



# Okanagan Foreshore Plant Species at Risk

## Identifying Species and Habitat

September 12/13, 2018

Presented by:

**Josie Symonds, Ecosystems Biologist &  
Terry Malotich, Botanist/Consultant**

Presented for:

**2018 Foreshore Plant SAR ID and Survey Workshop  
Summerland, B.C.**

# Presentation Outline



1. Introduction to Okanagan Foreshore Plant Species at Risk
2. Recognizing Foreshore Plant SAR Habitat
3. Identifying Key Foreshore Plant SAR
4. Available Resources

# Introduction to Okanagan Foreshore Plant Species at Risk

# Introduction to Foreshore Plant SAR

## What are Species and Ecosystems at Risk (SEAR)?

“At risk”

Endangered

Special concern

Rare

Red-listed



Identified Wildlife

Blue-listed



Threatened

“Of management concern”

Imperilled

# Introduction to Foreshore Plant SAR

## What are Species and Ecosystems at Risk?

### Global

- NatureServe Global Conservation Status (G1-G5)

### Canada

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC)
- *Species at Risk Act* (SARA)

### British Columbia

- BC Conservation Data Centre (CDC)
- BC Conservation Framework



# Introduction to Foreshore Plant SAR

## COSEWIC and SARA

- **Endangered (E):** A species facing imminent extirpation or extinction
- **Threatened (T):** A species that is likely to become endangered if limiting factors are not reversed
- **Special Concern (SC):** A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events

*Federal cabinet reviews COSEWIC lists and makes SARA decision*

*Limited to species (no ecosystems)*



Small-flowered Lipocarpha  
COSEWIC: E (2002) / SARA: 1-E (2005)



Short-rayed Aster  
COSEWIC: E (2006) / SARA: 1-E (2007)

# Introduction to Foreshore Plant SAR



## British Columbia Conservation Data Centre

- **Red-listed**: Includes any indigenous species or subspecies or ecological community that have, or are candidates for, Extirpated, Endangered, or Threatened status in BC
- **Blue-listed**: Includes any indigenous species or subspecies or ecological community considered to be of Special Concern in BC



©Terry McIntosh

**Red-listed** Hairy Water-clover



©Ole Westby

**Yellow-Listed** Blue Vervain



©Josie Symonds

**Red-listed** Alkali Saltgrass Herbaceous

# Introduction to Foreshore Plant SAR

## BC Conservation Framework

Species are assigned a Priority (1-5) under each Goal:

- **Goal 1:** Contribute to global efforts for species & ecosystem conservation
- **Goal 2:** Prevent species & ecosystems from becoming at risk
- **Goal 3:** Maintain the diversity of native species & ecosystems

Species are then assigned Conservation Actions to address Goal ➡

### Action Groups

#### Assessing

- Review Status Rank
- Compile Status Report
- Inventory
- Monitor Trends
- Review Taxonomy and Classification

#### Planning and Listing

- Planning
- Send to COSEWIC \*
- List Under *Wildlife Act* \*

#### Acting

- Ecosystem and Habitat Protection
- Ecosystem and Habitat Restoration
- Private Land Stewardship
- Species and Population Management \*
- Review Resource Use
- No New Action

\* indicates the action is only applicable to species.



# Introduction to Foreshore Plant SAR

## Thompson Okanagan Region SEAR

- TOR has a disproportional amount of SEAR:
  - Animals: 136 of 436 (31%) Red/Blue
  - Plants: 199 of 864 (23%) Red/Blue
  - Ecological Communities: 172 of 346 (50%) Red/Blue

### Foreshore Plant SAR

- 37 (19%) of TOR Plants
- BC CDC: 13 Red, 24 Blue
- SARA: 4 Endangered, 1 Threatened

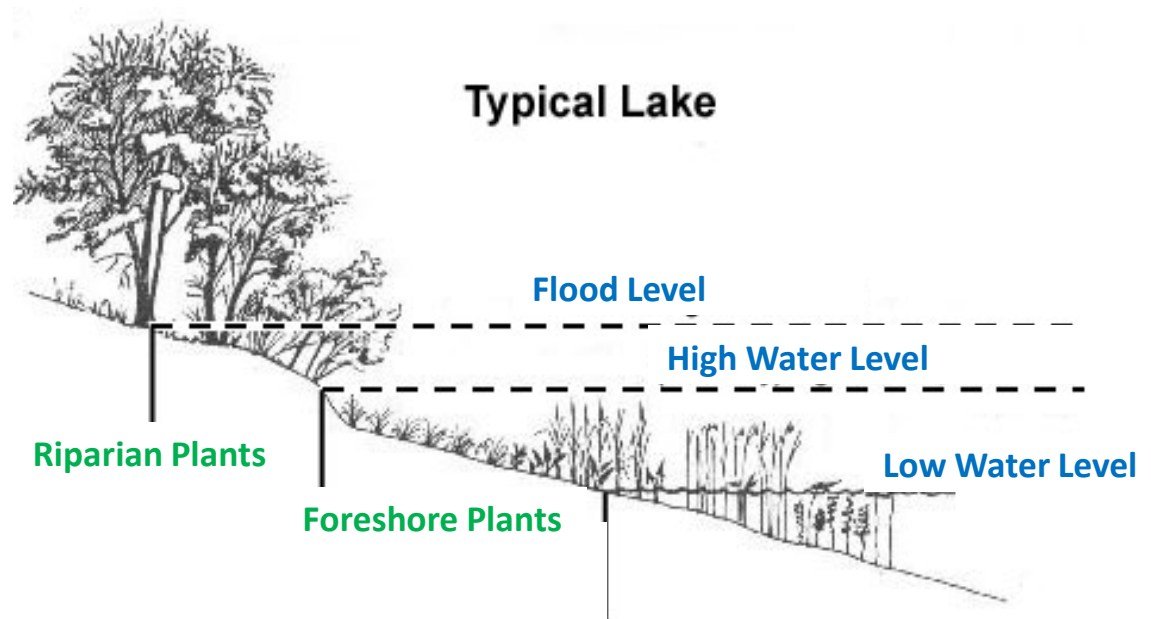


# Introduction to Foreshore Plant SAR

## Defining “Foreshore” Plant SAR

### Foreshore

- Part of shore between high and low water levels
- Typically describing lakeshore species
- Generally small annuals
- Group also includes some riparian plants



Modified from: DFO, <http://www.pac.dfo-mpo.gc.ca/habitat/Glossary-glossaire-eng.htm>

# Introduction to Foreshore Plant SAR

## Okanagan Foreshore Plant SAR

Scientific Name <sup>1,2</sup>	Common Name	Family	Status <sup>3</sup>
<i>Ammannia robusta</i>	scarlet ammannia	Lythraceae	Red / E
<i>Bidens vulgata</i>	tall beggarticks	Asteraceae	Blue
<i>Carex comosa</i>	bearded sedge	Cyperaceae	Blue
<i>Carex hystericina</i>	porcupine sedge	Cyperaceae	Blue
<i>Cyperus erythrorhizos</i>	red-rooted cyperus	Cyperaceae	Blue
<i>Elatine rubella</i>	three-flowered waterwort	Elatinaceae	Blue
<i>Eleocharis coloradoensis</i>	dwarf spike-rush	Cyperaceae	Red
<i>Eleocharis engelmannii</i>	Englemann's spike-rush	Cyperaceae	Red
<i>Eleocharis geniculata</i>	bent spike-rush	Cyperaceae	Red / E
<i>Eleocharis ovata</i>	ovate spike-rush	Cyperaceae	Blue
<i>Limosella acaulis</i>	Owyhee mudwort	Scrophulariaceae	Red
<i>Lindernia dubia</i> var. <i>anagallidea</i>	false-pimpernel	Scrophulariaceae	Blue
<i>Lindernia dubia</i> var. <i>dubia</i>	yellowseed false-pimpernel	Scrophulariaceae	Red
<i>Lipocarpa micrantha</i>	small-flowered lipocarpa	Cyperaceae	Red / E
<i>Potentilla supina</i> ssp. <i>paradoxa</i>	bushy cinquefoil	Rosaceae	Blue
<i>Rotala ramosior</i>	toothcup	Lythraceae	Red / E
<i>Salix amygdaloides</i>	peach-leaf willow	Salicaceae	Blue
<i>Schoenoplectus saximontanus</i>	Rocky Mountain clubrush	Cyperaceae	Red
<i>Symphotrichum frondosum</i>	short-rayed aster	Asteraceae	Red / E
<i>Verbena hastata</i>	blue vervain	Verbenaceae	Blue



# Introduction to Foreshore Plant SAR

## Okanagan Foreshore Plant SAR

Scientific Name <sup>1,2</sup>	Common Name	Family	Status <sup>3</sup>
<i>Ammannia robusta</i>	scarlet ammannia	Lythraceae	Red / E
<i>Bidens vulgata</i>	tall beggarticks	Asteraceae	Blue
<del><i>Carex comosa</i></del>	<del>bearded sedge</del>	<del>Cyperaceae</del>	<del>Blue</del> ↓ 2018
<i>Carex hystericina</i>	porcupine sedge	Cyperaceae	Blue
<i>Cyperus erythrorhizos</i>	red-rooted cyperus	Cyperaceae	Blue
<del><i>Eiatine rubella</i></del>	<del>three-flowered waterwort</del>	<del>Elatinaceae</del>	<del>Blue</del> ↓ 2018
<i>Eleocharis coloradoensis</i>	dwarf spike-rush	Cyperaceae	Red ↓ 2018
<i>Eleocharis engelmannii</i>	Englemann's spike-rush	Cyperaceae	Red
<i>Eleocharis geniculata</i>	bent spike-rush	Cyperaceae	Red / E
<i>Eleocharis ovata</i>	ovate spike-rush	Cyperaceae	Blue
<i>Limosella acaulis</i>	Owyhee mudwort	Scrophulariaceae	Red ↓ 2018
<del><i>Lindernia dubia</i> var. <i>anagallidea</i></del>	<del>false pimpernel</del>	<del>Scrophulariaceae</del>	<del>Blue</del> ↓ 2018
<i>Lindernia dubia</i> var. <i>dubia</i>	yellowseed false-pimpernel	Scrophulariaceae	Red ↓ 2018
<i>Lipocarpa micrantha</i>	small-flowered lipocarpa	Cyperaceae	Red / E
<i>Potentilla supina</i> ssp. <i>paradoxa</i>	bushy cinquefoil	Rosaceae	Blue
<i>Rotala ramosior</i>	toothcup	Lythraceae	Red / E
<i>Salix amygdaloides</i>	peach-leaf willow	Salicaceae	Blue
<i>Schoenoplectus saximontanus</i>	Rocky Mountain clubrush	Cyperaceae	Red
<i>Symphotrichum frondosum</i>	short-rayed aster	Asteraceae	Red / E
<del><i>Verbena hastata</i></del>	<del>blue vervain</del>	<del>Verbenaceae</del>	<del>Blue</del> ↓ 2018

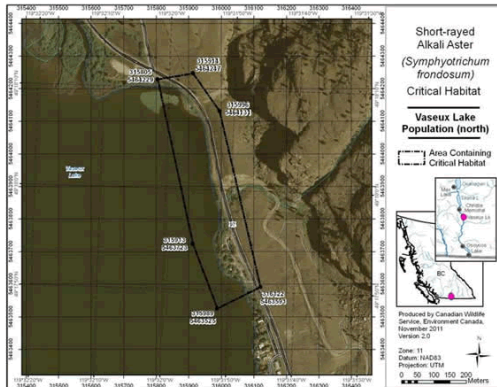


# Introduction to Foreshore Plant SAR

## Why focus on Okanagan Foreshore Plant SAR?



- Multi-species/ecosystems approach
- Area of high development pressure in Okanagan (threats-based)
- Regional interest in these habitat types (e.g., OBWB)
- Critical Habitat first designated for species in this group
- Legislative control under *Water Sustainability Act* and RAR
- Potentially affected by FLNRORD decisions (e.g., land development, moorage, dams, grazing)



# Introduction to Foreshore Plant SAR

## Why focus on Okanagan Foreshore Plant SAR? (cont.)

- For many of these species:
  - Inventory efforts have been low (65% with Inventory as CF Action)
  - Harder to identify (small, relatively obscure, sedge family)
- Existing guidance for foreshore developments
- Plant SAR identified by QPs as the top species group requiring field workshops in Okanagan
- Assists professionals in meeting government, association and proponent expectations

### Action Groups

#### Assessing

- Review Status Rank
- Compile Status Report
- Inventory
- Monitor Trends
- Review Taxonomy and Classification

#### Planning and Listing

- Planning
- Send to COSEWIC \*
- List Under *Wildlife Act* \*

#### Acting

- Ecosystem and Habitat Protection
- Ecosystem and Habitat Restoration
- Private Land Stewardship
- Species and Population Management \*
- Review Resource Use
- No New Action

# Recognizing Foreshore Plant SAR Habitat

# Recognizing Foreshore Plant SAR Habitat

## General Plant Characteristics that Dictate Habitat



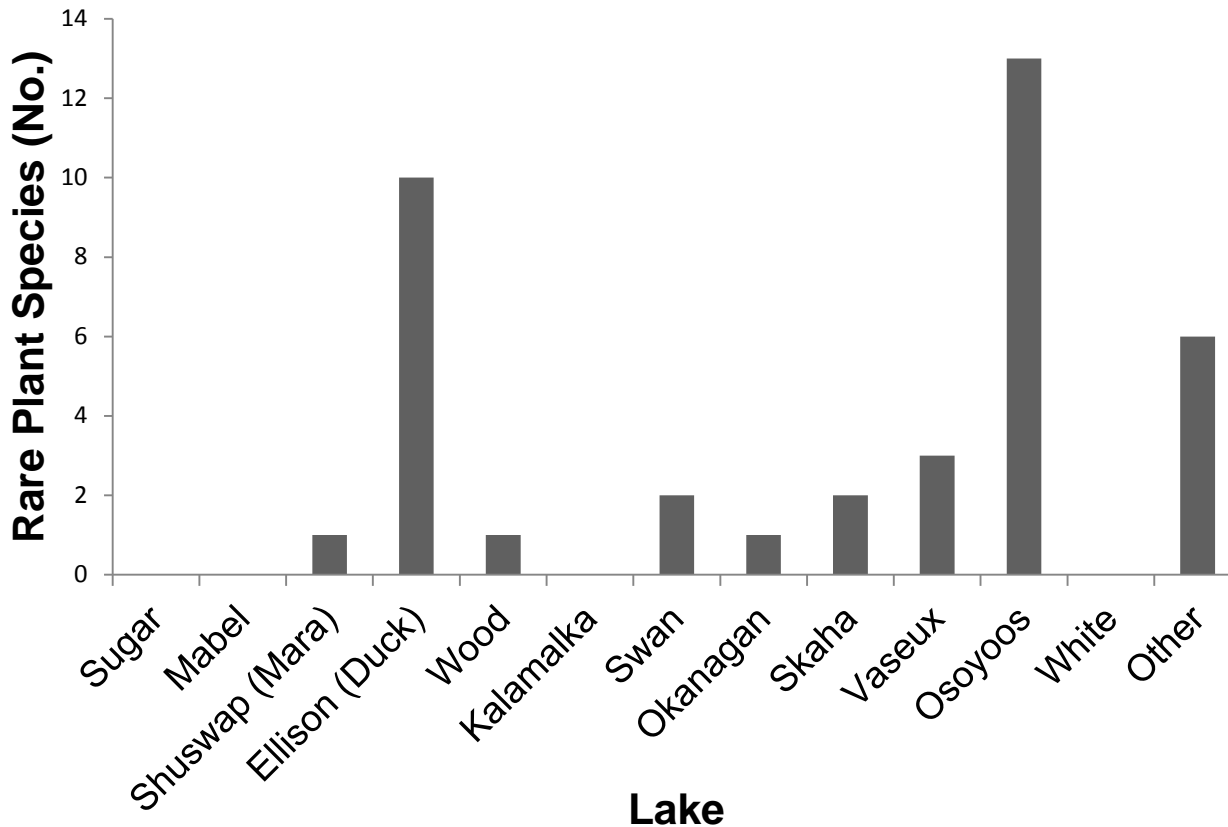
- Typically small annual species that grows each year from seed
- Typically do not reproduce vegetatively, so population survival depends on seeds and seed bank
- Generally have low competitive ability – need open substrate
- Germination and development depends on the recession of spring high water levels
- May not appear in some years due to persistent high water levels





# Recognizing Foreshore Plant SAR Habitat

## Where are they found in the Okanagan?



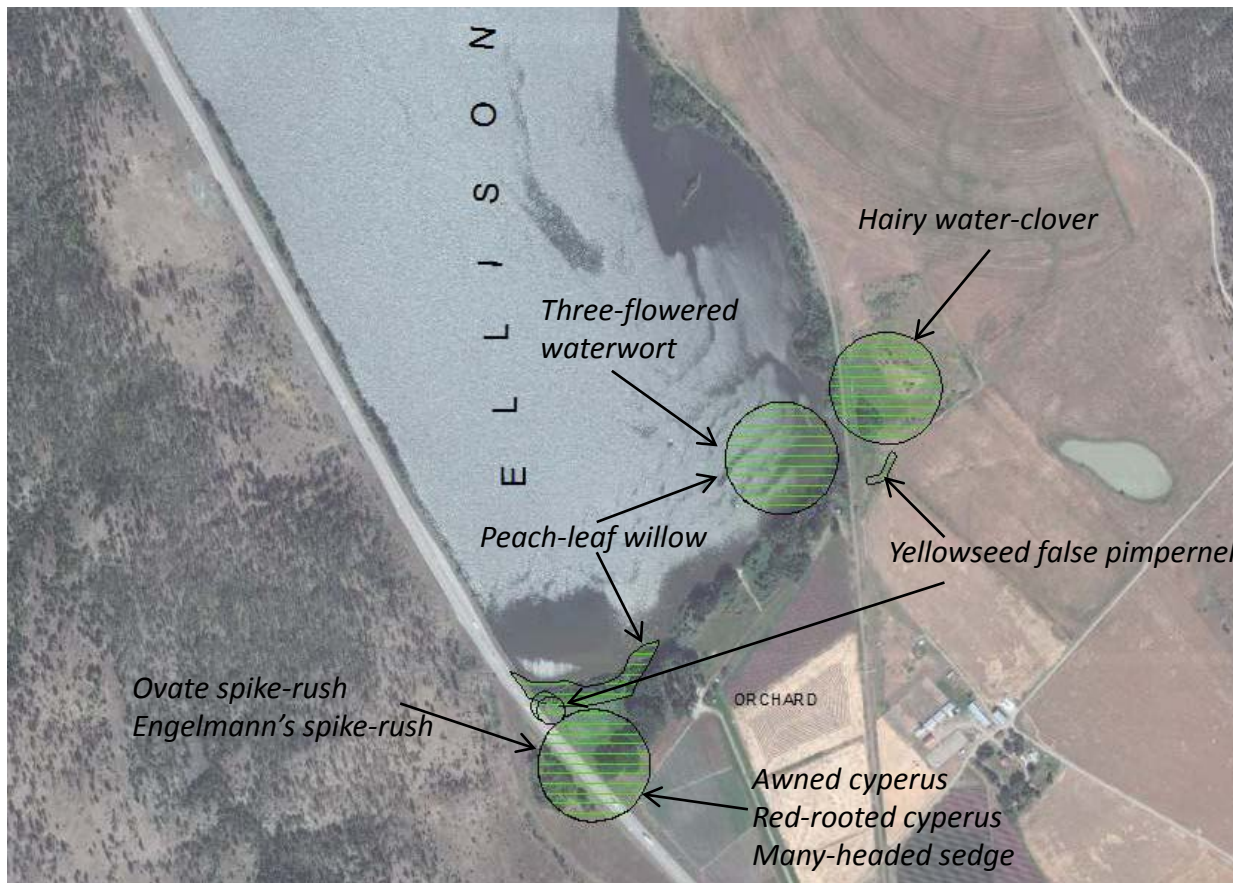
Ellison (Duck) Lake



Osoyoos Lake

# Recognizing Foreshore Plant SAR Habitat

## Hot Spot: Ellison Lake (Kelowna)



### Red-Listed

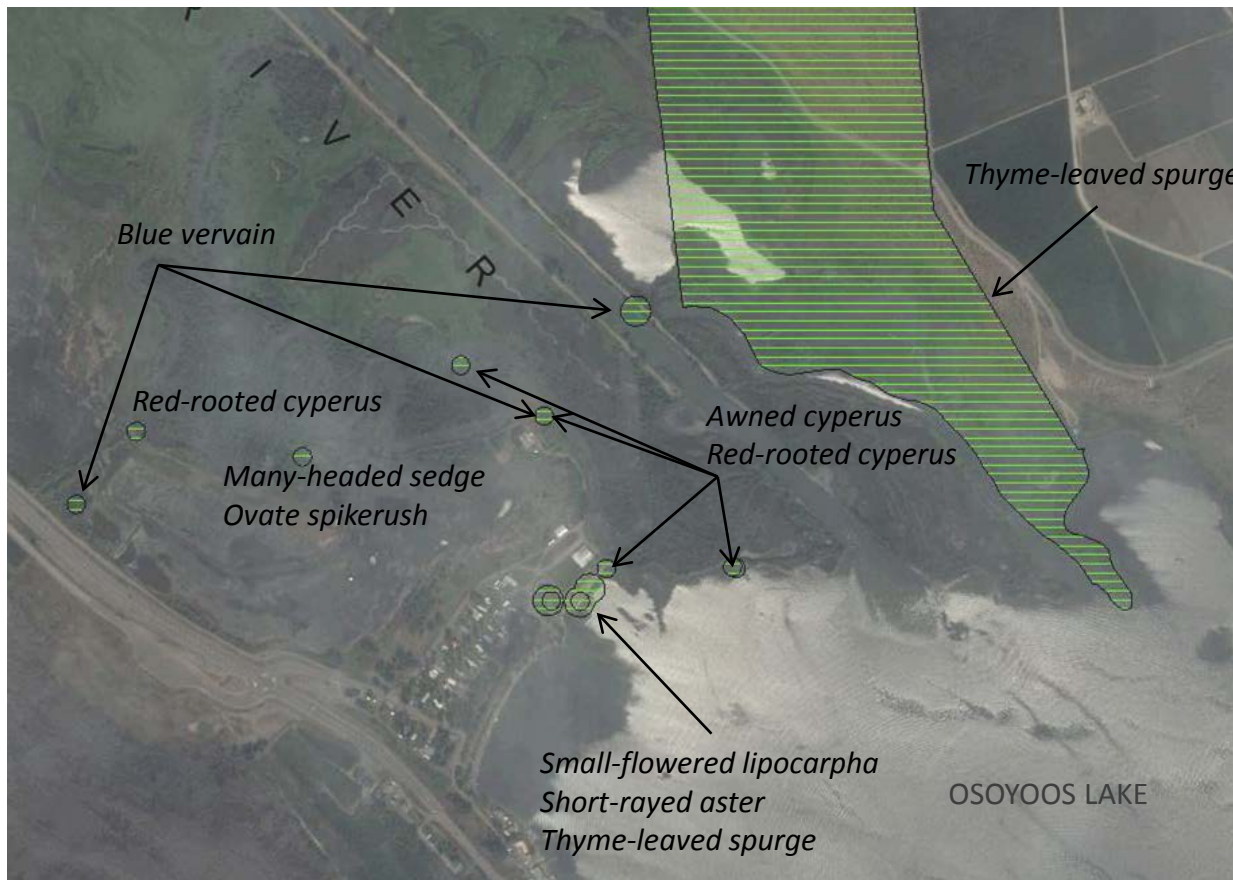
- Red-rooted cyperus ↓ 2015
- Ovate spike-rush ↓ 2015
- Engelmann's spike-rush
- Yellowseed false pimpernel ↓ 2018
- Hairy water-clover
- Peach-leaf willow ↓ 2017

### Blue-Listed

- Many-headed sedge ↓ 2015
- Awned cyperus ↓ 2015
- Three-flowered waterwort ↓ 2018

# Recognizing Foreshore Plant SAR Habitat

## Hot Spot: Osoyoos Lake (Osoyoos)



### Red-Listed

- Small-flowered lipocarpha
- Red-rooted cyperus ↓ 2015
- Short-rayed aster
- Ovate spikerush ↓ 2015

### Blue-Listed

- AwneD cyperus ↓ 2015
- Blue vervain
- Thyme-leaved spurge ↓ 2015
- Many-headed sedge ↓ 2015

# Recognizing Foreshore Plant SAR Habitat

## Hot Spot: Shuswap Lake (Salmon Arm)



### Red-Listed

- Mexican mosquito fern
- Hairy water-clover
- Moss grass ↓ 2015

### Blue-Listed

- American sweet-flag
- Thyme-leaved spurge ↓ 2015



# Recognizing Foreshore Plant SAR Habitat

## What habitats are they found in?

Attribute	Higher Potential Habitat	Lower Potential Habitat
<b>Foreshore Habitats</b>		
Disturbance	Natural, modified	Disturbed
Exotic Plant Cover	<30% cover	>30% cover
Wave / Erosion	Minimal, infrequent	Substantial, frequent
Beach Substrate	Natural silts, sands and gravels	Imported, non-natural
Topography	Depression to gentle (<10%)	Moderate to steep (>10%)
Vegetation	Vegetation present	Non-vegetated

# Recognizing Foreshore Plant SAR Habitat

## Natural Foreshore Habitats



Peach-leaf willow @ Osoyoos Lake



Many-headed sedge @ Ellison Lake



Short-rayed aster @ Vaseux Lake



Giant helleborine @ Skaha Lake

- Gentle slope
- Native silts / sands / gravels
- Small dunes and transition zones
- Low to moderate invasive species cover

# Recognizing Foreshore Plant SAR Habitat

## Modified Foreshore Habitats



Awned cyperus @ Osoyoos Lake



Short-rayed aster @ Skaha Lake



Short-rayed aster @ Skaha Lake



Thyme-leaved spurge @ Osoyoos Lake

- Modified habitats
- Gentle slope
- Native sands / gravels
- Small dunes and transition zones
- Low to moderate invasive species cover

# Recognizing Foreshore Plant SAR Habitat

## Riparian/Wetland Habitats



Cut-leaved water-parsnip @ cattail marsh



Western centaury @ alkaline pond



Giant helleborine @ Peachland Creek



Mexican mosquito fern @ slough near Salmon Arm

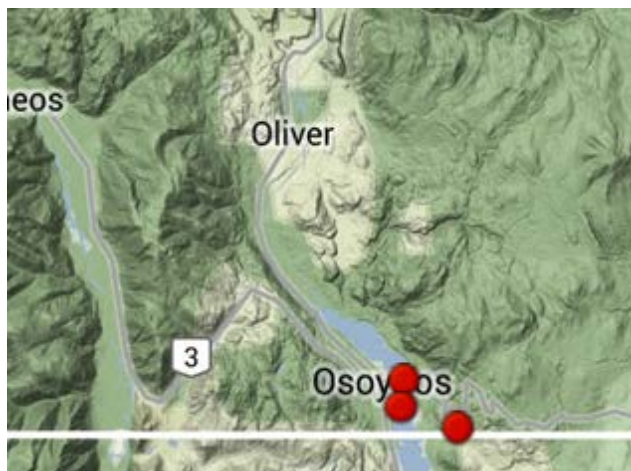
- Undisturbed to modified habitats
- Generally natural features (marsh, pond, swale)
- Low to moderate invasive species cover



# Identifying Key Foreshore Plant SAR

# Identifying Key Foreshore Plant SAR

## 1. Scarlet Ammannia (*Ammannia robusta*)



### BC Range

- Known from four locations near Osoyoos (two extirpated)

### Habitat

- Open, muddy soils along lakeshores affected by seasonally fluctuating water levels with high mineral nutrient richness and warm water temperature in the BG Zone

### Life History

- Annual sp., grows each year from seed, dispersed by water/animals



# Identifying Key Foreshore Plant SAR

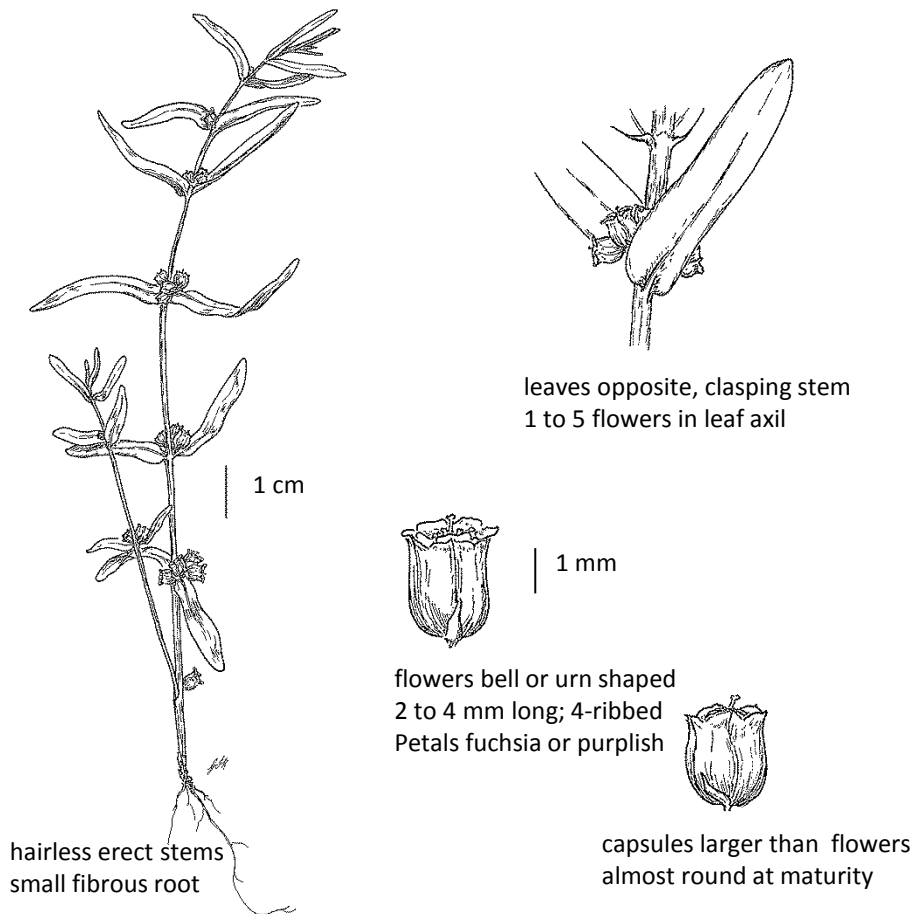
## 1. Scarlet Ammannia (*Ammannia robusta*) (cont.)



- Hairless erect stems
- Small fibrous root
- 1 to 5 flowers in leaf axil
- Leaves opposite, clasping stem
- Flowers bell or urn shaped, 4-ribbed
- Petals fuchsia or purplish
- Capsules almost round at maturity

# Identifying Key Foreshore Plant SAR

## 1. Scarlet Ammannia (*Ammannia robusta*) (cont.)

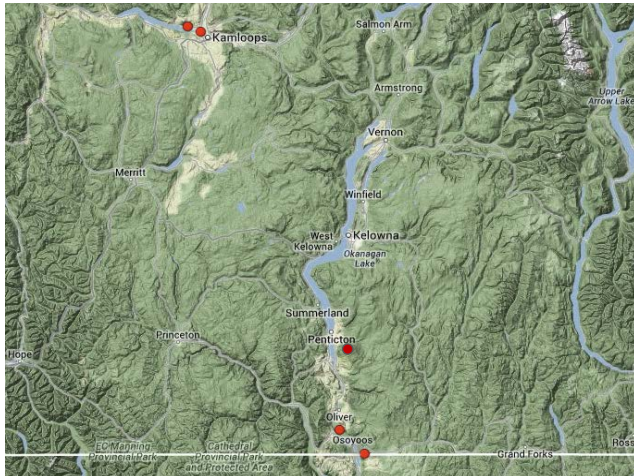


### Identification Tips

- Characterized by its small stature (10-30 cm), opposite claspng leaves that are rounded at base, and numerous flowers tightly arranged in leaf axils
- May be confused with toothcup (*Rotala ramosior*) = smaller plant, non-claspng leaves that narrow towards base, and generally fewer flowers in leaf axils

# Identifying Key Foreshore Plant SAR

## 2. Toothcup (*Rotala ramosior*)



### BC Range

- Known from Kamloops, Summerland and two locations in the vicinity of Osoyoos

### Habitat

- Open to semi-shaded, usually sandy, swales and flats with seasonally wet soils in riparian habitats in the BG Zone
- Also found in mudflats along lakeshores, receded pond margins and sandy backwater river channels

### Life History

- Annual sp., grows each year from seed, dispersed by water/animals



©Curtis Bjork

# Identifying Key Foreshore Plant SAR

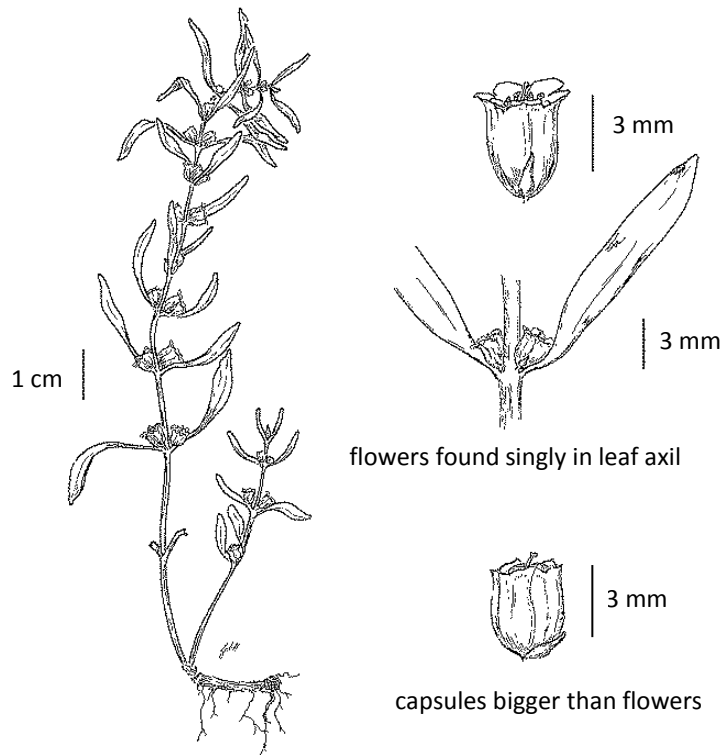
## 2. Toothcup (*Rotala ramosior*) (cont.)



- Small, hairless, annual herb with stems usually erect or somewhat decumbent, from 5 to 15 cm
- Leaves in opposite pairs, smooth edged, tapered towards stem
- Flowers tightly arranged in the leaf, with usually one flower per axil
- Stamens and styles short, not exerted from corolla
- Fruits are large elliptic capsules

# Identifying Key Foreshore Plant SAR

## 2. Toothcup (*Rotala ramosior*) (cont.)

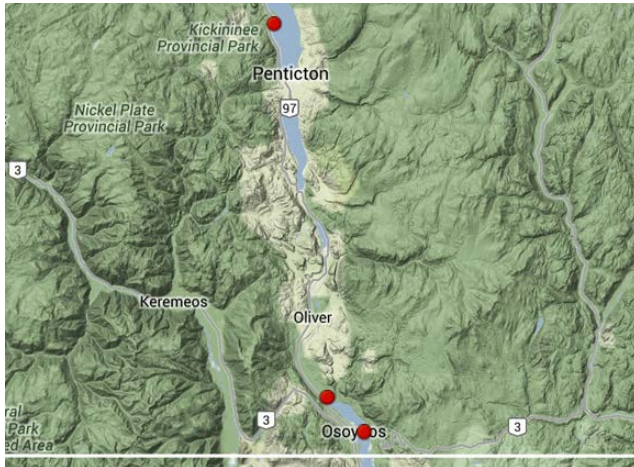


### Identification Tips

- Characterized by small stature, short-stalked non-clasping leaves, and often singular flowers tightly arranged in the leaf axils
- May be confused with scarlet ammannia (*A. robusta*) = generally taller plant with clasping unstalked leaves, >1 flower in each leaf axil, and styles that are slightly exerted beyond the calyx

# Identifying Key Foreshore Plant SAR

## 3. Small-flowered Lipocarpha (*Lipocarpha micrantha*)



### BC Range

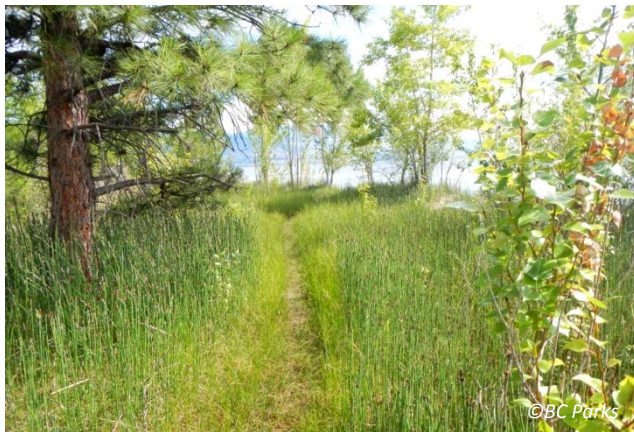
- Known from two sites on Osoyoos Lake and one on Okanagan Lake at SunOka PP

### Habitat

- Sandy lakeshores that are moderately wave-washed as well as shallow interdunal swales with seasonal flooding but that are protected from high waves and strong currents in BG Zone

### Life History

- Annual sp., grows each year from seed, dispersed by water/animals





# Identifying Key Foreshore Plant SAR

## 3. Small-flowered Lipocarpha (*Lipocarpha micrantha*) (cont.)



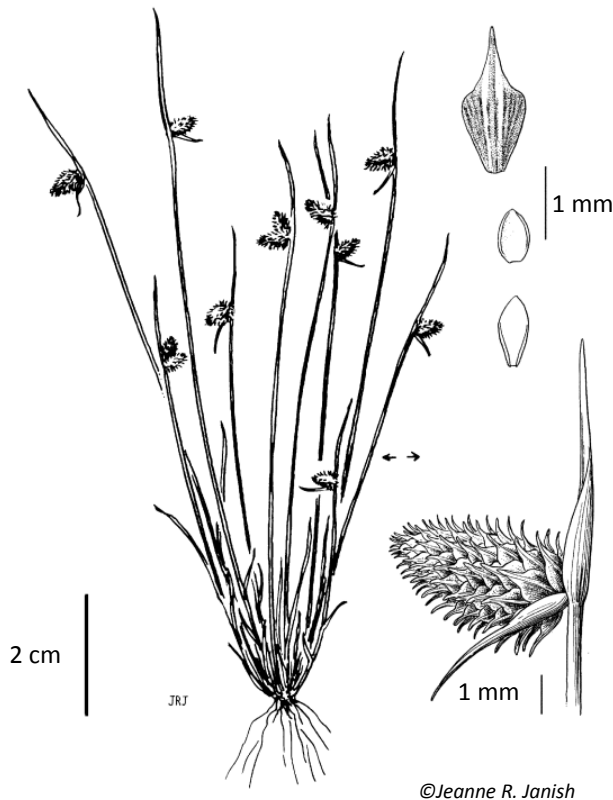
- Tufted growth habit, small (2-20 cm)
- Leaves narrow, 0.5 mm wide
- Numerous green flowers
- Cone or egg-shaped sessile spikes
- Two long floral bracts at base of spikes

# Identifying Key Foreshore Plant SAR

## 3. Small-flowered Lipocarpha (*Lipocarpha micrantha*) (cont.)

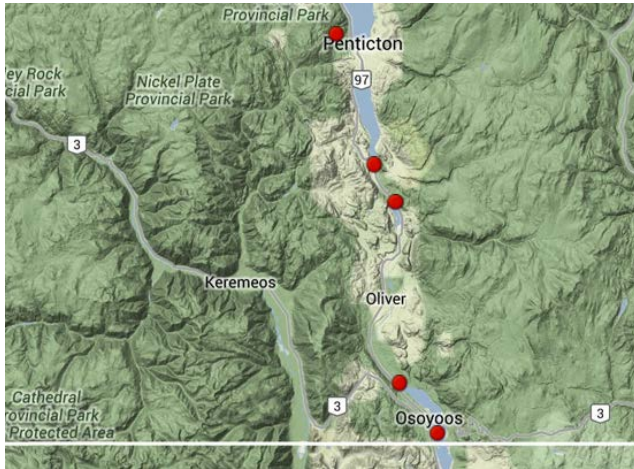
### Identification Tips

- Characterized by tufted growth habit, small size, egg-shaped sessile spikes and specialized habitat
- May be confused with awned cyperus (*Cyperus squarrosus*) = flowers on flat, two-sided spikes, and flower scales that are bent backwards (squarrose)
- Also resembles small, tufted spike-rushes (*Eleocharis* spp.), which have rounded spikes but lack long floral bracts



# Identifying Key Foreshore Plant SAR

## 4. Short-rayed Aster (*Symphyotrichum frondosum*)



### BC Range

- Known from south Okanagan Valley at Osoyoos Lake, Vaseux Lake, Skaha Lake and Max Lake

### Habitat

- Open sandy soil along lakeshores in the BG Zone, including moist to dry drawdown zones of sandy beaches and saline zones around lakes and ponds that become exposed in summer and early fall

### Life History

- Annual sp., grows each year from seed, dispersed by water/wind/animals



# Identifying Key Foreshore Plant SAR

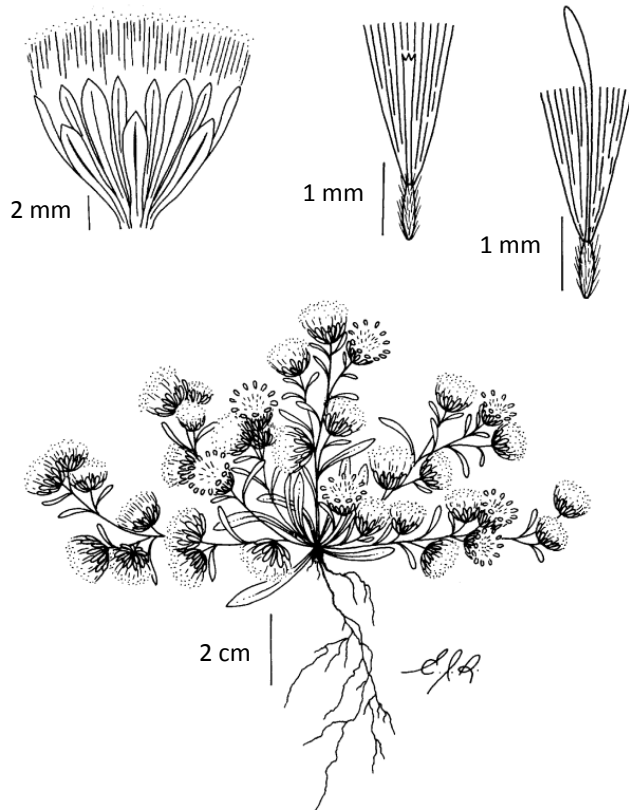
## 4. Short-rayed Aster (*Symphyotrichum frondosum*) (cont.)



- Small to medium-sized annual herb
- Branched, usually 2 to 30 cm (up to 60 cm) tall stems, small taproot
- Branches may be erect or spreading out over soil
- Flower heads borne open, short-branched inflorescences
- Pink or white narrow and strap-like ray flowers
- Broad, leaf-like floral bracts

# Identifying Key Foreshore Plant SAR

## 4. Short-rayed Aster (*Symphyotrichum frondosum*) (cont.)



### Identification Tips

- Characterized by broad, leaf-like floral bracts, narrow ray petals, and low, sprawling growth habit
- Rayless alkali aster (*S. ciliatum*) often co-occurs in same habitats but has erect, taller stems, much shorter often inconspicuous rays, and narrow sharply pointed floral bracts
- Hybrids with *S. ciliatum* occur in mixed populations; these are recognizable by their intermediate traits

# Identifying Key Foreshore Plant SAR

## 5. Bent spike-rush (*Eleocharis geniculata*)



### BC Range

- Currently known only from a single site on private land in the south Okanagan Valley

### Habitat

- Sandy mudflats along seasonally receding lakeshores and sloughs in the BG Zone

### Life History

- Annual or short-lived perennial sp., germination and development depend on the recession of spring high water levels, dispersed by water/waterfowl
- May not appear in some years due to persistent high water levels



# Identifying Key Foreshore Plant SAR

## 5. Bent spike-rush (*Eleocharis geniculata*) (cont.)



- Tufted growth habit, arching culms (up to 30 cm)
- Leaves present in tight, persistent sheaths around base of fertile culms
- Flowers in terminal, oval spikelets less than 1 cm long
- Fruits are shiny black achenes, 1 mm
- Tubercles broadly conical, pale

# Identifying Key Foreshore Plant SAR

## 5. Bent spike-rush (*Eleocharis geniculata*) (cont.)



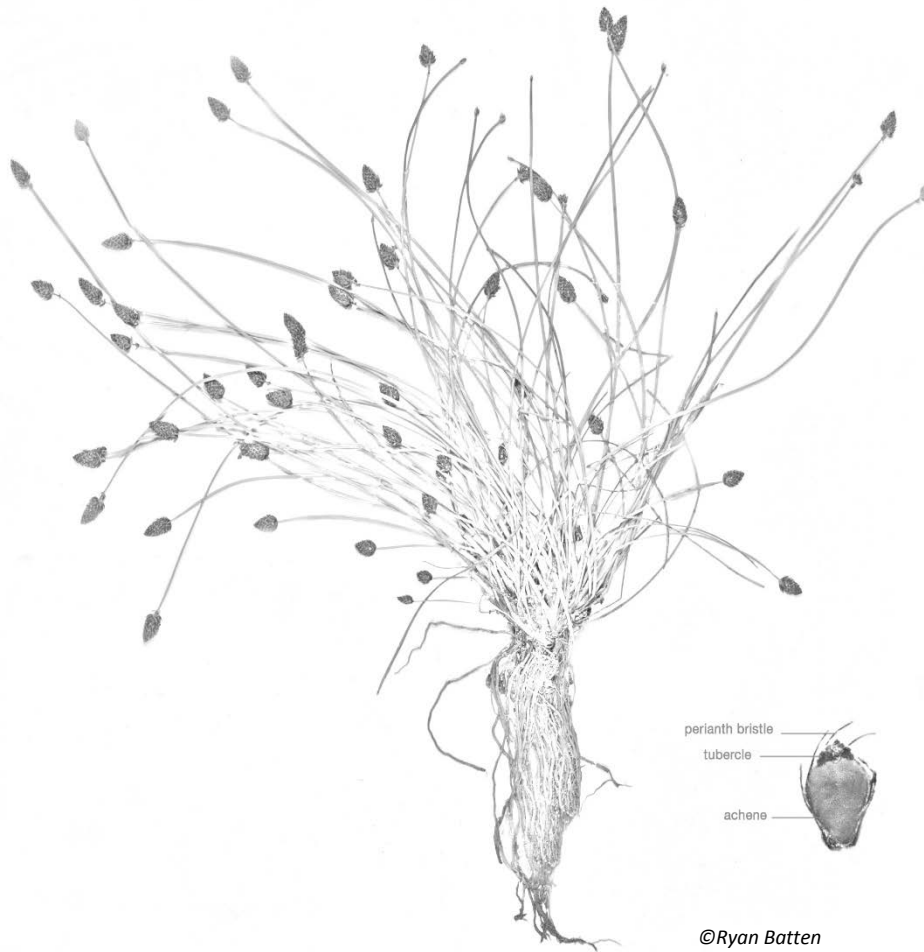
### Identification Tips

- Mature achenes are essential to confirm species within this group of spike-rushes
- Most similar to purple spike-rush (*E. atropurpurea*)
- Ovate spike-rush (*E. ovata*) and blunt spike-rush (*E. obtusa*) = brown achenes, not shiny black



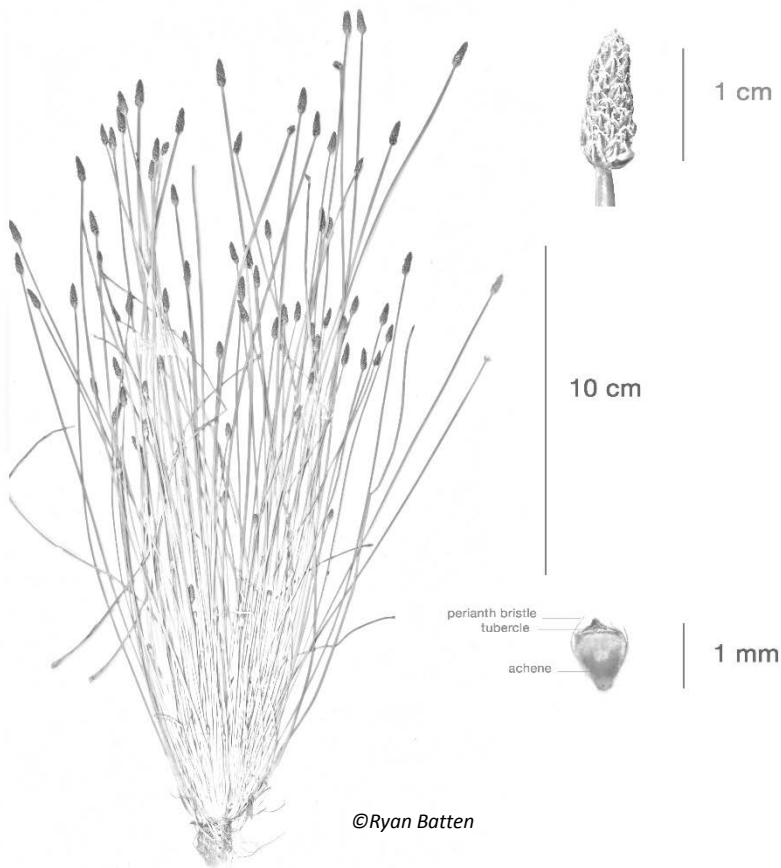
# Identifying Key Foreshore Plant SAR

## 6. Ovate Spike-rush (*Eleocharis ovata*)



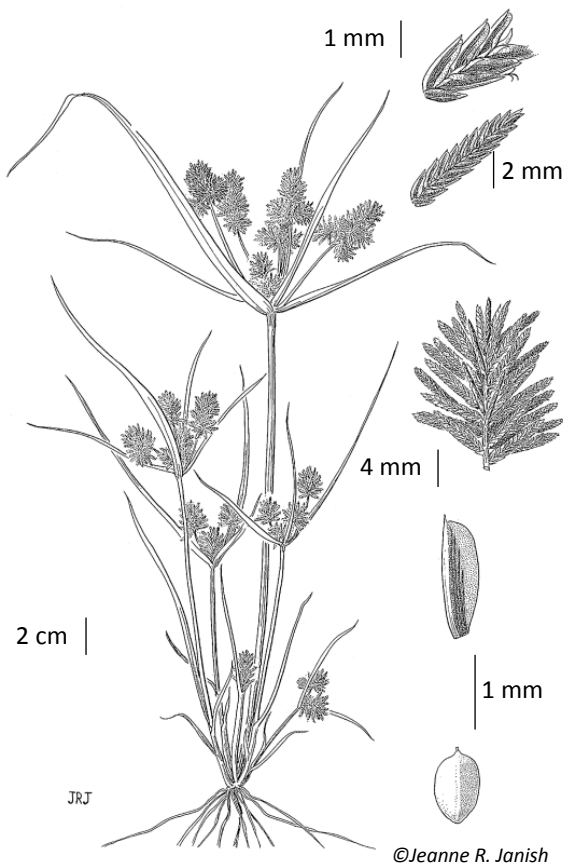
# Identifying Key Foreshore Plant SAR

## 7. Englemann's Spike-rush (*Eleocharis engelmannii*)



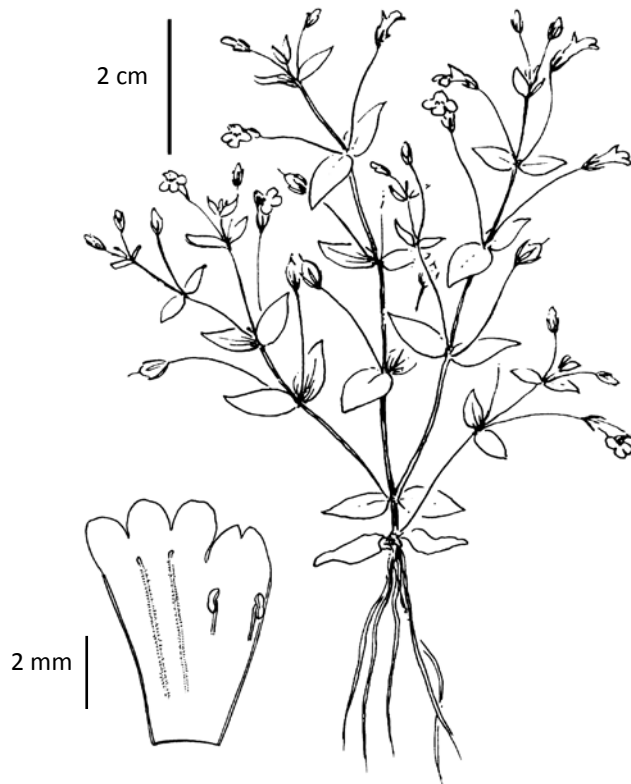
# Identifying Key Foreshore Plant SAR

## 8. Red-rooted Cyperus (*Cyperus erythrorhizos*)



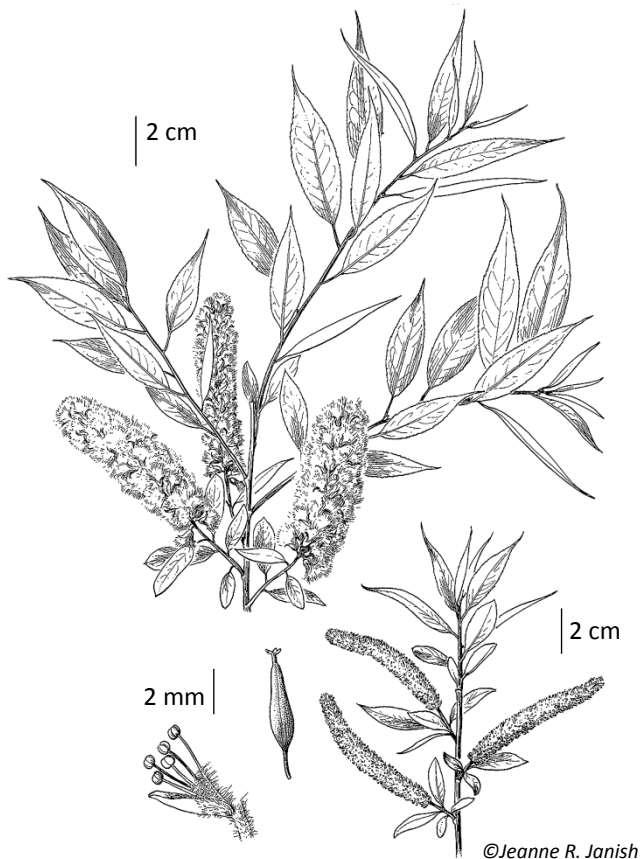
# Identifying Key Foreshore Plant SAR

## 9. Yellowseed False-pimpernel (*Lindernia dubia* var. *dubia*)



# Identifying Key Foreshore Plant SAR

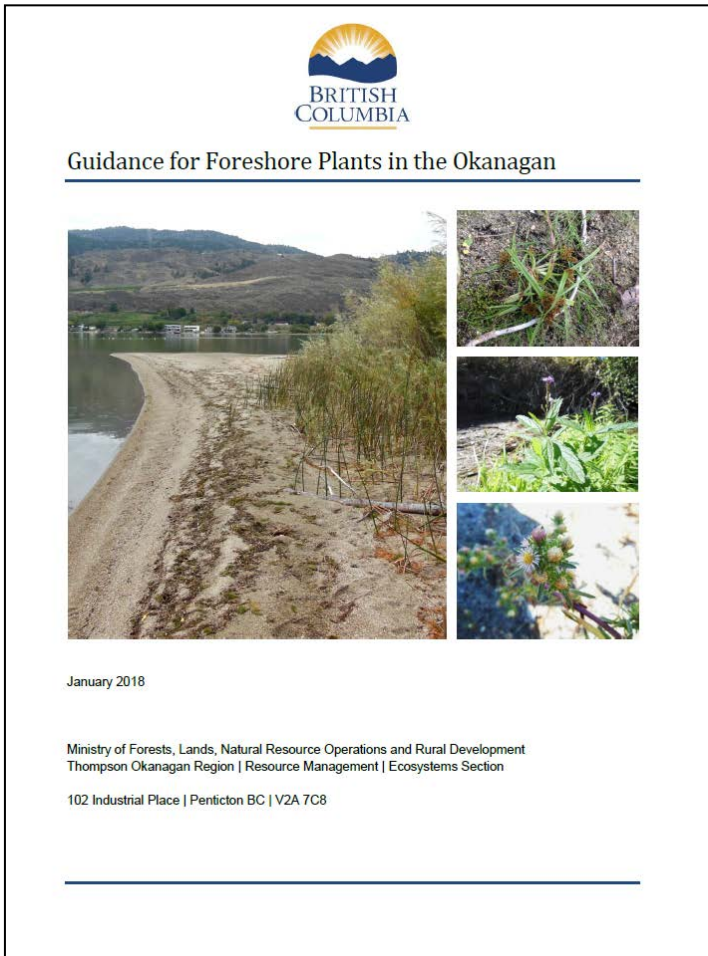
## 10. Peach-leaf Willow (*Salix amygdaloides*)



# Available Resources

# Available Resources

## Guidance Documents



- Published in January 2018
- Provides guidance on:
  - When surveys are required
  - Surveyor qualifications
  - Survey methods
  - Mitigation options
- We will do a detailed review after coffee!

[https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/okanagan/guidance\\_for\\_foreshore\\_plants\\_in\\_the\\_okanagan.pdf](https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/okanagan/guidance_for_foreshore_plants_in_the_okanagan.pdf)

# Available Resources

## Guidance Documents

---

### **Inventory and Survey Methods for Rare Plants and Lichens**

Standards for Components of British  
Columbia's Biodiversity No. 43

Prepared by  
Ministry of Environment and Climate Change Strategy  
Ecosystems Branch

For the  
Resources Information Standards Committee

May 2018

Version 1.0

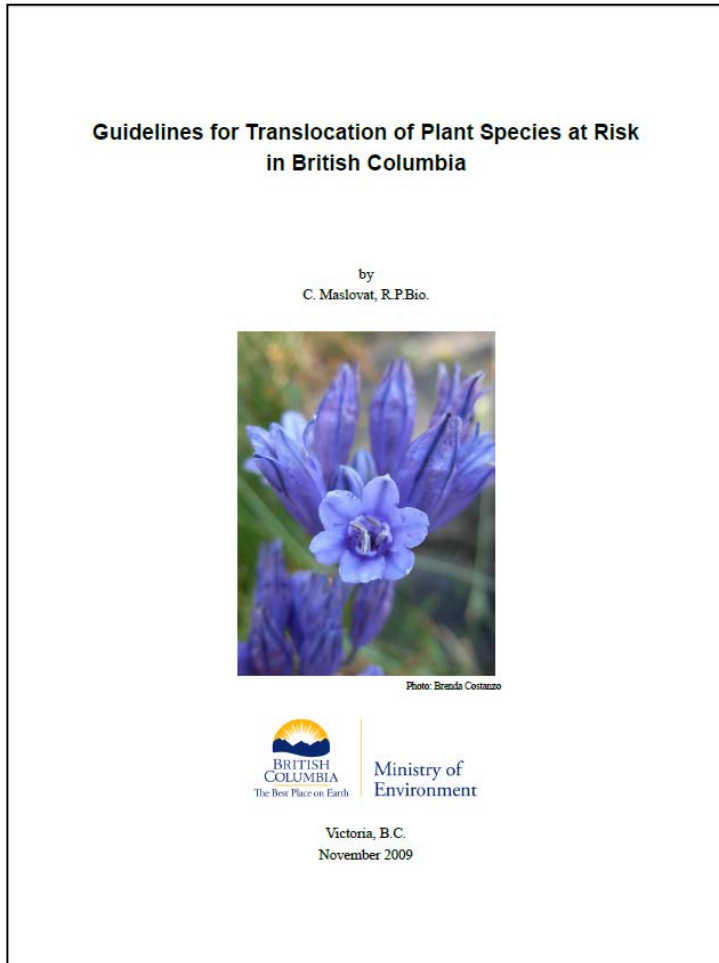
- Published in May 2018
- Part of RISC Terrestrial Ecosystems, Biodiversity series
- Provides guidance on:
  - Surveyor qualifications
  - Survey design and methods
  - Reporting requirements
  - Collecting voucher specimens

[https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/inventory\\_and\\_survey\\_methods\\_for\\_rare\\_plants\\_and\\_lichens.pdf](https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/inventory_and_survey_methods_for_rare_plants_and_lichens.pdf)



# Available Resources

## Guidance Documents



- Published in 2009
- Provides guidance on:
  - Suitability of translocations
  - Pre-translocation planning
  - Translocation methods
  - Conducting a translocation project
  - Documentation
  - Post-translocation monitoring

<http://a100.gov.bc.ca/pub/eirs/finishDownloadDocument.do?subdocumentId=8321>

# Available Resources


## Herbarium & Photo Library



- FLNRORD herbarium training collection with 34 samples:
  - 10 red-listed
  - 7 blue-listed
  - 5 yellow-listed "look-alikes" for rare species
- Collection to be used at QP workshop and training events
- Have a look at over coffee!

# Available Resources

## Factsheets



Status: Red / Endangered ■

Best Survey Time: Jul to Sep ■

General Habitat: Foreshore ■

### Short-rayed Aster (*Symphotrichum frondosum*) Asteraceae (Sunflower Family)

**RANGE**

- Widespread in North America from British Columbia east to Colorado (USA) and south to Baja California (Mexico)
- In B.C., found in the south Okanagan Valley at Osoyoos Lake, Vaseux Lake, Skaha Lake and Max Lake

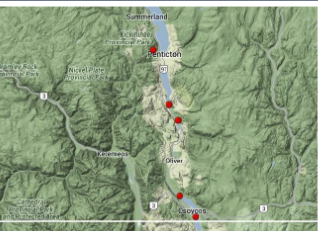


Figure 1 B.C. distribution of *S. frondosum* (BC CDC 2013)

**HABITAT**

- Open sandy soil along lakeshores in the Bunchgrass Biogeoclimatic Zone, including moist to dry drawdown zones of sandy beaches and saline zones around lakes and ponds that become exposed in summer and early fall
- Associates include rayless alkali aster (*S. ciliatum*), tufted white prairie aster (*S. ericoides*), spike-rushes (*Eleocharis* spp.) and rare foreshore plants




Figure 2 Open sandy lakeshore habitat along Vaseux Lake, B.C.




Figure 3 Disturbed lakeshore habitat along Osoyoos Lake, B.C.

**LIFE HISTORY**

- Annual species that grows each year from seed, germinating following water drawdown in late June or July and flowering from July into September
- Achenes (containing seeds) produced from September to October, then released into seed bank
- Does not reproduce vegetatively, so population survival depends on seeds and seed bank
- Seed dispersal by wind, water, waterfowl or small mammals
- May be subject to annual population fluctuations due to varying environmental conditions

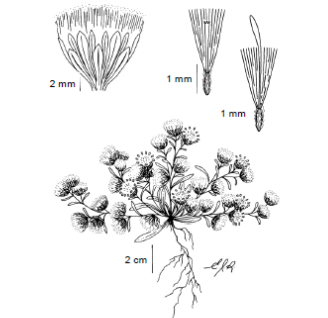


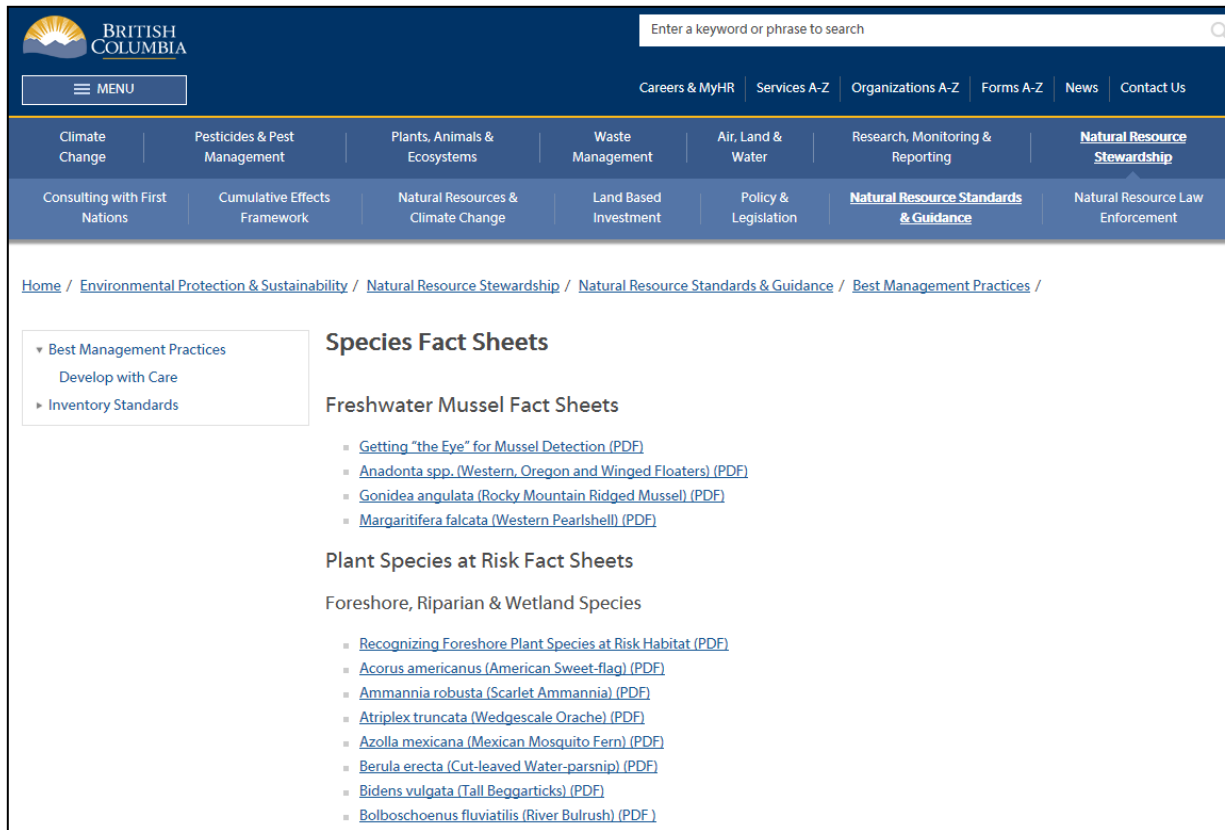
Figure 4 Illustration of *S. frondosum* (Douglas et al. 1998)

Ministry of Forests, Lands and Natural Resource Operations | Thompson Okanagan Region  
Resource Management | Conservation Section | Penticton, B.C. | Version 1.0  
July 2014

- Thompson Okanagan Plant SAR Fact Sheets
  - 27 foreshore, riparian and wetland species
  - 15 upland species
  - Completed by BC experts
  - Most up to date taxonomic info
  - Caution: some listings out of due to recent status changes

# Available Resources

## Factsheets (cont.)



The screenshot shows the British Columbia website's navigation menu and a page titled 'Species Fact Sheets'. The navigation menu includes: Climate Change, Pesticides & Pest Management, Plants, Animals & Ecosystems, Waste Management, Air, Land & Water, Research, Monitoring & Reporting, Natural Resource Stewardship, Consulting with First Nations, Cumulative Effects Framework, Natural Resources & Climate Change, Land Based Investment, Policy & Legislation, Natural Resource Standards & Guidance, and Natural Resource Law Enforcement. The breadcrumb trail is: Home / Environmental Protection & Sustainability / Natural Resource Stewardship / Natural Resource Standards & Guidance / Best Management Practices / Species Fact Sheets. The page content is organized into three sections: 'Best Management Practices' (with sub-items 'Develop with Care' and 'Inventory Standards'), 'Freshwater Mussel Fact Sheets' (with links for 'Getting "the Eye" for Mussel Detection (PDF)', 'Anadonta spp. (Western, Oregon and Winged Floaters) (PDF)', 'Gonidea angulata (Rocky Mountain Ridged Mussel) (PDF)', and 'Margaritifera falcata (Western Pearshell) (PDF)'), and 'Plant Species at Risk Fact Sheets' (with sub-section 'Foreshore, Riparian & Wetland Species' and links for 'Recognizing Foreshore Plant Species at Risk Habitat (PDF)', 'Acorus americanus (American Sweet-flag) (PDF)', 'Ammannia robusta (Scarlet Ammannia) (PDF)', 'Atriplex truncata (Wedgescale Orache) (PDF)', 'Azolla mexicana (Mexican Mosquito Fern) (PDF)', 'Berula erecta (Cut-leaved Water-parsnip) (PDF)', 'Bidens vulgata (Tall Beggarticks) (PDF)', and 'Bolboschoenus fluviatilis (River Bulrush) (PDF)').

<https://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/natural-resource-standards-and-guidance/best-management-practices/species-factsheets>

# Available Resources

## Inventory & Monitoring Reports – most available through Ecocat



- 2009 Osoyoos Lake Inventory
- 2011-2018 Annual Surveys at Christie Memorial Park (Short-rayed Aster Critical Habitat)
- 2013 Osoyoos/Vaseux Lake Plant SAR Inventory
- 2013-2015 Ellison Lake Plant SAR Inventories
- 2015 Foreshore Plant SAR Recovery Actions
- *2018 Swan Lake Foreshore Plant SAR Inventory and Assessment of Water Level Impacts*
- *2018 Okanagan Large Lakes Foreshore Protocol Foreshore Plant Zone Confirmation*

# Questions?

