Source: Oklahoma Department of Wildlife Conservation.

CASE STUDY: GOLDEN ALGAE (*Prymnesium parvum*)

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: Southwest

Golden algae have been found in more than 20 states, and blooms were first noted in Texas in the 1980s. During the early 2000's, algae blooms in reservoirs and rivers occurred across the southern United States. The alga occurs in brackish inland waters and coastal freshwater rivers, lakes, and estuaries. Seaplane-accessible water bodies across the Southwest may be at risk from golden algae introductions.

What is Golden Algae?

Golden alga can be found suspended in the water column. The algae, suspected to originate from Europe, uses energy from the sun to grow. The algae produces chemicals toxic to other plankton and microscopic life. As other organisms die from these toxic chemicals, golden algae grow excessively, or bloom, creating a golden color in the water. Evidence suggests that the toxin production by golden algae can be triggered by increased salinity linked to periods of drought.

Why is Golden Algae a problem?

The chemicals produced by golden algae are toxic to gill-breathing animals, such as fish and shellfish as well as plankton. The first observation of the algae in North America was linked to a massive fish kill of nearly 150,000 individual fish in Texas. A conservative estimate of more than 30 million fish deaths in Texas are directly linked to golden algae toxic blooms. Native mussel beds have also succumbed to toxins from algal blooms. Harmful algal blooms that cover the surface of the water block sunlight from reaching other organisms in deeper water, hindering their growth. To minimize their negative impacts and spread, algal blooms can trigger waterbody closures to all activities.

How can Golden Algae be spread by seaplanes?

Algae may be transported within or on the floats of seaplanes. It is also possible that algae may hitchhike on other aquatic plants that attach to seaplane floats, mooring lines, wires and cables, and rudders. The resting, or dormant, stage of the algae may be one way that this species can survive and facilitate spread to new waters.

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*)
- Brittle Waternymph (*Najas minor*)
- Common Salvinia (*Salvinia minima*)
- Feathered Mosquitofern (*Azolla pinnata*)
- Giant (or Island) Apple Snail (*Pomacea maculata*)
- Giant Salvinia (*Salvinia molesta*)
- Indian Swampweed (*Hygrophila polysperma*)
- Water Hyacinth (*Eichhornia crassipes*)
- Water Lettuce (*Pistia stratiotes*)
- Waterflea (*Daphnia lumholtzi*)

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.