Foreshore Plant Species at Risk Inventory, Osoyoos Lake, BC

Short-rayed Alkali Aster (SARA Endangered) along west side of Osoyoos Lake Sept. 14, 2009 (T. McIntosh).

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Proponent:
Terry McIntosh Ph.D.
3-1175 E. 14th Ave.
Vancouver, BC.
V5T 2P2

Prepared for:
Kristina Robbins
BC Ministry of Environment
102 Industrial Place
Penticton, BC
V2A 7C8

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1. Introduction

The BC Ministry of Environment (MOE) has developed an Okanagan Region Large Lakes Foreshore Protocol that identifies sensitive foreshore areas and outlines requirements, based on risk, for activities below the high water mark. This protocol allows for options to provide legal habitat protection for species at risk that occur below the high water mark. The BC Ministry of Environment has identified the following plant species as priority species to incorporate into the protocol for Osoyoos Lake:

1. scarlet ammannia (*Ammannia robusta*)
2. toothcup (*Rotala ramosior*), and
3. small-flowered lipocarpha (*Lipocarpha micrantha*)

These three plant species are listed by the *Species at Risk Act* (SARA) as Endangered. They are also on the Red List provided by the British Columbia Conservation Data Center (CDC) and are high priority species under the provincial Conservation Framework (available at: www.env.gov.bc.ca/conservationframework). The BC Ministry of Environment requires inventory data for these plant species in order to accurately identify current and potential distribution along the foreshore of Osoyoos Lake. Occurrence records and areas of potential habitat will be used to establish sensitive foreshore area zones and provide habitat protection through the Large Lakes Foreshore Protocol.

The main objectives of this study are to:

1. Complete a reconnaissance inventory of the three priority plant species: scarlet ammannia, toothcup, and small-flowered lipocarpha. Inventory will cover approximately 25 km of foreshore along Osoyoos Lake and will be restricted to privately owned lands.
2. Complete observation records on the Conservation Data Centre's Rare Plant Observation Form or Spreadsheet for all occurrences of the three priority plant species and any other foreshore CDC Red or Blue Listed plants incidentally observed during field work.
3. Provide digital photographs of the species, location, and habitat for each occurrence record. Location and habitat photographs are required for sites identified with potential habitat.
4. Record a track log of all areas surveyed and document search effort (number of people and duration).
5. Document and describe all areas with high potential habitat. Record a GPS line feature (or start and end points).
6. Produce a brief written report summarizing the above tasks including inventory methods, results, and recommendations.
7. Provide all data, forms, photographs, and GPS track logs to Kristina Robbins in digital format by October 23, 2009.

2. Methods

Surveys of the foreshore areas along Osoyoos Lake were completed from September 14th to 17th, 2009. Terry McIntosh PhD (botanist) was accompanied by MOE staff personnel Kristina Robbins (on the 14th and 16th) and Kirk Safford (on the 14th, 15th, and 17th) during the survey period. A small flat-bottomed boat was used on the first three days and a walking survey of the Hayne's Point shorelines and associated wetlands was completed on September 17th. The surveys took approximately 46 person hours.

During the surveys, shorelines north of the Canada – United States border were visually surveyed from the boat, and walking surveys were completed along foreshores in areas that appeared, from the boat, to have potential habitat for rare plant species. When rare plants were encountered, population, threat, and habitat data were gathered. Locations of rare plant observations were recorded in UTMs (NAD83) using a Garmin GPS unit. Information about these species was entered into the CDC Rare Plant Observation Spreadsheet.

High potential foreshore habitat was qualitatively determined by T. McIntosh (based on experience in other habitats along the Osoyoos Lake shorelines where the three rare plant species are present). Potential habitat was determined based on the conditions present at each foreshore habitat/site. High potential foreshore habitat was qualitatively determined using the following attributes:

1. relatively undisturbed (i.e., by human activities),
2. mostly open and with low cover of exotic plant species,
3. minimal wave action,
4. composed of 'natural' sands and gravels (i.e., not placed there by landowners), and
5. with a low, less than 5 degree, slope to the water.

High potential foreshore habitat can be present even if rare plants are absent since there is a potential for their seeds to have survived in these habitats (seeds of annual plants can survive for many years, germinating when conditions are appropriate).

Locations of high potential foreshore habitat were recorded using a Garmin GPS unit and were marked as linear features later, using Google Earth and aerial photographs.

Field data, including associated photographs, for selected observation points and rare species have been recorded in an Excel file and this file, along with a complete set of photographs, accompanied this report.

3. Results and Discussion

3.1 Rare Plants

No observations of the three target rare plant species, scarlet ammannia, toothcup, or small-flowered lipocarpha, were made during the surveys. However, four other rare plant species were observed, two CDC Red Listed Species, short-rayed alkali aster (*Symphyotrichum frondosum*) and bushy cinquefoil (*Potentilla paradoxa*), and two Blue Listed species, thyme-leaved spurge (*Chamaesyce serpyllifolia* ssp. *serpyllifolia*) and

awned cyperus (*Cyperus squarrosus*). Another Red Listed species, peachleaf willow (*Salix amygdaloides*), may be present, but was not confirmed in 2009 because flowers and fruit were absent and the leaves were unusually large, although other leaf characteristics indicated this species. Table 1 lists and provides distribution data of the rare plant species observed along the Osoyoos Lake foreshore in 2009.

The Willow Beach area along the north end of Osoyoos Lake was visited (Potential Foreshore Habitat Site #8, Table 2) on September 16, 2009. In 2007, a few plants of small-flowered lipocarpha was observed at the east end of this area during a survey for the landowner in preparation for a development application. Four the species listed in Table 1 were also observed at this site in 2007; peachleaf willow was absent. Although thyme-leaved spurge and awned cyperus, with much lower numbers of plants than in 2007, were observed in 2009, small-flowered lipocarpha, bushy cinquefoil, and short-rayed alkali aster were not observed at this site in 2009, and appear extirpated. Non-native invasive plants have almost completely covered the previously open beach where small-flowered lipocarpha was observed in 2007, and the portion of the foreshore where the other species were observed had been washed away by waves (probably as a result of the unusually high water levels in September, 2009).

Table 1. Rare plant species observed along the Osoyoos Lake foreshore in 2009.

Species	**Conservation Status**	**Distribution and Notes** Waypoint (WP) data found in accompanying Excel file
1. *Chamaesyce serpyllifolia* ssp. *serpyllifolia* (thyme-leaved spurge); Fig. 1.	CDC Blue List	common, and abundant at some sites (a few observations were not recorded); observed at 23 sites: WP57 (>1000 plants), WP65 (<5 plants), WP72 (>50 plants), WP73 (>200 plants), WP74 (>20 plants), WP75 (<5 plants), WP78 (>1000 plants), WP79 (>10 plants), WP80 (>10 plants), WP83 (<5 plants), WP84 (<5 plants), WP86 (>30 plants), WP88 (>100 plants), WP89 (>5 plants), WP90 (>20 plants), WP95 (<5 plants), WP103 (<5 plants), WP106 (3 plants), WP117 (>50 plants), WP118 (20 plants), WP120 (4 plants), WP125 (<5 plants), WP147 (1 plant)
2. *Cyperus squarrosus* (awned cyperus); Fig. 2.	CDC Blue List	common, and abundant at a few sites; observed at 14 sites: WP53 (>1000 plants), WP72 (2 plants), WP73 (6 plants), WP74 (>20 plants), WP78 (>100 plants), WP79 (>40 plants), WP80 (>60 plants), WP82 (24 plants), WP88 (>200 plants), WP89 (>35 plants), WP90 (>35 plants), WP93 (3 plants), WP125 (>200 plants), WP127 (1 plant)
3. *Potentilla paradoxa (*bushy cinquefoil); no photo.	CDC Red List	rare; observed at 1 site: WP53 (1 plant; small, juvenile and non-flowering plant)
4. *Salix* ? *amygdaloides* (peachleaf willow); no photo.	CDC Red List	rare; possibly observed at 2 sites: WP77 (possibly 2 plants) and WP145 (1 plant)
5. *Symphyotrichum frondosum* (short-rayed alkali aster); front cover photo and Fig. 3.	CDC Red List SARA Endangered	rare; observed at 2 sites: WP42 (3 plants), WP43 (1 plant; same beach as WP42; plants all low-growing, probably kept low through human walking/mowing activities as site is near a trailer park, and through grazing by ducks and Canada geese), WP53 (23 plants)

Figure 1. Thyme-leaved spurge (September 14, 2009; T. McIntosh).

Figure 2. Awned cyperus growing with thyme-leaved spurge (September 14, 2009; T. McIntosh).

Figure 3. Short-rayed alkali aster (September 14, 2009; T. McIntosh).

3.2 Potential Foreshore Habitat

Scarlet Ammannia and Toothcup

Potential foreshore habitat was not observed for either scarlet ammannia or toothcup. To date, scarlet ammannia and toothcup have only been observed on seasonally wet flats or alongside seasonally ponded depressions that are separated by low, usually broad dune systems from the lake shorelines. Neither species has been observed in or near the foreshore habitat. It is likely that the two species require either calmer conditions for establishment than are found along wave-modified and more active shorelines, or require different soil or other unknown habitat conditions that are present in their typical inshore habitats. These flats and depressions were more common in the past along some parts of Osoyoos Lake. At present, except for some protected ponds along the east side of Osoyoos Lake on private property and in the Willow Beach area at the north end of Osoyoos Lake, these inshore habitats have been lost through development. Figure 4 shows the early town of Osoyoos, probably from around 1925 (M. Sarrell, pers. comm. 2009). The photograph also shows the Osoyoos spit and two large ponded areas (A and B on the photograph). Figure 5 shows the same area as Fig. 4 in 2002. As can be observed, the build-up of the City of Osoyoos has permanently altered the two large ponds. One collection of scarlet ammannia was made alongside a seasonally ponded depression in the 1930's, probably at B in Fig. 4, but has undoubtedly been lost because this pond had been deepened and buildings built along the shoreline. This site was visited in 2009 and no habitat favoured by these two species remains.

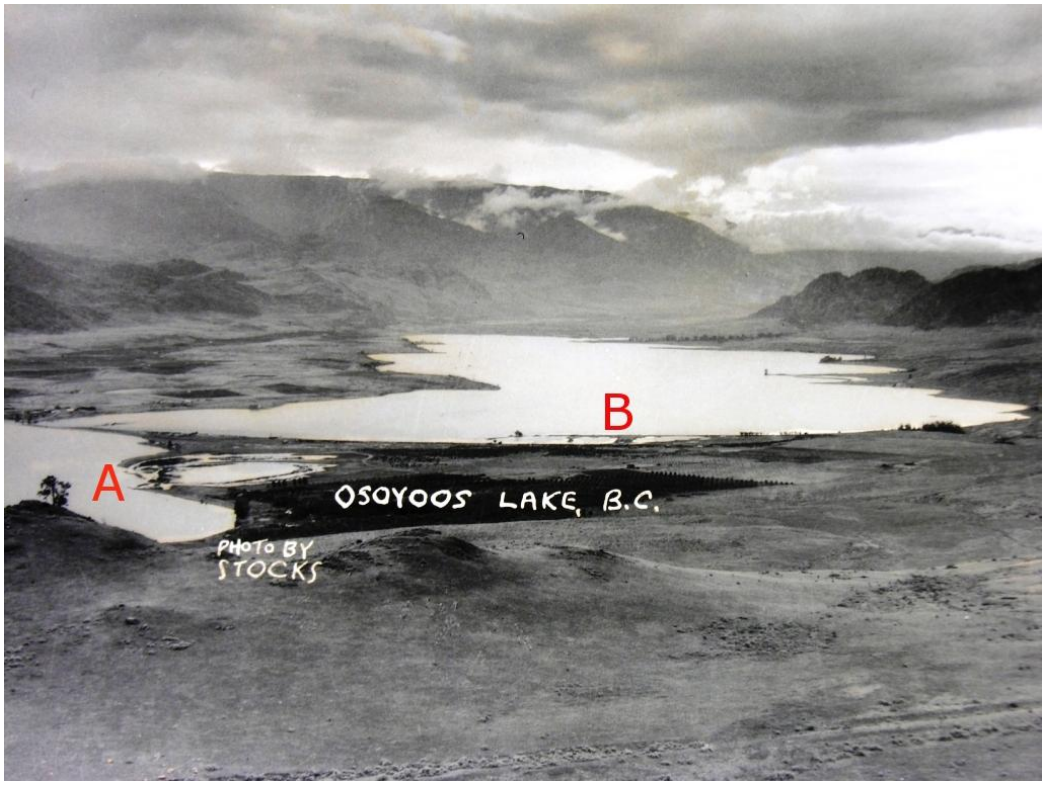

Figure 4. A view of Osoyoos and part of Osoyoos Lake circa 1925 showing large ponded areas to the east of the long spit A and B (photographer unknown).

Figure 5. A view of Osoyoos and part of Osoyoos Lake in 2002 showing development around the two ponded areas; the ponded area to the right has had many more buildings constructed along it since 2002 (T. McIntosh).

Small-flowered Lipocarpha

During the 2009 survey, high potential foreshore habitat for small-flowered lipocarpha was observed at nine sites along Osoyoos Lake (Table 2). In contrast to scarlet ammannia and toothcup, small-flowered lipocarpha is almost always observed in open, drier, sand-rich sites along the edges of Osoyoos Lake and Okanagan Lake. It has been observed in large numbers along the shorelines and within the low dune habitats on the east side of the lake on private property, but has only been found once recently outside of these private lands along sandy, low dunes in the Willow Beach area. High potential habitat for this species is lacking along most of the western shore of the lake north of Osoyoos because gravels and/or vegetation dominates much of the shoreline. In addition, invasive species, in particular reed canary grass, dominate shorelines alongside many parts of the lake and have eliminated potential habitat. Human-related shoreline modifications including concrete or stone walls, docks, and placement of gravels, as well as manicuring activities (e.g., raking) have reduced or eliminated potential habitat along many sections of the lake.

Table 2. Locations and descriptions of high potential foreshore habitat for small-flowered lipocarpha along Osoyoos Lake (2009).

High Potential Foreshore Habitat Site Number	Location (approximate UTMs; all in 11U)	Description
1	320226/5430387 to 320270/5430434	fairly large sandy, partially gravelly beach; grazed (Canada geese and ducks); also some exotic grasses; mowed and groomed at some point, some human trampling and pea gravel added (Photos 1327-1340)
2	320500/5431481 to 320560/5431513	relatively even, sandy beach with few exotic species, slightly groomed (Photos 1348-1349)
3	320680/5431734 to 320645/5431735	sandy beach along a spit and inlet area; mostly undisturbed and close to what would be determined ‘natural’; inshore and foreshore rich in native and rare plant species (Photos 1351-1365)
4	321815/5432226 to 321852/5432165	long, even beach composed of sandy and gravelly stretches; a few introduced species (Photos 1383-1386)
5	321720/5430892 to 321710/5430870	vegetated (mostly native species), sandy beach; partially mowed (Photos 1395)
6	320294/5432055 to 320141/5432054	sandy beach; not cleaned or raked; some exotic species along edge and above foreshore (Photos 1413-1414)
7	319569/5433330 to	sandy beach in park in W side of Osoyoos; grass is regularly cut here; some grazing by ducks and

	319609/5433325	geese (Photos 1435-1437)
8	315716/5438975 to 315445/5438641	sandy, somewhat gravelly beach along N end of Osoyoos Lake (formerly Willow Beach camping area); although some small portions of this beach may not be good habitat, most of it is; manicured in past but not recently; some exotic species; (Photos 1483-1504)
9	320647/5432094 to 320672/5432110	sandy, somewhat gravelly beach along S side of Haynes Point (Photos 016-017)

4. Recommendations

1. In 2009, relatively few rare plants were observed along the Osoyoos Lake foreshores. However, because of natural perturbations, the potential for annual artificial lake level fluctuations, and variations in foreshore management or use by the landowners, conditions may change at any site from year to year. Also, many rare species, including all of the species listed in Table 1 except for peachleaf willow, are annual species and seeds, even though present, may lay dormant in the soil for many years, germinating only when conditions are favorable. Therefore, it is recommended that additional foreshore inspections be completed before development is authorized at sites containing high potential foreshore habitat as defined in Section 2.
2. Most, if not all, property owners along Osoyoos Lake are unaware that rare plant species are or may be present along the shorelines of their properties. Stewardship is a key component in conservation work. Therefore, it is recommended that landowners with rare species or with high potential habitat on their property be contacted with respect to their interest in protection or management of the resident species or habitat, and about the potential for restoration work in these habitats on their properties.
3. One species, peachleaf willow, was not confirmed in 2009, but is suspected to be present at two sites. Therefore, it is recommended that a botanist familiar with this species visit the two sites in the late spring when it would be in flower, and attempt to confirm this tentative identification.
4. It is recommended that this report be made available to contractors and other interested parties who plan to build or modify foreshore areas alongside Osoyoos Lake.