Maine Department of Environmental Protection
Environmental Outreach Activity

MUSICAL MILFOIL

Ages 6-12+	**Location** Inside or Outside
Group Size ~ 6-30 children	**Length** 0.5 – 1 hour
Materials ➢ Chairs, carpet squares, towels or other things to sit on ("lakes") ➢ Method to create music: stereo or instrument ➢ Playing Cards; native and invasive plants and human cards (see attached) ➢ 'Prevention is Simple…' brochure ➢ 'Maine's Lake Plants' brochure	Optional Materials ➢ Pocket magnifier to look at plants ➢ Boat and Trailer with simulated Milfoil (any green plant but Milfoil, imitation plants, or green crepe paper etc.) ➢ Plant specimens ➢ Plant ID poster board (a compilation of all Native plant cards)

SUMMARY

This activity is a version of musical chairs and introduces the topic of inasive aquatic plants. Rounds 1 & 2 focus on the concepts of native vs. invasive plants in lakes, plant ID, and are appropriate for older students. Rounds 3 & 4 show how humans use and affect lakes and are appropriate for younger students.

OVERVIEW & OBJECTIVES

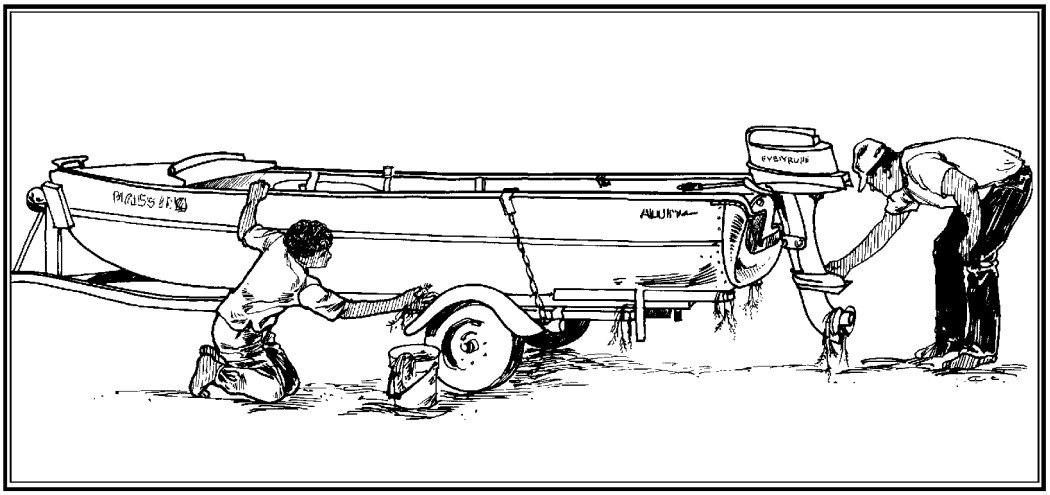
Recently, invasive aquatic plants have become a hot topic in Maine. In this activity, students will play musical chairs to help them become familiar with the invasive aquatic plant Milfoil. Students will learn the differences between native and non-native species, how Milfoil spreads, and discuss how humans affect lakes by transporting plant material. Students will also understand how Milfoil affects lakes on a wide scale in a very short time period.

BACKGROUND

There has been a lot of talk recently about **invasive** aquatic plants in Maine. These are plants that are not native to Maine. Invasive plants like Variable and Eurasian Milfoil, once introduced to a lake, sometimes grow uncontrollably and spread rapidly, taking over a lake or river from the plants that belong there. They form dense mats on the surface of the water, making boating, fishing, and swimming difficult and unpleasant, if not impossible!

BUT NOT ALL AQUATIC PLANTS ARE BAD. Not all Milfoil species are bad – there are 6 native Milfoil species in Maine. We need plants like these to have a healthy lake.
What do these native plants do for us?

- Reduce shoreline erosion
- Improve water quality
- Provide habitat for aquatic animals
- Provide food & shelter for fish and wildlife
- Create beauty



BEFORE YOU BEGIN

1. Review 'Prevention is Simple' and 'Maine's Lake Plants' brochures for reference.
2. Review terms: **Invasive Aquatic Plants, Milfoil, Habitat, Native, Non-native, Competition, Carrying capacity** - What do these terms make you think of? (A glossary of bold terms is attached)
3. Discuss the basic needs that plants must have in their habitat to live (food, light, water, and space). All plants must meet these basic needs in order to survive.

PLAYING THE GAME

(The following instructions are based on using 15 students; it may need to be adjusted to fit your class) Paragraphs in *italics* are for teachers to read to students to help introduce the round.

- → Rounds One and Two introduce the concepts of native vs. invasive plants in lakes and plant identification. (*Older Students)*
- → Rounds Three and Four show how humans use and affect lakes. (*Younger Students).*

ROUND 1 -- NATIVE PLANTS, HEALTHY LAKES

1. The carpet squares or chairs represent "lakes". Arrange enough lakes circle (one per student) in a large with the plant ID poster in the center. Place the **native** plant cards face down on the chairs.

2. All students will start the round. Play music and have students walk around outside of the chairs in a circle. When the music stops, students should find a lake (chair/square) to sit on. In this round, all will easily find a lake.

3. Have students tell the rest of the group what native plant is on their card (refer to plant poster in center of circle). This is a time for discussion about the many types of plants the live in the lake and hand them to the instructor. Move on to Round 2.

ROUND 2 -- MILFOIL IS INTRODUCED TO A LAKE

"One day, Bo Boater forgot to check his boat for any aquatic plants that were stuck to his motor when he left his lake in his home state. Then he came to Maine, and an invasive aquatic plant, Variable Milfoil, hitched a ride. Now that it is in our state, where will it end up? What could happen?"

1. Collect all plant cards and replace one native plant card with a Milfoil card. Play the game with everyone. For those who found lakes, what plant did you find? Refer to the poster in the center of the circle. Who found the lake where Milfoil was introduced? The lake that gets the Milfoil card is now off limits for future rounds. This lake will never be rid of Milfoil!

2. Collect all the native plant cards and replace two more natives with two Milfoil cards. Play a round with all students. What happened? Now three lakes are infested with Milfoil. This represents the ability of Milfoil to spread rapidly and out-**compete** native plants. Now there are tree lakes that are off limits and some participants will have to share a lake.

3. Continue replacing native plant cards with Milfoil cards. Continue to add Milfoil to the lakes until only one or two lakes are not infested and everyone in the game is trying to visit these lakes.

"How did this happen?"

Methods of Milfoil spreading:

- → Seed transport (by animal, water, etc)
- → Root runners or rhizomes (think of strawberry plants)
- → Human activities (fragmentation!) ← <u>THIS IS THE BIG CONCERN</u>!

4. Ask *"Why does Milfoil, like other invasive species, spread so quickly and out-compete native plants?"*
    - → It has few predators in its new environment (they weren't imported with the invasives!).
    - → It grows well in cold water, so it gets a "head start" in spring, reaches the surface, and blocks the light from reaching other native plants.

ROUND 3 -- PEOPLE AND LAKES

So, we determined that invasive Milfoils are a problem for the native plants in the lake. But how do you think invasive plants affect people?

1. Discuss what students like to do on the lake. (boating, fishing, swimming, jet-skiing, etc)

2. Place the human use cards face down on all of the chairs. Play the game with all students. After the music stops have each person look at their card and tell the others what they were doing in the lake. Return cards to the instructor and move onto round four.

ROUND 4 -- PEOPLE AND MILFOIL

"Oh no! Bo Boater is back! And once again, he forgot to check his boat for any aquatic plants that were stuck to his motor when he left another lake. He came to Maine, and a fragment of Eurasian Milfoil hitched a ride on his boat. Now it is in our state, but where will it end up? What could happen?"

1. Shuffle in a "bad" human/Milfoil card. Put the cards face down on the lakes, and make sure that one human/Milfoil card is put on a lake. Play a round. If Milfoil is in your lake, what happens? Now no one else can use the lake, as it has been infested with Milfoil. Leave the card face up on that lake. The person who found the human/Milfoil card continues to play, but this lake is now off limits since it will never be rid of milfoil.

"If boaters in the lake don't recognize the invasive Milfoil, and boat through the patches, they can worsen the infestation. Propellers can chop the existing plants into fragments, and each individual fragment, no matter how small, has the potential to float to other sections of the lake, or down a connecting stream, where it can root and grow and spread the problem! MILFOIL IS FOREVER!!!"

2. Reshuffle the cards, adding two more human/Milfoil cards on the available lakes. Play another round, with the one lake that is already off limits - students will have to share lakes. Stop the music. What are people doing on their lakes? Who found Milfoil? Leave the Milfoil card face up on the lake. These lakes are now off limits and there will be more lake sharing.

3. Replace more cards with human/Milfoil cards. Milfoil is spreading quickly. Continue in the same fashion by adding Milfoil-infested cards. Play until every lake is infested with Milfoil. Now, is anyone able to enjoy his or her lake?

WRAP-UP

1. Look over Invasive Brochure. Discuss the laws with students and review how both Milfoil and Humans can affect Maine lakes. Be sure to emphasize that not all lake plants…or even all Milfoil species…are bad! However, if all plants are removed from our boats and trailers, we stop the chance of introducing any plants to waters where they aren't normally/natively found. For more information regarding the aquatic invasive plant program in Maine, visit the Maine DEP lakes page at www.maineDEP.com.

2. If a boat/trailer is available, show them how to check and clean their boats, and what to do with the plant fragments.

Invasive plants are FOREVER! Once they are introduced into a water body, it is nearly impossible to successfully get rid of them. Prevention education is the first step, and your class can help by doing some of the outreach opportunities below.

ENRICHMENT/OUTREACH

1. Use the information that you learned today and teach another class in your school about invasive plants and their effects on your community/watershed.

2. Have students visit a lake without a Milfoil problem, then travel to a lake with mats of Milfoil – discuss the differences and how Milfoil is affecting the lake. If travel isn't possible – find pictures of Milfoil infested and non-Milfoil infested lakes on the Internet and discuss the differences.

3. Discuss other invasive species and how they affect the surrounding community and its native species.

4. Ask students what they can do to prevent invasive plants like Milfoil from infesting Maine's lakes. How would they inform boaters from away about the problem and that we don't want invasive species in our lakes?

5. Contact your local Lake Association about their boat inspection program. Volunteer to help at a local boat launch to inspect boats/trailers entering and leaving the water for fragments of plants. Hand out flyers and talk with boaters about the problems facing Maine.

6. Bring in a representative from your local Lake Association to discuss the issues surrounding your lakes and rivers.

SPREAD THE WORD, NOT THE PLANT!

Designed by Mary Gilbertson, Maine DEP/Americorps Educator 2001.
Adapted by Cameron Parker, Maine DEP/Americorps Educator 2002.

How to Use Musical Milfoil Game Cards

You need 2/3 as many materials (chairs/carpet squares/cards) as you have students in class. For 15 students, you need 10 'lakes,' 10 native plant cards, 2-10 invasive plant cards, and 20 human use cards (10 each of round three and four). Please alter numbers to work best for your class.

Rounds One and Two use Plant cards.

You can either cut cards apart (to help students learn the plants by ID) or keep them together. Make photocopies for correct number of students. You may also use the side with the printed plant name to make a Plant ID Poster to put in the center of the circle for students to refer to.

Round One: Use cards labeled Water Marigold, Bladderwort, Coontail, and Yellow Water Crowfoot. These are **native** aquatic plant species in Maine. Either cut apart or leave together for this round.

Round Two: Introduce the cards labeled Variable Milfoil and Eurasian Milfoil. These are **non-native, invasive** aquatic plant species.

Rounds Three and Four use Human cards.

Make photocopies as necessary for the number of students that you will be using. Each sheet has 9 cards. Cut each card out and place on 'lakes' for each round.

Round Three: Cards show how humans use lakes – swimming, boating, snorkeling, fishing.

Round Four: Cards show how humans can affect their lakes with weeds/Milfoil – not checking boat equipment, weeds make it difficult to swim/fish/boat.

MUSICAL MILFOIL GLOSSARY

Adaptation – An ecological or evolutionary change in structure or function of an organism or species that enhances its ability to survive and reproduce.

Biodiversity – This is a relatively "new" term, coined by E. O. Wilson about a decade ago. In general, biodiversity refers to the variety of living things, their connections to each other and to the physical environment. It includes the variety of ecological and evolutionary processes that sustain living things and keep them ever-changing and adapting.

Carrying Capacity – The maximum number of organisms of a given species that can survive in a particular ecosystem on a long-term basis.

Competition – When two or more organisms have the potential for using the same resource. May be intra-specific (within one species) or inter-specific (between two or more species).

Habitat – An area that provides an animal or plant with adequate food, water, shelter, and living space in a suitable arrangement. Other plants and animals can also be considered part of the habitat.

Introduced species – Species that have been brought into a new region or habitat and are now reproducing. Exotic or Alien species are also terms used in this manner. Some introductions are purposeful, others accidental, i.e. aquarium plants that are dumped into a local water body are introduced accidentally and may be invasive.

Invasive species –These are species that can quickly spread and compete with native species for the essential resources necessary for survival and reproduction. These species are the second most important threat to biodiversity (after habitat loss). Rarely, some species native to a community can become invasive due to human activities or other natural changes. Most invasives, however, are exotics/aliens/non-natives that arrived by natural dispersal or were introduced by people.

Milfoil – Milfoil is the common name for a number of species in the genus *Myriophyllum.* While six species of Milfoil are native to Maine, Variable Milfoil (*Myriophyllum heterophyllum*) and Eurasian Milfoil (*Myriophyllum spicatum**)*** are non-native, invasive threats to Maine lakes and streams. These two species of Milfoil create mats of vegetation at shallow depths, blocking light from native aquatic plant species. Variable Milfoil has been documented in 10 lakes in Maine, but Eurasian has yet to invade the state.

Native species – Species that have not been introduced and that has historically occurred in a particular area or region; species that naturally occur in a community as a result of natural processes of dispersal and range expansion. Human activity is not considered to be a natural factor. On this continent, the term is generally used to refer to those species that were present in a given community before European contact.

Non-Native/Alien/Exotic species – These terms are used interchangeably and refer to species that have not historically occurred in a particular area or region. These species may or may not be considered invasive.

Species – A species is a group of organisms - plant, animal, or microbe - of a single kind. Organisms are presumed to be of the same species if they are capable of breeding and producing fertile offspring.