Clean. Drain. Dry!

~Caregiver Instructions Page~

This activity is an adaption of Aquatic Invaders from "kNOweeds", K-12 MT Invasive Plant Curriculum Guide.

Objective – Observe the mechanisms that allow aquatic invasive species to be accidentally introduced or spread to water bodies by recreational activities, and discuss ways to reduce that spread.

Audience and Time – 1 - 5 participants; all ages, but easiest for 8+; 30 minutes

Background – ***Invasive species*** are plants or animals that ***are not native to where you've found them***, and ***causes harm to things we value***, like the environment, human health, and the economy. Aquatic invasive species often travel by hitchhiking with the help of unsuspecting people, on boats, kayaks, canoes, trailers, fishing lines, and other recreational gear. Taking the time to inspect and clean your boat or recreational equipment before leaving a body of water and before entering a new body of water goes a long way to reduce the spread of aquatic invasive species. This is known as "***Clean. Drain. Dry.***": ***Clean*** mud and plant fragments from your vessel, trailer, and recreational gear before leaving a water body. ***Drain*** all water from your vessel, trailer, and equipment from every conceivable space, doing so away from waterways and storm drains. ***Dry*** your vessel, trailer, and equipment completely after each use (anything that contacts water). There is an additional example story below, discussing the aquatic invasive species, Hydrilla.

Hydrilla: (*Hydrilla verticillata*) is a submerged, perennial aquatic invasive plant that can grow in a variety of aquatic habitats including: rivers, streams, lakes, ponds, marshes, canals, ditches, and reservoirs. Hydrilla is native to Asia (i.e., India, Sri Lanka, and Korea) and was first brought to the United States intentionally in the 1960's to sell as an aquarium plant. Today it can be found in many parts of the US, and is spread primarily by human activities. Small fragments of hydrilla can be transported from one water body to another on boats, trailers, recreational gear, earthmoving equipment, and even our four-legged furry friends.

Hydrilla is not currently found in Vermont!

Part of hydrilla's success as an invader is its capacity to grow in a range of aquatic habitats under a variety of water conditions, substrates, and temperatures. Unlike most native aquatic plants, hydrilla can grow under extremely low light conditions at depths of up to 30 feet. Hydrilla can begin photosynthesizing much earlier in the morning than native plants so it is able to capture most of the carbon dioxide in the water, which limits the growth of other plants. In its non-native range, hydrilla can grow very rapidly (it can double its biomass every two weeks in summer) and has no natural predators or diseases to limit its population.

Under ideal growing conditions, hydrilla can completely take over a water body. Dense infestations can shade or crowd out all other native aquatic plants, alter water chemistry, cause dramatic swings in dissolved oxygen levels, increase water temperatures, and affect the diversity and abundance of fish populations. Thick mats of hydrilla can impede navigation, reduce recreational boating, swimming, and fishing opportunities, obstruct flow in irrigation canals, and clog industrial pipes and intake grates.

Hydrilla identification: small, bright green, pointed leaves with serrated edges and 1 or more sharp "teeth" under the center of each leaf; leaves arranged in whorls of 3-8 (generally 5), connected directly to the stem; stems thin and may grow at a rate of one inch per day; near the water surface, stems branch prolifically and will continue to grow horizontally, often forming impenetrable mats of vegetation; grows rooted into substrate, but the plant is easily fragmented and will also survive as a free-floating mat at the water surface.

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~Activity Instructions Page for Clean. Drain. Dry!~

Supplies You Need to Collect Ahead of Time

- 1 spoonful dried herb that has big flakes (like parsley, basil, thyme, etc.)
- 1 floating toy (or paper boat – check out this tutorial from National Geographic Kids)
- 3 containers (like plastic food storage containers or mixing bowls)
- 1 cup or spray bottle filled with water (this is your cleaning station)
- Light or white colored towel, hand towel, wash cloth, rag, or piece of paper towel

Activity

Step 1. Have a quick discussion with the student(s) about the definition of an invasive species. Share a specific example, like hydrilla, and reference the story details about how hydrilla grows and spreads. And ask them to share ways that people might recreate on or near water (boating, swimming, fishing, beach, etc.).

Step 2. Have student(s) set up with their own floating toy and containers to hold water. Explain that each container is a different type of waterbody: lake, pond, wetland.

Step 3. Explain that the dried herb represents an aquatic invasive species, like hydrilla, and that they will be conducting an investigation to see how aquatic invasive species may be spread from one water body to another through recreational activities. [testing their hypotheses from the earlier discussion].

Step 4. Instruct them to fill all 3 containers halfway with tap water, and *add a spoonful of dried herbs to ONLY 1 of the containers filled with water*. The container with water and herbs will be your "lake".

Step 5. Now it's time for some fun! Have them take their floating toy and act out the associated activities of recreating on a lake.

Step 6. After 30 seconds, have them remove item from "lake" and transfer directly into a second container (that only has water) that will be the "pond". And again, have them act out the associated activities of recreating on a pond.

Step 7. Repeat this again for the "wetlands" container. After 30 seconds in the "wetland", transfer toy to towel. Have them examine the toy closely and look for any signs of "hydrilla" on the towel or item – paying close attention to the insides of the toy or other spaces that may hold water. Also have them examine the containers of water for any signs of "hydrilla".

Step 8. Discuss what happened in the activity and what they observed. You can use the following questions:

- Did the items representing recreational equipment still have "hydrilla" on them after visiting the Pond and Wetland? If so, where was the "hydrilla" located on the items?
- Did you find "hydrilla" in the Pond and Wetland containers? If so, how did the aquatic invasive species get into the other water bodies?
- How does this activity relate to real recreational activities?
- How could you prevent the spread of the aquatic invasive species from one container to another?

Step 9. Next, introduce the concept of Clean. Drain. Dry. Have them "wash" off their floating toy with a cup or spray bottle of water, simulating the steps they might take to clean, drain, and dry a vessel, trailer, or recreational equipment.

Step 10. Empty and clean the containers, and have them repeat the same activity again, but with a quick trip to the "washing station" before going to the next container of water. After visiting all three containers, examine the equipment and containers. Was "hydrilla" spread this time? Remind them that the best way to prevent the introduction and spread of aquatic invasive species from one water body to another is to practice **Clean, Drain,** and **Dry**!