



## CASE STUDY: FEATHERED MOSQUITOERN (*Azolla pinnata*)

The introduction and spread of aquatic invasive species (AIS) poses a threat to lakes, rivers, and other water bodies throughout North America. One pathway that has been shown to contribute to AIS spread is seaplanes. This case study illustrates the role seaplanes can play in the spread of AIS and the negative impacts AIS establishment can have on the environment as well as seaplane safety and operations. These case studies also illustrate the important role seaplane pilots can play to prevent the spread of AIS.

### FAA Geographic Region: Southern

Feathered mosquitofern has been found in (and removed from) numerous plant nurseries in the United States. It has a limited distribution to water bodies in Florida and Hawaii. Because of its limited distribution, seaplane pilots can prevent further spread of this plant to new water bodies.

### What is Feathered Mosquitofern?

Feathered mosquitofern is a small free-floating aquatic fern with roots that are suspended in the water column. Individual plants often clump together to form dense floating mats. Native to Australia, feathered mosquitofern grows in habitats of slow-moving freshwater ponds, swamps, and drainage canals, and thrives in temperate humid climates. The few populations that exist in the United States were spread by hitchhiking on other aquarium plants, and subsequently dumped into waterbodies. Both plant fragments and spores can produce new plants.

### Why is Feathered Mosquitofern a problem?

Feathered mosquitofern can grow rapidly and cover the surface of a waterbody. The species can grow very quickly and can double its population size every two to five days. Their dense mats can reduce water oxygen levels and deplete nutrients in the water column resulting in impeded native plant growth. Dense mats can also limit access to boating, fishing, and other activities. Feathered mosquitofern can spread on currents between connected waterbodies, and can attach to watercraft and equipment. Dense mats may also clog irrigation and flood control structures.

### How can Feathered Mosquitofern be spread by seaplanes?

Seaplanes that take on water in their floats may contain fragments or spores of feathered mosquitofern. Feathered mosquitofern can survive for days on moist soil out of water. Fragments can easily be transported on seaplane floats, mooring lines, wires and cables, and rudders.

### Seaplane pilots can help prevent the spread of aquatic invasive species.



Examples of other aquatic invasive species you may encounter in your region:

- Alligatorweed (*Alternanthera philoxeroides*)
- Common Salvinia (*Salvinia minima*)
- Giant Salvinia (*Salvinia molesta*)
- Indian Swampweed (*Hygrophila polysperma*)
- Parrotfeather (*Myriophyllum aquaticum*)
- Water Hyacinth (*Eichhornia crassipes*)
- Water Lettuce (*Pistia stratiotes*)
- Waterflea (*Daphnia lumholtzi*)
- Yellow Floating-heart (*Nymphoides peltata*)

# SEAPLANE PILOT BEST PRACTICES TO REDUCE THE SPREAD OF AQUATIC INVASIVE SPECIES

Follow these steps to improve your flying safety while preventing the spread of aquatic invasive species (AIS).

**Why? AIS can take over waterbodies and crowd out native species, harming native fish and wildlife populations and potentially reducing seaplane access.**

## Planning a Flight

Familiarize yourself with AIS at destination water bodies, but recognize that not all water bodies are monitored for AIS—always assume a waterbody has AIS.

If you are departing from a waterbody that has confirmed high-risk AIS, before landing at another water body, consider landing at an airport first to fully inspect and clean your aircraft.

## Before Entering the Aircraft

Inspect and remove any visible vegetation or other debris from the aircraft. Remove any plant growth on mooring lines and dispose of any plants or identified AIS in a container, which can then be disposed of properly upon returning to the base location. Inspect the following for AIS:

- Floats
- Hulls
- Rudders
- Wires and Cables
- Mooring lines
- Wheel Wells
- Crossmembers
- Exterior paddle
- Your footwear and gear

Visually inspect submerged parts of the aircraft and run your hands, or use a brush, along the surfaces to check for any AIS that may be attached, especially if the aircraft has been moored on a waterbody for more than a few hours.

Pump as much water as possible out of bilge compartments using a pump with an invasive species filter (e.g., [Turbo Pump](#)) to limit the possibility of transporting microscopic AIS.

## Before Takeoff

Just prior to takeoff, **raise and lower your water rudders several times to remove aquatic hitchhikers**, which can cause cable stretch and affect steering.

Avoid taxiing through aquatic plants. If you must taxi through aquatic plants, stop once in open water and manually clear vegetation from floats, hull, and rudders.

## After Takeoff

After takeoff at a safe altitude, if conditions permit, **raise and lower your water rudders numerous times while flying over the water body you are departing** to clear aquatic plants from the water rudders and cables. If aquatic plants remain visible on the plane, return and remove them.



## Storage and Mooring

Thoroughly *Clean, Drain, Dry* the aircraft prior to flying to another waterbody. If the aircraft floats take on water, completely drain and dry if possible, and flush the floats with hot water. Allow to dry completely.

## Report Invasive Species

Report any invasive species you see to your state AIS reporting system.

## Spread the Word about Clean, Drain, Dry

Informed seaplane pilots can make a difference in preventing the spread of AIS. Talk with your colleagues and spread the word about the importance of *Clean, Drain, Dry* and the steps pilots can take to minimize the spread of AIS.

Expand your understanding of the types of AIS you might encounter in local and regional waterbodies by visiting <https://nas.er.usgs.gov>.



## Become a Certified AIS-Trained Seaplane Pilot!

Click on the QR code to watch a video created by the Washington Seaplane Pilot Association. After watching the video, take a short test, and earn your annual certificate to become an AIS-trained seaplane pilot. This certificate is recognized by all of the Pacific Northwest states.