

LESSON 26

Aquatic Invaders

OBJECTIVES

Students will understand the impact of aquatic invasive plants on ecosystems. Students will know how one of Montana's newest aquatic invaders, Eurasian watermilfoil, spreads into new environments and what can be done to help prevent its spread.

METHOD

Students demonstrate and discuss ways that Eurasian watermilfoil and other aquatic invasive species can be spread inadvertently to new locations during recreational and other activities.

MATERIALS

- 📎 Photo(s) of Eurasian watermilfoil
- 📎 Sink (or outdoor site for draining water)

For each group, distribute the following:

- 📎 1 teaspoon dry dill weed (available in spice section of grocery store)
- 📎 3 plastic tubs or buckets labeled **Lake, Pond and Wetland**
- 📎 3 sheets of white paper
- 📎 Newspaper
- 📎 Magnifying glasses
- 📎 Small toy boats, twine or string, paper clips or washers, pencils, aluminum can, and other items for demonstrating human activity in our state's waters
- 📎 2 coffee filters and a large funnel
- 📎 Cup

BACKGROUND

Aquatic invasive plants from sources outside of Montana are finding their way into our state's streams, lakes, rivers, and wetlands. Several species are currently found on the state's Noxious Weed List, including Eurasian watermilfoil.

Eurasian watermilfoil (*Myriophyllum spicatum*) is an underwater aquatic plant believed to have been accidentally introduced in the 1940s to North America from Europe, where it is a widespread native plant. It is highly invasive in the northern U.S., aggressively competing with native plant communities. The mat-forming plants can clog propellers, impair swimming, restrict boating and fishing access, and affect water quality. By 2009, the only known infestations of Eurasian watermilfoil in Montana were in the Noxon Rapids area, where the plant was first discovered in the Cabinet Gorge Reservoir in 2007. In Montana it

Grade level: K-12

Subject Areas: Life science

Duration: 45 minutes

Setting: Indoors

Season: Any

Conceptual Framework Topics:

Integrated weed management, weed control, plant ecology

is now listed as a Category 3 Noxious Weed as well as a Priority Class 3 species in Montana's Aquatic Nuisance Species Plan.

Eurasian watermilfoil can spread from small plant fragments. It is tolerant of low temperatures and begins growing in early spring, outcompeting and shading native aquatic vegetation. The plant grows quickly until reaching the water surface, where it forms dense mats. Competition for sunlight and other resources results in reduced native plant diversity and abundance. Eurasian watermilfoil foliage supports few invertebrates, which are important food sources for fish and other wildlife. In addition, it expands into open water and creates habitat for non-native fish, increasing predation rates on native salmonids, which are open water species. Dense mats of Eurasian watermilfoil restrict recreational activities such as swimming, fishing, and boating, and the plant can clog water intakes and outflows and foul shorelines with decaying mats of vegetation.

Eurasian watermilfoil can look much like native species (see links under *Procedure* for photos). It can be identified by its whorls of four feather-like leaves around the stems with each leaf finely divided into paired leaflets, typically 12 to 21 pairs per leaf. The number of stems per plant increases as the plant ages. Each individual stem branches several times as it nears the water surface, creating a dense floating mat over the surface of the water. Dense Eurasian watermilfoil beds usually occur in water between 3 and 20 feet deep. The tops of the milfoil plants, both stems and leaves, often turn red in color. This species spreads by fragmentation, currents and waves, and overland via transport on boats, motors, trailers, fishing nets, and other gear.

Herbicidal control of Eurasian watermilfoil requires applying chemicals directly into the water. In Montana, applicators need a special permit from the Montana Department of Environmental Quality before applying aquatic herbicides. Eurasian watermilfoil is very sensitive to 2, 4-D, but other plants in the treated area are impacted by the herbicide treatment as well. In weed removal as a control method, the risk of spread by stem fragments is high. Using fragment barriers around harvest operations and herbicidal control can prevent spread. Water drawdown followed by exposure to freezing temperatures for 96 hours will kill plants. This method has reduced infestations, but there are impacts to native vegetation and re-infestation can be rapid. There is also a biological control agent for Eurasian watermilfoil called the watermilfoil moth. However, it is not yet widely available.

Prevention is the most important management option for Eurasian watermilfoil in Montana. Mapping, monitoring, early detection and eradication are critical to prevention. If a new infestation is found, save a specimen and report

the infestation to your County Extension or Weed Coordination office, or Montana Fish, Wildlife and Parks. To prevent spread, away from waterways remove all sediment and vegetation from boats, trailers, and equipment and wash thoroughly, including live wells. Dry all equipment. Never transfer water, vegetation, or animals between bodies of water.

PROCEDURE

Share a photo of the species Eurasian watermilfoil to the class while providing an overview of the threat of aquatic invasive plants and, specifically, Eurasian watermilfoil as one of our state's newest aquatic nuisance species (you can refer to information provided in the background section of this lesson). See the following web pages for photos and additional information:

<http://agr.mt.gov/weedpest/Category3/EurasianWaterMilfoil.htm>

<http://www.seagrant.umn.edu/exotics/eurasian.html>

Inform students that they will be conducting a small group investigation of how aquatic weeds like Eurasian watermilfoil can invade new locations from small plant fragments (The “weed” is represented by dill weed in this activity).

Teacher Note: For older students you may elect to have students design their own investigations.

1. Fill three plastic containers about halfway with clean tap water.
2. Label the containers as follows: **Lake**, **Pond** and **Wetland**.
3. Add approximately a teaspoon of dry dill weed to the water in each group's **Lake** and mix the “weed” into the water.
4. Each group will next conduct water recreational activities in the **Lake**. For example, they will be boating (using a small toy boat), fishing (using a pencil with a string tied from its end and a paper clip or washer tied to the end); and placing “trash” into the body of water- such as an empty aluminum can, and pulling it out such as would happened during a lake cleanup day. You may want to provide materials representing other activities common to your local waters as well.
5. Each time a group removes an item from the water, ask them to move it directly to the **Pond** container, and then demonstrate the recreational activity again with each item.
6. Next, move the items from the **Pond** to the **Wetland**. Demonstrate recreational activities in the **Wetland**.

Extensions

Take a class field trip to a local pond, wetland or lake. Use **Lesson 10: Know Your Neighbors** from this guide or other format for study of the plants at this site. What would happen to this ecosystem if Eurasian watermilfoil were introduced? Have students research control methods for Eurasian watermilfoil and discuss the challenges of weed control in aquatic environments. How can we help ensure that aquatic invasive plants are not spread by our activities in and around Montana's aquatic areas?

7. Remove the recreational vehicles and gear and place each item onto clean white paper (over a stack of newspaper pages to absorb excess water). Using the hand lenses, ask groups to look for any remaining "weed" fragments on the white paper or anywhere on the recreational vehicles or other items. Pay particular attention to the insides of boats or other spaces that hold water – these show how boat bilges and engines can hold and carry weed fragments to new places.

8. In a sink (or outside) use a cup to slowly transfer water from the **Pond** through a coffee filter placed in a funnel and drain off the water. Similarly, pour the **Wetland** water through a separate coffee filter. Check for "weed" fragments in each filter, then compare how much "weed" was caught in each filter, and ask students to explain any differences in amounts (*Hint: The pond was exposed to recreational items first, and then the wetlands.*)

9. Compare what happened in this demonstration to the spread of aquatic invasive plants during recreational activities. Ask students: Is there anything we can do to stop the spread of Eurasian watermilfoil or other aquatic invasive plants?

Teacher Help: Wash boats and recreational equipment after use and before using them again including water skis, fishing poles, boots, float tubes, etc. Clean engines and bilges where water-carrying fragments of invaders may be stored before using again. Be careful that well-intended activities like weed removal and waterway cleanups do not contribute to the spread of invasives. European watermilfoil can even spread after being dried out.