CASE STUDY: GIANT SALVINIA (*Salvinia molesta*)

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: Western Pacific

Giant salvinia is an invasive floating freshwater fern found in the lower Colorado River basin. It is associated with southern drainages, as well as San Luis Obispo County, California. Native to Brazil and introduced to the United States for use in aquariums and decorative ponds, giant salvinia is one of many similar species of invasive floating vegetation that blanket water bodies, choking out native plants and animals and eliminating recreational opportunities.

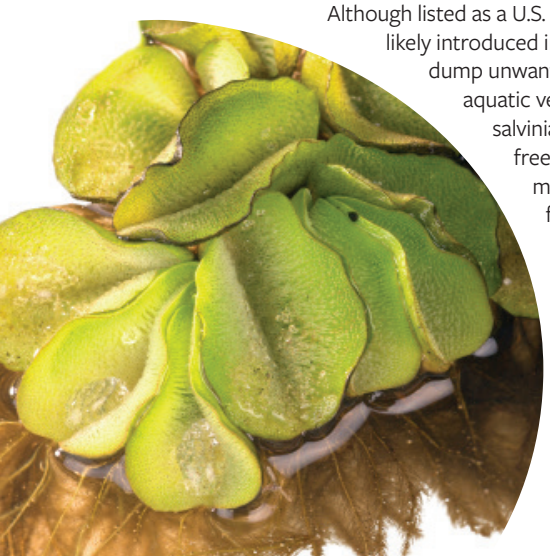
What is Giant Salvinia?

Considered one of the most problematic aquatic plants in the southern United States, giant salvinia is a robust, fast-growing, floating aquatic fern. Originally imported from Brazil for sale in the pond and aquarium trade, it grows in dense mats that can double in size in just a week under ideal conditions. Giant salvinia grows best in warm, nutrient-rich, still or slow-moving water bodies, including ditches, ponds, lakes, slow-moving rivers, and canals.

Why is Giant Salvinia a problem?

Thick mats of giant salvinia can eventually cover the entire surface of a water body, slowing water movement and dramatically decreasing available sunlight and oxygen for native plants and animals. Decaying plant matter falls to the bottom of these systems, further decreasing available oxygen. Mats of giant salvinia up to 3 feet thick have been reported, but even less dramatic densities of salvinia are known to impede navigation and eliminate recreational activities, such as swimming and fishing, while creating a beneficial habitat for mosquitos.

How can Giant Salvinia be spread by seaplanes?



Although listed as a U.S. Federal Noxious Weed and thus illegal to sell, giant salvinia is likely introduced into new areas by uninformed aquarium or pond owners who dump unwanted vegetation. Recreational activities that entrain and transport aquatic vegetation are likely responsible for the further spreading of giant salvinia. Fragments of giant salvinia, which can tolerate short periods of freezing temperatures, can easily be transported on seaplane floats, mooring lines, wires and cables, and rudders. Once established, floating clumps of giant salvinia can spread independently through flowing water, wind, and currents.

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

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

- European Water-starwort (*Callitriche stagnalis*)
- Feathered Mosquitofern (*Azolla pinnata*)
- Hydrilla (*Hydrilla verticillata*)
- Quagga Mussel (*Dreissena bugensis*)
- Red-rim Melania (*Melanoides tuberculata*)
- Spongeplant (*Limnobium laevigatum*)
- Water Primrose (*Ludwigia spp.*)
- Waterflea (*Daphnia lumholtzi*)
- Yellow Floating-heart (*Nymphoides peltata*)
- Zebra Mussel (*Dreissena polymorpha*)

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.