially protected within a small wildlife tree retention area and a visual landscape reserve.

Old growth management areas are unlikely to be located in the appropriate locations to meet the needs of this species. Riparian reserves will likewise not be important in protecting this species. This species does not typically grow along watercourses.

Identified Wildlife Provisions

Wildlife habitat area

Goal

Maintain the population and provide adequate space for population to persist as well as maintain a seed source for colonization or recolonization into nearby suitable habitat.

Feature

Establish WHAs at known or historical populations. A population is considered to be a cluster of individuals that are likely interbreeding, that is, they are not separated by any barrier that would restrict reproduction. Large distances could be a barrier, so populations are generally defined by polygons with a radius of no more than 500 m.

Size

Typically between 20 and 40 ha but will depend on site-specific conditions such as size of the population and area covered by population.

Design

The WHA should include a core area and a management zone. The core area is defined using the perimeter of the population plus a 30–50 m band surrounding the population. The management zone should be 150–200 m depending on site-specific characteristics but should be large enough to

preserve the ambient conditions and be windfirm. In some cases a wider management zone may be required on the upslope side of the population to maintain hydrological conditions.

General wildlife measure

Goals

1. Prevent direct mortality from road construction or maintenance activities.
2. Maintain core area as suitable habitat to allow population stability or growth.
3. Maintain microclimatic conditions (i.e., light conditions, soil moisture).
4. Minimize introduction and spread of invasive species.
5. Maintain the diverse stand structural components (e.g., *Acer* spp., canopy gaps).
6. Maintain an open canopy.
7. Maintain hydrological characteristics of core area.

Measures

Access

- Do not construct roads, trails, or stream crossings, particularly upslope of the population.
- Rehabilitate temporary access structures where possible.
- Where roads are determined to be necessary or already exist within WHA, ensure road maintenance practices do not damage or kill plants (i.e., do not mow plants) and use methods to prevent spread of invasive species (i.e., use control measures and seed with native species).

Harvesting and silviculture

- Do not harvest within core area except for treatments aimed at maintaining or improving stand characteristics for this species.
- Use partial harvesting systems in the management zone that maintain 60% basal stem area. Remove 40% basal stem area in small openings with a minimum of only a few crowns per gap.
- Retain *Acer* species, particularly *Acer macrophyllum*. Retain at least 20–30% from inventory distribution.

- Do not salvage unless it can be done without disturbing important structural elements (e.g., *Acer* species).
- Include deciduous species specifically *Acer* species, in the Free Growing standards.
- Use stand tending activities to promote canopy gaps around identified individuals of tall bugbane.

Pesticides

- Do not use pesticides.

Recreation

- Do not develop recreational trails, facilities, or structures within core area.

Additional Management Considerations

Avoid seeding with non-native species within the stand in which the WHA is found.

Avoid foliar or broadcast spraying of herbicides within the stand in which the WHA is found.

Promote persistence of deciduous species, in particular *Acer*, during stand tending activities.

Information Needs

1. Baseline biological and ecological data on tall bugbane in British Columbia.
2. Response of populations of tall bugbane to different logging treatments (i.e., population structure, inflorescence production, and average reproductive plant size) following treatments (done on more southerly populations, but not on Canadian populations).
3. Long-term viability of tall bugbane in managed forests in British Columbia.

Cross References

Coastal Tailed Frog, Marbled Murrelet, Pacific Water Shrew

References Cited

- Collins, B.S., K.P. Dunne, and S.T.A. Pickett. 1985. Responses of forest herbs to canopy gaps. *In* The ecology of natural disturbance and patch dynamics. S.T.A. Pickett and P.S. White (editors). Academic Press, Inc., San Diego, Calif., pp. 217–234.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2002. Canadian Species at Risk. www.speciesatrisk.gc.ca
- Kaye, T. 2000. Population dynamics of tall bugbane and effects of forest management. USDI Bur. Land Manage., U.S. Dep. Agric. For. Serv., and Oreg. Dep. Agric., Plant Conserv. Biol. Program. 29 p.
- Kaye, T. and M. Kirkland. 1994. *Cimicifuga elata*: status, habitat analysis, monitoring, inventory, and effects of timber management. Report prepared for the Oreg. Dep. Agric., Salem, Oreg. Unpubl.
- _____. 1999. Effects of timber harvest on *Cimicifuga elata*, a rare plant of western forests. *Northwest Sci.* 73(3):159–167.
- NatureServe Explorer. 2002. An online encyclopaedia of life. Version 1.6. NatureServe. Arlington, VA. Available at <http://www.natureserve.org/explorer/>
- Penny, J.L. and G.W. Douglas. 1999. Status of the Tall Bugbane, *Cimicifuga elata* (Ranunculaceae) in Canada. *Can. Field-Nat.* 113(3):461–465.
- Wentworth, J. 1996. Report on the status in Washington of *Cimicifuga elata* Nutt. Report prepared for the Wash. Nat. Heritage Program, Olympia, Wash. Unpubl. 44 p.