



Source: National Park Service.

CASE STUDY: NEW ZEALAND MUD SNAILS (*Potamopyrgus antipodarum*)

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: Eastern

First reported in the United States near the Snake River in Idaho, New Zealand mudsnails have spread rapidly throughout the western states, in the Great Lakes, and in lakes and streams in parts of the East Coast, including Pennsylvania and New York. The physiology and biology of mudsnails make them well-suited for human-aided introduction and spread.

What are New Zealand Mudsnails?

New Zealand mudsnails are tiny, brownish freshwater snails about ¼ inch long. These small snails are remarkably adaptable to a wide range of conditions and habitats ranging from cold flowing streams to warm water lakes and brackish water. Their broad tolerances for water temperature, flow rates, and salinity create significant potential for widespread establishment across much of the United States. Mudsnails have a flap (also known as an operculum) that allows them to withdraw into their shells, making it possible for them to survive out of water for days. Populations within the United States are almost exclusively female and produce live young through cloning—the introduction of a single snail can start a new population.

Why are New Zealand Mudsnails a problem?

Once established, mudsnail densities can increase rapidly, sometimes carpeting the shallow portions of water bodies, crowding out native insects and invertebrates essential in the food webs of lakes and streams. Because of their small size and hard shell, mudsnails are not a good food source for fish, often remaining undigested and alive after a trip through a fish's digestive system. Once established, mudsnails are unlikely to be eradicated from natural systems even with targeted pesticides or water drawdowns.

How can New Zealand Mudsnails be spread by seaplanes?

These tiny snails, easily mistaken for bits of gravel or mud, are natural hitchhikers. Because of their small size, they can wedge themselves into cracks and crevices. Mudsnails can also be transported on any entangled aquatic plants or standing water. In addition, any equipment, including anchors, lines, and cables, that come in contact with the sediment at the bottom of a lake can transport mudsnails.

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

Image Source: U.S. Geological Survey.

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

- Didymo (*Didymosphenia geminata*)
- European Frogbit (*Hydrocharis morsus-ranae*)
- Faucet Snail (*Bithynia tentaculata*)
- Fishhook Waterflea (*Cercopagis pengoi*)
- Mystery snails (*Cipangopaludina spp.*)
- Spiny Waterflea (*Bythotrephes longimanus*)
- Variable-leaf Watermilfoil (*Myriophyllum heterophyllum*)
- Water Primrose (*Ludwigia spp.*)
- Waterwheel Plant (*Aldrovanda vesiculosa*)
- 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.