BC Environment

Status of Scarlet Ammania in British Columbia

by
George W. Douglas

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Ministry of Environment, Lands and Parks
Wildlife Branch
and
Resources Inventory Branch
Victoria, B.C.

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FRONTSPIECE

Ammannia robusta

by Gail F. Harcombe

FOREWORD

In cases where a Wildlife Bulletin is also a species' status report, it may contain a recommended status for the species by the author. This recommendation is the opinion of the author and may not necessarily reflect that of the Wildlife Branch.

Official designation will be made by the Wildlife Branch in consultation with experts, and the data contained in the status report will be considered during the evaluation process.

ABSTRACT

In British Columbia, scarlet ammannia (*Ammannia robusta* Rottb.) is restricted to two sites in the south-central part of the province in the Osoyoos Lake area. Two other sites discovered in 1953 are considered extirpated. The two extant sites represent the northern limit of this species, which extends from British Columbia down through much of the central and western U.S.A. to Mexico and Central America. Population trends and phenological patterns appear to totally depend on seasonal water levels. The continued survival of this species at both sites in B.C. depends on water levels controlled by dams. Given that there is a limited number of populations, and that their persistence is precarious, it is recommended that *A. robusta* be considered Endangered in British Columbia.

ACKNOWLEDGEMENTS

This paper is primarily based on a COSEWIC (Committee on the Status of Endangered Wildlife in Canada) status report by the author. I thank Jenifer Penny for aid in the preparation of this paper. In addition, I thank Chief Clarence Louie of the Osoyoos Indian Band for kindly permitting the author to visit populations on band territory.

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INTRODUCTION

The status report on scarlet ammannia (*Ammannia robusta*[1]) is part of an ongoing program of the British Columbia Ministry of Environment, Lands, and Parks, Wildlife Branch, designed to manage species-at-risk more effectively for long-term viability.

Ammannia belongs to the family, Lythraceae (Loosestrife), which encompasses approximately 21 genera and 500 species (Hitchcock and Cronquist 1961). The family is mainly tropical, but also has a number of temperate members. *Ammannia robusta* is one of four taxa in this genus occurring in North America. Approximately 19 other species of *Ammannia* are known, mainly in tropical regions (Graham 1985). *Ammannia robusta* is the only member of the genus occurring in British Columbia.

This species is an annual with glabrous stems, which are decumbent to erect, simple or branched, and 0.5-10 dm tall. *Ammania robusta* has oblong to oblong-lanceolate, glabrous, opposite, entire leaves which are cordate-clasping at the base and 2-8 cm long. Flowers are three to five, rarely one, in the leaf axils, the hypanthium is globose to campanulate, the stamens and style are exerted beyond the hypanthium, and the petals are deep rose-purple, approximately 3-5 mm long. The fruits are glabrous, globose, usually 4-valved, and 3-5 mm long. *Ammania robusta* is easily mistaken for its close relative, also a member of Lythraceae, *Rotala ramosior*, which grows in the same habitat. Close examination of the plants will reveal that the leaves of *A. robusta* are sessile and clasping at the base, while those of *R. ramosior* gradually taper to a distinct petiole. In addition, *A. robusta* has at least some leaf axils with two or more, usually three to five flowers. *R. ramosior*, rarely has more than a single flower per leaf axil.

Populations of *A. robusta* are threatened by habitat destruction as the result of development and changes in lake level. Concern for this species resulted in the basis for this report, which was provided by a national status report submitted in 1996 to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

GENERAL BIOLOGY

Ammannia is predominantly an autogamous genus, although out-crossing occurs. For example, plants of *A. robusta* have amphidiploid origin, or result from hybridization (Graham 1979). Self-pollination starts at anthesis in this species, with anther dehiscence and stigma receptivity beginning simultaneously when these organs are at the level of the floral tube opening, or slightly exerted (Graham 1985). In *A. robusta*, an abscission layer forms about 1 mm above the base of the style after fertilisation, at which point, the upper style withers and falls away (Graham 1985). *Ammannia robusta* is pollinated by skippers and small bees; these animals seek nectar produced by the thickened glandular area surrounding the base of the ovary (Graham 1985). Plants emerge in summer sometime between late June and July, depending on year-to-year fluctuations. In one instance, plants had not yet emerged in early August.

HABITAT

Description

Ammannia robusta inhabits moist, sandy shorelines or moist or dried, alkaline flats in British Columbia. These sites are submerged early in the year, and plants emerge in the summer when lake levels go down. The composition and dominance of the relatively sparse vegetative cover varies slightly at the two sites known for *A. robusta*. Species composition includes only semi-aquatic species, or species able to withstand early seasonal flooding. At Veronica Lake (local, non-gazetted name), the dominant vegetation includes *R. ramosior*, *A. robusta*, *Scirpus supinus* ssp. *saximontanus,* and *Euphorbia serpyllifolia,* all rare in British Columbia. At Osoyoos Lake, one of the populations is almost solely dominated by *A. robusta* and *Eleocharis acicularis*, whereas the other is dominated by *R. ramosior, A. robusta, Cyperus aristatus* (also rare in British Columbia) and *Eleocharis acicularis*.

[1] Nomenclature follows Douglas *et al.* (1989-1994).

Ecoprovince and Biogeoclimatic Zone

Ecoprovinces — All *A. robusta* occurrences fall in one ecoprovince and one ecosection in British Columbia, the Southern Okanagan Basin (SOB) within the Southern Interior (SOI). The ecoregions of British Columbia have been delineated by Demarchi (1995).

Biogeoclimatic zones — Likewise all occurrences of *A. robusta* in the province fall in one biogeoclimatic zone, the Bunchgrass zone (BG), delineation of which was done by the B.C. Ministry of Forests Research Branch (1992).

DISTRIBUTION

Ammannia robusta ranges from south-central British Columbia south through Nebraska, Minnesota and Ohio to most of the extreme southern U.S.A. and Mexico. It also occurs in tropical Central America (Hitchcock and Cronquist 1961; Douglas *et al*. 1990, Hickman 1993). In British Columbia, it is restricted to the Osoyoos Lake area. Populations have been recorded from Haynes Point, just east of Osoyoos, the Osoyoos Indian Reserve (#1), and Veronica Lake (Figure 1).

POPULATION SIZE AND TRENDS

All of the populations found in British Columbia are in the Osoyoos Lake area of the south-central part of the province (Table 1). Of the four extant (post 1949) sites, two have been recently confirmed. One of the other two sites has definitely been extirpated, while the other is probably extirpated.

Trends in Recently Verified Populations

"Veronica Lake"—This small lake (ca. 10 ha in area) is located approximately 2 km east of Osoyoos Lake and 0.5 km north of the U.S. border in the southern Okanagan Valley. A population of 30 plants was discovered growing about a metre above the lake level on 28 July 1994. Information on population changes at this site are not available. This small population has been observed only once in 1994.

Table 1. *Ammannia robusta* sites in British Columbia.

Collection Site	Last Observation	Collector	Population plant numbers/area observed
Osoyoos Lake, E of Osoyoos	1953	Calder	
Osoyoos Lake, Haynes Point	1953	Calder	
"Veronica Lake"	1994	Douglas	30/3 m_
Osoyoos Lake Indian Reserve (Population #1)	1995	Douglas	150,000+/0.7 ha.
Osoyoos Lake Indian Reserve (Population #2)	1995	Douglas	100/50 m_

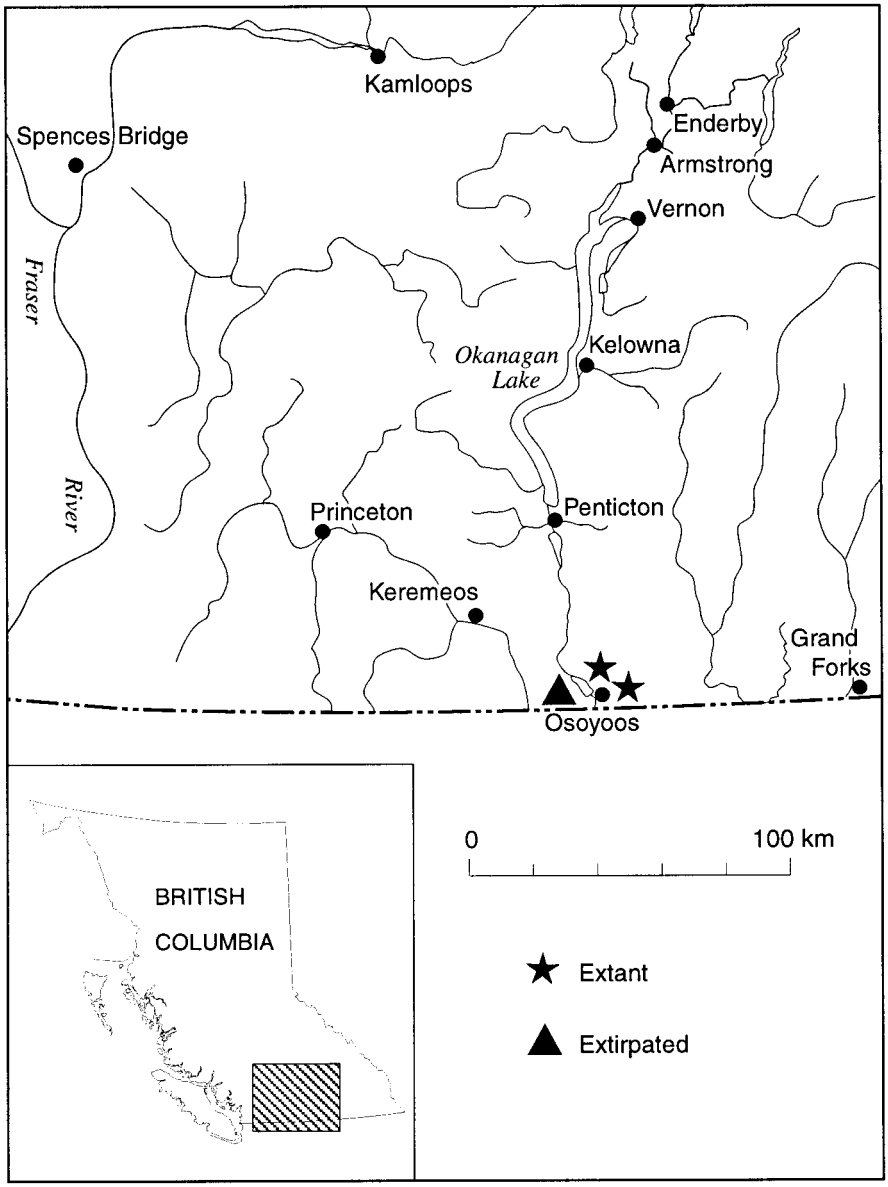

Figure 1. Distribution of *Ammannia robusta* in British Columbia.

Osoyoos Lake Indian Reserve—Two populations of *A. robusta* are located on the eastern shoreline of Osoyoos Lake, approximately 1 km south of Mica Spit.

Population #1 - This population was originally discovered, but not inventoried on 7 September 1993. It is located in a small pond separated from Okanagan Lake by a shallow (0.5 m) sandy ridge. The author visited the site on 27 July and 7 August 1994 but the site was still partially submerged, and *A. robusta* had yet to emerge. On 15 July 1995, 100 plants covering 50 m_ were observed.

Population #2—This population, approximately 100 m east of Population #1, was discovered on July 15, 1995, after an extended period of hot, dry weather. Over 150,000 plants were counted covering an area of approximately 0.7 ha. When this site was visited on August 7, 1994, the entire area was submerged.

The only data on population changes were recorded in 1994 and 1995 at the Osoyoos Lake Indian Reserve #2 site. There is no information available on trends for Population #1. However, Population #2 increased in numbers from 30 to 100 plants and from 3 m_ to 50 m_ from 1994 to 1995. Population changes for this annual species are probably mainly due to lake level changes and the available seed bank areas that vary greatly from year to year.

Extirpated Populations

Osoyoos Lake, Haynes Point — Ammannia robusta was collected at Haynes Point in 1953, whereas, during an extensive inventory of the area in 1991, 1994 and 1995, this species was not found. Since almost all of the potential shoreline sites for this species have been modified by the activities of BC Parks, it is unlikely that this species still persists at this site.

Osoyoos Lake, east of Osoyoos — It is almost certain that this site, discovered in 1953, no longer exists. All potential habitat in this area of Osoyoos Lake has been destroyed by the development of motels.

PROTECTION

Currently there is no specific legislation for the protection of rare and endangered vascular plants in British Columbia. Pending federal endangered species legislation may eventually protect a few special cases. However, most rare vascular plants would not be conserved under this legislation, whereas pending under the *Forest Practices Code of British Columbia*, more species could be protected; red-listed vascular plants may be protected as *Identified Wildlife*.

While populations located in parks are usually protected to a certain extent (although not in the case of Haynes Point Provincial Park), the extant populations of *A. robusta* populations located on the Okanagan Indian Reserve #1 or on private property are highly vulnerable to development or alteration.

Veronica Lake — At this site, the small population of *A. robusta*, probably leads a precarious existence. The water in this small, dammed lake likely represents a highly valuable irrigation resource for the ranch below. If large amounts were taken early in the season, or the dam raised, then it would have a negative effect on this species.

Osoyoos Lake, Okanagan Indian Reserve #1 —The populations at this site are currently in good condition. Their continued existence depends, in part, on the maintenance of the present lake levels across the U.S border. Potential development at the site, especially the recent proposal to build a casino, could easily destroy the populations. Another threat is cattle, ranging on nearby grasslands, that, if allowed access, will trample and browse the unique habitats of the spit. Currently, however, the populations are being conserved by the Indian Band, who have erected a sturdy fence across the neck of the spit. This is an extremely important conservation plan, since 12 Red-listed taxa and two Blue-listed taxa occur at this site. Three of these species, *Aster frondosus*, *Eleocharis atropurpurea,* and *Lipocarpha micrantha* are known

only from this unique enclave in south-central British Columbia.

LIMITING FACTORS

Habitat destruction via development and rising lake levels are the greatest threat to the existing populations of *A. robusta*. Beach enhancement, shoreline housing and commercial development have already led to the destruction of almost all of the potential habitat on Osoyoos Lake. The extant populations, although currently protected by the Osoyoos Lake Indian Band, are under potential threat of rising lake levels. The present lake levels are controlled by a dam at the south end of the lake in the U.S.A. The population at "Veronica" Lake, which is on private property, also depends on lake levels controlled by a dam at the west end of the lake.

SPECIAL SIGNIFICANCE OF THE TAXON

Ammannia robusta is only one of four taxa in the genus of *Ammannia* in North America, and the only member of the genus occurring in British Columbia. The populations in British Columbia represent the northernmost extension of the distribution of the species. *A. robusta* is only found around Osoyoos Lake in south-central British Columbia. It is a semi-aquatic, annual species whose germination depends on lake levels, as is the case with a host of other rare plants that also occur in the same habitat. Populations widely fluctuate from year to year resulting in interesting population trends.

RECOMMENDATIONS AND MANAGEMENT OPTIONS

Rehabilitation or Reintroduction Efforts

There have been no attempts to reintroduce *A. robusta* into suitable potential habitat in other areas. Since the habitat of this species, especially the moist, sandy, lakeshore habitat, is quite uniform and readily available in the southern Okanagan Valley, it likely would not be difficult to establish new populations. Disturbance that causes changes in lake levels should be avoided to preserve populations.

EVALUATION

Globally, *A. robusta* is ranked as G5 by The Nature Conservancy of the U.S. This ranking indicates that, on a global scale, the plant is considered "frequent to common to very common; demonstrably secure and essentially ineradicable under present conditions."

Provincially, *A. robusta* is ranked by the British Columbia Conservation Data Centre (British Columbia Ministry of Environment, Lands and Parks) as S1 (Douglas *et al.* 1998), which indicates that this species is "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 taxon has also been placed on the Red list (Douglas *et al.* 1998). This is the most critical status that can be applied to a species at the provincial level.

Status Recommendations

Ammannia robusta should be ranked as Endangered in British Columbia for the following reasons:

1. *Ammannia robusta* populations in British Columbia are few in number and only one population has a substantial number of individuals.

2. In British Columbia, *A. robusta* is limited to the southern Okanagan Valley. Both sites are at risk either by lake level changes or potential development.

3. *Ammannia robusta* in British Columbia represents the northern limits of this taxon and may represent populations that are genetically distinct to those found elsewhere.

Prognosis

The prognosis for this species is only fair. At both known extant sites there is no assurance of the long-term viability of the populations. The limited number of individuals could also reduce the potential for genetic variation, which may be necessary to respond to environmental changes in the future.

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