



**BEST MANAGEMENT PRACTICES**

# **Seaplane Operations and Invasive Species**

A Pocket Guide for Commercial and Recreational  
Seaplane Operators

**2023 EDITION**



# Acknowledgements

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S. Schnepf, Getty Images

## Invasive Species and Why You Should Care

Invasive species (IS) are non-native plants and animals that negatively impact the environment, economy, and society. IS outcompete native species for food, impact native ecosystems, and reduce biodiversity. Once IS become established in a body of water, it is almost impossible to get rid of them – prevention and early detection are critical. Human activity is a major pathway for the movement of invasive species into new areas; flying boats and floatplanes (both of which are encompassed under seaplanes) have been identified as a vector for the spread of aquatic

invasive species (AIS).

As a seaplane operator, you play a key role in preventing the movement of aquatic invasive species – please familiarize yourself with the best management practices below to help stop the spread.

### DID YOU KNOW?

BC is the most biologically diverse province in Canada. 75% of Canada's mammal species are found here and there are over 1,800 species at risk!



Yellow flag iris, E. Sellentin

## WHAT ARE INVASIVE SPECIES?

Invasive species are non-native plants, animals or other organisms whose introduction and spread harms BC's native species, ecosystems, economy and human health.

## THE PROBLEM

Commercial and recreational seaplane activity is a pathway for the spread of AIS throughout BC. Seaplanes, including floatplanes and flying boats, often access remote and sensitive watersheds, which are especially vulnerable to the invasion and harmful effects of invasive species. Seaplanes

can act as vectors for the transport of AIS – such as Zebra and Quagga mussels (*Dreissena polymorpha* and *D. rostriformis*) and Eurasian watermilfoil (*Myriophyllum spicatum*). AIS could be transported via fouling of cables, cross members, rudders, transoms, step areas, wheel wells, and chine of the floats/pontoons, or the water inside the floats themselves.

## DID YOU KNOW?

Floatplanes were found to have spread an invasive species of Elodea in Alaska. In 2015, Elodea was identified in Lake Hood, the world's busiest floatplane base. The introduction and dispersal of Elodea throughout the state could severely impact the spawning ground of resident salmon - a major concern to Alaska's economy.

Invasive species have environmental, societal, and economic impacts. AIS can degrade the environment by altering watershed ecosystems, reducing water quality, and preying on or competing with native species. Dense populations of aquatic invasive plant species inhibit boating, fishing, and swimming. Additionally, dense mats of AIS, like Eurasian watermilfoil, can decrease taxiing areas and complicate safe operations. Managing AIS can be expensive.

## DID YOU KNOW?

The cost of controlling Eurasian watermilfoil in Shuswap Lake topped \$300,000 in 2016! And nationally, the estimated annual impact of invasive species in Canada is \$35 billion. Recreational and commercial seaplane operators can reduce or stop the spread of aquatic invasive species by implementing best practices.



4Alee, Getty Images

# Aquatic Invasive Species Best Management Practices for Seaplane Operators

By incorporating Best Management Practices (BMPs) when flying seaplanes, operators can prevent the spread of AIS and mitigate the adverse effects of invasive species on BC's native wildlife, the environment, and the tourism industry.

## DID YOU KNOW?

Preventing the introduction and subsequent spread of aquatic invasive species is the most cost effective and efficient management strategy.

Prevent the introduction and spread of AIS by practicing Clean Drain Dry the next time you are on the water.

**CLEAN** off all plant parts, creatures, and mud from the aircraft and equipment (e.g., ropes, cables, wheels, etc.)

**DRAIN** onto land all items that can hold water (e.g., floats, hulls, buckets, wells, bilge, and ballast). Ensure to always pull all the plugs!

**DRY** all items completely before moving to another body of water. This applies to all types of watercraft and gear— seaplanes, canoes, kayaks, paddle boards, paddles/oars, life jackets, etc.

**\*Remember: if it comes in direct contact with water, practice Clean Drain Dry.**

# Best Practices Checklist

Use this checklist prior to, during, and after each flight to actively prevent the spread of aquatic invasive species during seaplane operations. Additional resources are provided towards the end of this guide.



## BEFORE PLANNING A FLIGHT

- ✓ Familiarize yourself with AIS that you might encounter through your regional Invasive Species Organization's website (see Regional Invasive Species Organizations on page 41)
- ✓ Determine if your itinerary includes waterbodies with confirmed Zebra and/or Quagga mussel infestations by checking [this map](#).
- ✓ If you are coming from out of province, check if your seaplane is HIGH-RISK by contacting [COS.Aquatic.Invasive.Species@gov.bc.ca](mailto:COS.Aquatic.Invasive.Species@gov.bc.ca).
  - » If coming from a high-risk region, call the BC provincial government RAPP hotline at 1-877-952-7277. Note: there is no charge for decontamination.
  - » If coming from an infested region, fill out the [Out of Province Watercraft Form](#) and follow instructions.
  - » If AIS have been confirmed in the waterbody you're departing from, find out if you can land at a local airport instead to fully inspect and decontaminate your aircraft.



## BEFORE ENTERING THE AIRCRAFT

- ✓ Inspect and remove any visible vegetation or other debris from the aircraft (floats, hulls, rudders, cables, lines, wheel wells and crossmembers). Dispose of any weeds or identified AIS in the landfill.
- ✓ Visually inspect submerged parts of the aircraft and run your hands along surfaces that appear dirty.
- ✓ Using a brush, remove surface deposits from the aircraft that could be hiding attached juvenile mussels.
- ✓ Do not move water between waterbodies - check and drain the aircraft's hull of any water and pump water out of floats. Drain water into a bucket or drain on gravel/cement away from surrounding waterbodies.

## DID YOU KNOW?

Zebra and Quagga mussels can survive up to 30 days out of water, depending on the temperature and humidity.

## BEFORE TAKEOFF

- ✓ Always cycle landing gear and/or rudders in open water while taxiing out.
- ✓ Do not taxi through heavy aquatic plant growth.
- ✓ If taxiing through weed beds, stop once in open water and manually clear vegetation from floats, hull, and rudders



## AFTER TAKEOFF

- ✓ Cycle landing gear and/or rudders again, in flight, over the waterbody you are leaving to remove any remaining aquatic plant fragments.

## STORAGE AND MOORING

- ✓ Ensure you thoroughly Clean Drain Dry the aircraft prior to flying to another waterbody.
- ✓ If floats take on water, ensure to completely drain and, if possible, flush the floats with 60°C hot water. Allow to dry completely.

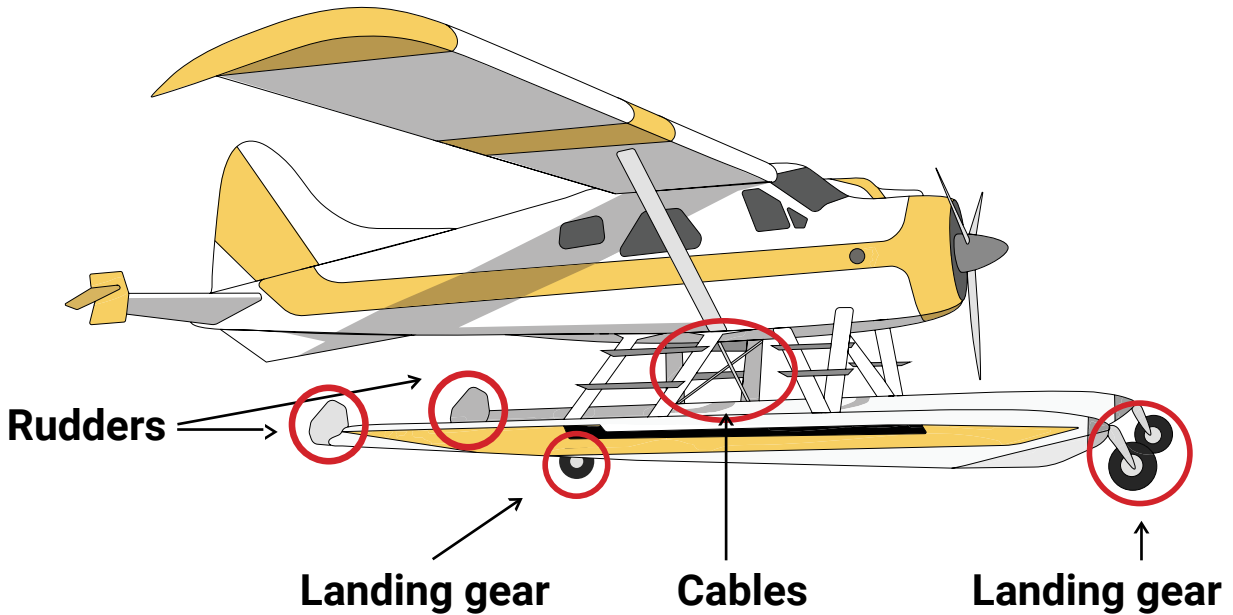
## REPORT

- ✓ Report any invasive species you see through the Report Invasives BC app (see Reporting Invasive Species on page 41).

## DID YOU KNOW?

Landing a seaplane in saltwater does not immediately kill all aquatic invasive species. A saltwater pitstop should not be used as a standalone best management practice. Zebra and Quagga mussels cannot survive in high salinity environments, but the length of time it takes for saltwater to kill all juvenile and adult Zebra and Quagga mussels is still unclear.

Due to these uncertainties, carefully following the Clean Drain Dry program is the recommended best management practice for all aircraft operators.



This figure highlights the parts of a floatplane that need to be thoroughly cleaned using Clean Drain Dry practices. These same Clean Drain Dry practices should be applied to flying boats, as they share similar structures.

This includes the rudders, floats, cables, and landing gear.



Zebra & Quagga mussels, SLO County



Zebra mussels, M. Herborg

## INVASIVE SPECIES

### Zebra and Quagga mussels (*Dreissena polymorpha*, *Dreissena rostriformis bugensis*)

**High Alert Species!** EDRR (Early Detection & Rapid Response)

#### Description

Zebra and Quagga mussels—or dreissenid mussels— look very similar, but Quagga mussels are slightly larger and rounder, measuring  $\leq 4$  centimeters (cm). Zebra mussels are slightly smaller in size measuring  $\leq 3.5$  cm. Both species range in colour; they can be black, cream, or white with varying amounts of banding. Both mussels have byssal threads which are strong fibers that allow the mussel to attach itself to hard surfaces.

#### Habitat

They thrive in freshwater lakes, ponds, quarries, and reservoirs, and they're sometimes found in brackish waters. Both Zebra and Quagga mussels can survive in depths of over 100 metres (m) but they favour shallower environments. Zebra mussels prefer depths of 2-12 m, while ideal depths for Quagga mussels are 10-30 m.

#### Reproduction

Females can produce up to one million eggs each year. Fertilized eggs hatch into free-floating veligers (larvae) within 2-3 weeks, before producing a calcium-based shell and then developing a hard surface.

## Dispersal via Seaplanes

Adult Zebra and Quagga mussels can attach to floats, landing gear, and aircraft rudders using their byssal threads. Larvae can accidentally be transported in the water within the floats or in standing water. Depending on the temperature and humidity, these mussels can survive up to 30 days out of water, so be sure to Clean Drain Dry to avoid unintentionally spreading AIS

## Impacts

- » **Economic:** Create massive colonies that can block water intakes and interfere with municipal water supplies, agricultural irrigation, and power plant operations. This often results in millions of dollars per year spent on removal and management. If invasive mussels are introduced to BC, they could cost the province more than \$43 million annually.
- » **Ecological:** Pose a serious threat to the biodiversity of aquatic ecosystems, competing for resources with native species like phytoplankton and zooplankton, which form the basis of aquatic food webs.

Removal of large masses of phytoplankton can alter water clarity, forcing light-sensitive organisms deeper into the water and encouraging the growth of unwanted aquatic vegetation.

- » **Social:** Mussel colonies can take over beaches, leaving shorelines covered in razor sharp shells and making them unusable for recreation, affecting property values and tourism. They can also impact boaters as they colonize exposed seaplane surfaces and often damage engines by clogging water intakes.

## Distribution Map





## **Eurasian watermilfoil (*Myriophyllum spicatum*)**

### **Description**

Eurasian watermilfoil is an aquatic plant that made its way into the wild after being released from aquariums. It prefers still or slow-moving water with silty or sandy bottoms and spreads by roots, seeds, buds, and stem fragments.

### **Leaves**

Bright green feathery leaves that are 3 cm long. Leaves occur in whorls of 3 or 4 with 12 or more segments on each side of the flower structure. Leaves rarely extend out of water as they tend to lose their stability and collapse around the stem.

### **Flowers**

Reddish flowering spikes, that emerge 5-10 cm

above the water, contain small yellow flowers that have 4 petals. Flowers are alternate and attached directly to the stem.

### **Stems**

Reddish brown, long, slender, branching, and hairless. Stems become leafless toward the base of the plant. Plants typically grow between 1-4 m but can extend up to 10 m.

### **Other ID Tips**

Eurasian watermilfoil (*Myriophyllum spicatum*) is often confused with Parrot's feather (*Myriophyllum aquaticum*), which is another aquatic invasive species of concern. Eurasian watermilfoil can be distinguished by its yellow flowers and shorter leaf stalks that are <2 millimetre (mm) long, or absent.

## Dispersal via Seaplanes

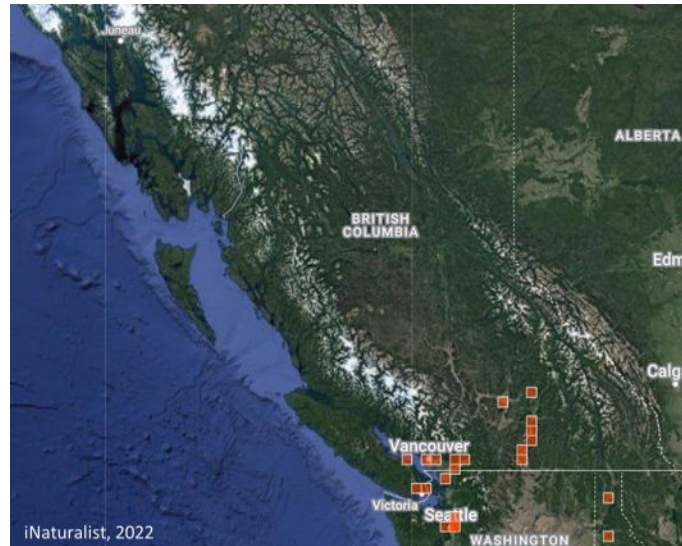
The weedy strands of Eurasian watermilfoil can easily attach to any part of the aircraft and gear. This is of significant concern as a single stem fragment can take root and establish a new colony in a body of water. Avoid taxiing through weed beds and remove any weeds from the aircraft before takeoff.

## Impacts

- » **Economic:** Dense stands impact waterways, irrigation ditches, and drainage canals where it has the potential to inhibit flow and increase maintenance costs. It can also detract from the aesthetic appeal of the shoreline reducing the desirability of adjacent residential areas.
- » **Ecological:** Has the ability to outcompete and replace native plant communities, reducing overall biological diversity. It can change water chemistry and flow rate, which significantly alters aquatic ecosystems. The stagnant water created by the dense mats can increase breeding grounds for mosquitoes.

- » **Social:** Forms thick, underwater stands of tangled stems and vast mats of vegetation on the water's surface, especially in shallow, nutrient-rich water. It can quickly take over waterways, causing sluggish flow that attracts mosquitoes and limits recreational opportunities like boating, swimming, and fishing. These dense mats can also pose a drowning hazard to recreationalists.

## Distribution Map





W. T. Haller, Bugwood.org



R. Videki, Bugwood.org

## **Brazilian elodea (*Egeria densa*)**

### **Description**

Brazilian elodea is a submerged, freshwater perennial herb native to South America. This species is a common aquarium plant that has been confirmed in two BC waterbodies – Richmond drainage waterway in Metro Vancouver and Glen Lake in Greater Victoria.

### **Flowers**

White with 3 petals that are 8-11 mm long and extend above the water surface on slender stalks. Flowers bloom in July and August.

### **Leaves**

Whorls of 4 bright green serrated leaves, 2-3.5 cm long and 2-5 mm wide.

### **Stems**

Solitary and irregularly branched stems create dense intertwined mats. Stems can grow from 3-5 m long.

### **Other ID Tips**

Found in freshwater lakes, rivers, and ditches. Prefers slow moving water.

## Dispersal via Seaplanes

The weedy strands of Brazilian elodea can attach to any part of the aircraft and gear. Avoid taxiing through weed beds and remove any weeds from the aircraft before takeoff. If you see Brazilian elodea, please report it immediately. The quickest and most effective way to report is by using the Report Invasives BC app (see Reporting Invasive Species on page 41).

## Impacts

- » **Economic:** Impacts waterways, irrigation ditches, and drainage canals, where it has the potential to inhibit flow and increase maintenance costs. It can also detract from the aesthetic appeal of the shoreline reducing the desirability of adjacent residential areas.
- » **Ecological:** Has the ability to outcompete and replace native plant communities, reducing overall biological diversity. Forms thick, vast mats of vegetation that impact natural hydrology and block fish migration.

- » **Social:** Forms mats that can quickly take over an area and limit recreational opportunities like boating, swimming, and fishing.

## Distribution Map







L. Mehrhoff, Bugwood.org



G. Lovell, Bugwood.org

## **Parrot's feather (*Myriophyllum aquaticum*)**

### **Description**

Parrot's feather is an introduced aquatic plant native to the Amazon River in South America. This plant is currently present in the Lower Mainland of British Columbia, in freshwater lakes, ponds, streams, and canals with low flow and high nutrient levels. The emergent stems can survive on wet banks of rivers and lake shores.

### **Flowers**

Pinkish-white flowers, approximately 1.6 mm long. Flowers are insignificant.

### **Leaves**

Both submersed and emergent leaves.

Submersed leaves are 1.5-3.5 cm long, have 20 to 30 divisions per leaf, are limp, and often appear to be decaying. The stiffer emergent leaves are bright green, 2 to 5 cm long, and have 6 to 19 divisions per leaf. The emergent stem and leaves resemble small fir trees.

### **Stems**

Submerged brownish stems create dense intertwined mats, while the green emergent stems grow over 1.5 m long.

### **Other ID Tips**

Looks like tiny trees that grow along the water's surface.

## Dispersal via Seaplanes

The weedy strands can attach to any part of the aircraft and gear. Avoid taxiing through weed beds and remove any weeds from the aircraft before takeoff.

## Impacts

- » **Economic:** Impacts waterways, irrigation ditches, and drainage canals, where it has the potential to inhibit flow and increase maintenance costs. It can also detract from the aesthetic appeal of the shoreline reducing the desirability of adjacent residential areas.
- » **Ecological:** Has the ability to outcompete and replace native plant communities, reducing overall biological diversity and reducing water quality. Dense stands also result in stagnant waters that increase breeding grounds for mosquitoes. It can also interfere with the flow of irrigation water, transport, hydro-electric power production and fisheries.

- » **Social:** Forms thick stands of tangled stems and vast mats of vegetation on the water's surface. These mats can limit recreational opportunities like boating, swimming, and fishing.

## Distribution Map





L. Mehrhoff, Bugwood.org



L. Mehrhoff, Bugwood.org

## **Flowering rush (*Butomus umbellatus*)**

### **Description**

Flowering rush is an aquatic perennial with green, grass-like foliage and pink almond-scented flowers. Originating in Eurasia, this invasive plant was brought to North America as an ornamental plant for water gardens. Flowering rush is present in the Fraser Valley, Cariboo, Squamish and Central Kootenay, but has not yet become established; its prevention is critical.

### **Flowers**

Flowers in pink umbrella shaped clusters on delicate, 5-10 cm long flower stalks

### **Leaves**

Basal, linear, and twisted from 50-100 cm long. Erect or floating in deep water

### **Stems**

Stems are solitary, 100-150 cm tall and sprout from a rhizome (part of the root structure).

### **Other ID Tips**

Two key identification features are the distinct triangular cross-section of the leaves and roots that are thick with bulbous nodes.

## Dispersal via Seaplanes

Fragments of flowering rush can attach to the aircraft during taxiing. These fragments can survive out of water for several weeks, increasing the chance of introduction. If you see Flowering rush, please report it immediately. The quickest and most effective way to report is by using the Report Invasives BC app (see Reporting Invasive Species on page 41).

## Impacts

- » **Economic:** Impacts waterways, irrigation ditches, and drainage canals, where it has the potential to inhibit flow and increase maintenance costs.
- » **Ecological:** Because Flowering rush spreads readily via propagules or reproductive plant parts, it has the ability to outcompete and replace native plant communities and alter water quality. Considered a noxious weed throughout BC.
- » **Social:** Impedes the use of shallow waters for recreation, irrigation, and industrial activities.



## Distribution Map





## MARINE INVASIVE SPECIES

**Cordgrass species (*Spartina anglica*, *S. densiflora*, *S. patens*, and *S. alterniflora*)**

### Description

*Spartina* species are aquatic intertidal cordgrasses that have invaded the west coast of Canada, modifying natural tidal mudflats. They are found on cobble beaches, in marsh zones and intertidal mudflats. These invasive *Spartina* species can grow from a single plant, or as a circular clump.

### Flowers

Flower heads resemble wheat. Either erect spikes or drooping.

### Leaves

Smooth, large leaves in varying shades of green. Often in-rolled and branched at 45-90° angle from the stem.

### Stems

Up to 1.5 m tall.

### Other ID Tips

It can be difficult to differentiate *Spartina* species from look-alike native species. The best time to identify *Spartina* species is in the fall, as it remains green longer than most native grass and rush species.

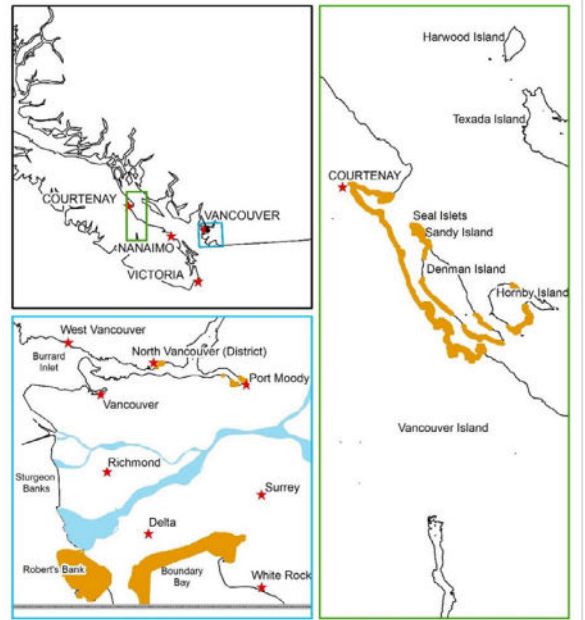
## Dispersal via Seaplanes

The propellers of seaplanes can dislodge rhizome fragments of *Spartina* species, allowing it to spread via tidal movement. Launch aircraft on designated docks and launch areas.

## Impacts

- » **Economic:** *Spartina* species impact fisheries, shellfish industries, and tourism by outcompeting and displacing native species. It specifically presents a significant risk of reducing rearing habitat for clams, mussels, and oysters.
- » **Ecological:** *Spartina* species outcompete native species in tidal areas, which will reduce critical habitats (including nursery areas) for fish, crabs, shellfish, and shorebirds.
- » **Social:** Impedes the use of shallow waters for recreation, irrigation, and industrial activities.

## Distribution Map



General location where *Spartina* species are found throughout British Columbia. Blue represents the Lower Mainland and green represents Baynes' Sound. The approximate distribution of *Spartina* species is shown in orange.

Map produced by BC *Spartina* Working Group BC *Spartina* Treatment Plan, February 2022.



Curly-leaved pondweed, C. Evans, University of Illinois, Bugwood.org

## Reporting Invasive Species

Help make a difference by reporting invasive species you see on your travels. Early identification and treatment of new infestations is key to stopping the spread! The information you share can have a significant role in invasive species management. Any suspect plants or animals you encounter should be reported in one of the following ways:

- » ISCBC – Contact us at [bcinvasives.ca/report](https://bcinvasives.ca/report) or toll free: 1-888-933-3722
- » Province of BC at [gov.bc.ca/invasive-species](https://gov.bc.ca/invasive-species)
- » If you believe you have found a Zebra or Quagga mussel, contact the RAPP Hotline: 1-877-952-7277

- » Download the Report Invasives BC app—free for Apple or Android. This mobile app lets you report invasive species sightings anywhere in BC and even works when you are offline. It has great photographs and can serve as a handy field guide too. Visit [Report - Invasive Species Council of British Columbia \(bcinvasives.ca/take-action/report\)](https://Report-InvasiveSpeciesCouncilofBritishColumbia.ca/take-action/report) to download the app and to check out a short video for tips on how to use the app.



- » iNaturalist - Join our iNaturalist project I Spy and Identify where we are building an active community of people observing nature and protecting Canada's landscapes from invasive species. Every report helps scientists track, and protect Canada's native species from unwanted impacts, including invasive species.



# Regional Invasive Species Organizations

## 1. Vancouver Island and Sunshine Coast

Coastal Invasive Species Committee (Coastal ISC)

**Phone:** 250-871-5117

**Email:** [info@coastalisc.com](mailto:info@coastalisc.com)

**Website:** [coastalisc.com](http://coastalisc.com)

## 2. Metro Vancouver

Invasive Species Council of Metro Vancouver (ISCMV)

**Phone:** 604-880-8358

**Email:** [info@iscmv.ca](mailto:info@iscmv.ca)

**Website:** [iscmv.ca](http://iscmv.ca)

## 3. Fraser Valley

Fraser Valley Invasive Species Society (FVISS)

**Phone:** 778-548-FVIS (3847)

**Email:** [info@fviss.ca](mailto:info@fviss.ca)

**Website:** [fviss.ca](http://fviss.ca)

## 4. Boundary

Boundary Invasive Species Society (BIS)

**Phone:** 250-446-2232

**Email:** [info@boundaryinvasives.com](mailto:info@boundaryinvasives.com)

**Website:** [boundaryinvasives.com](http://boundaryinvasives.com)

## 5. Central and West Kootenay

Central Kootenay Invasive Species Society (CKISS)

**Phone:** 1-844-352-1160

**Email:** [info@ckiss.ca](mailto:info@ckiss.ca)

**Website:** [ckiss.ca](http://ckiss.ca)

## 6. Columbia-Shuswap

Columbia-Shuswap Invasive Species Society (CSISS)

**Phone:** 1-855-PUL-WEED (1-855-785-9333)

**Email:** [info@columbiashuswapinvasives.org](mailto:info@columbiashuswapinvasives.org)

**Website:** [columbiashuswapinvasives.org](http://columbiashuswapinvasives.org)

## 7. Cariboo, Chilcotin, Coast

Cariboo Chilcotin Coast Invasive Plant Committee (CCCIPC)

**Phone:** 250-855-9333

**Email:** [info@cccipc.ca](mailto:info@cccipc.ca)

**Website:** [cccipc.ca](http://cccipc.ca)

## 8. Northwest

Northwest Invasive Plant Council (NWIPC)

**Phone:** 1-866-44WEEDS (449-3337)

**Email:** [manager@nwipc.org](mailto:manager@nwipc.org)

**Website:** [nwipc.org](http://nwipc.org)

## 9. Squamish, Whistler

Sea to Sky Invasive Species Council (SSISC)

**Phone:** 604-698-8334

**Email:** [info@ssisc.ca](mailto:info@ssisc.ca)

**Website:** [ssisc.ca](http://ssisc.ca)

## 10. East Kootenay

East kootenay Invasive Species Council (EKISC)

**Phone:** 1-888-55-EKISC (35472)

**Email:** [info@ekisc.ca](mailto:info@ekisc.ca)

**Website:** [ekisc.com](http://ekisc.com)



# For More Information

This guide includes some regulated invasive species.

## Regulated invasive species lists for BC can be found online at:

- » *Controlled Alien Species (Wildlife Act)*: [www.bclaws.ca/Recon/document/ID/freeside/94\\_2009](http://www.bclaws.ca/Recon/document/ID/freeside/94_2009)

## To learn more about invasive species, visit;

- » BC Ministry of Environment and Climate Change Strategy: [www.env.gov.bc.ca/bcparks](http://www.env.gov.bc.ca/bcparks)
- » BC Ministry of Environment and Climate Change Strategy: [www.for.gov.bc.ca/hra/invasive-species/index.htm](http://www.for.gov.bc.ca/hra/invasive-species/index.htm)
- » Invasive Species Council of BC: [www.bcinvasives.ca](http://www.bcinvasives.ca)



LeonU\_Getty\_images

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Province of Manitoba. [Aquatic Invasive Species Factsheet](#) (gov.mb.ca)

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# Glossary

**ALTERNATE:** plants whose leaves are single at each node and borne along the stem alternately in an ascending spiral.

**ANNUAL:** a plant that completes its life cycle in one year and dies at the end of the growing season.

**BASAL LEAVES:** a leaf that grows lowest on the stem of a plant or flower.

**BYSSAL THREAD:** fibers made from proteins that are used by mussels to attach to rocks, pilings or other substrates.

**FLOATPLANE:** an aircraft equipped with floats for landing on water.

**FLYING BOAT:** a large seaplane that lands with its fuselage in the water.

**FUSELAGE:** the main body of an aircraft.

**LINEAR LEAVES:** long and narrow, with almost parallel sides.

**NODE:** the points on a stem where the buds, leaves, and branching twigs originate.

**PERENNIAL:** a plant which lives for multiple years and may reproduce many times during its life.

**PETIOLES:** having a leafstalk or petiole attaching the leafblade to the stem.

**SEED POD:** the protective shell or case surrounding a seed.

**SERRATED:** having a jagged, saw-like leaf margin, with forward-pointing notches.

**RACHIS:** a stem of a plant bearing flower stalks at short intervals.

**RHIZOME:** a specialized kind of plant stem that can store energy and produce new shoots. Rhizomes typically grow like a root underground and send new shoots up from the soil along their length.

**SEAPLANE:** an aircraft designed to land on and take off from water. Includes both flying boats and floatplanes.

**SPIKE:** a flower cluster in which each flower is not stalked.

**WHORL:** a set of leaves, flowers, or branches arising from the stem at the same level and encircling it. In flowers, each of the sets of organs, especially the petals and sepals are arranged concentrically around the receptacle. Can also be referred to as coils or spirals.



**For more information on Invasive-Wise  
Tourism, please contact:**

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