



Mussel Walk Activity

Clean, Drain, Dry Challenge

Do you ever wonder what it takes to properly Clean, Drain, and Dry watercraft, gear, and toys exposed to outdoor waters?

◆ Grade Level(s)

Middle School

◆ Subject Areas

Life Science, Environmental Science, Ecology, and Human Impacts

◆ Key Topics

Aquatic Invasive Species (AIS), CDD (Clean, Drain, Dry), AIS prevention

◆ Duration

Preparation Time: 20 min

Activity Time: 15 min

◆ Setting

Outside or inside (Groups)

◆ Skills

Applying information, making decisions, evaluating solutions

◆ Standards

NGSS & MT Science Std.:

MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

ESS3.C: Human Impacts on Earth's Systems

CROSSCUTTING CONCEPT(S):

Cause and Effect
Influence of Science, Engineering, and Technology on Society and the Natural World

SCIENTIFIC & ENGINEERING

PRACTICE(S):

Designing Solutions

Overview

Students will be introduced to the practice of Clean, Drain, Dry (CDD) from the Stop Aquatic Hitchhikers! Campaign. This activity will explore what Clean, Drain, Dry is, how to properly Clean, Drain, Dry watercraft and objects exposed to local water bodies, what objects need to be Clean, Drained, and Dried, and how to apply Clean, Drain, Dry knowledge in several real-life scenarios.

Objectives

Students will be able to:

- explain what Clean, Drain, Dry (CDD) is and identify when and where to apply it.
- provide examples of different watercraft, water gear, and water toys that all recreational users should CDD before use.
- apply their CDD knowledge to several real-life scenarios involving different watercraft, water gear, and water toys.
- share how not practicing CDD can impact their life.
- describe how they can help to get more people to practice CDD.

Materials

Warm Up / Activity / Wrap Up

- Each CDD Challenge Inquiry Station contains:
 - Timer
 - 5 clear plastic bottles filled with water
 - Materials to CDD the bottles (ex. sponges, towels, brushes)
 - Spray bottle with water – labeled falsely as “Bleach Solution”
 - One plastic bin with:
 - 1.) 1 Scenario Card and 1 Set of Scenario Response Cards
 - 2.) 1 of 5 representative objects:
 - a. Sea Plane
 - b. Fire Tanker Truck
 - c. Car/Boat/Jet Ski/Hitch set
 - d. Kayak
 - e. Fishing Gear/Inflatable Toys and Squirt Toys set

Advanced Preparation

- Make arrangements to reserve and pick up the Mussel Walk Trunk with the materials above from FLBS.
 - Call (406) 872-4500 or make a request on the FLBS website: <https://flbs.umt.edu/newflbs/outreach/k-12-education/>



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- Prior to class, set up the five activity stations.
 - Fill the plastic bottles with water, wet the outside of the bottles with water, and stick grass to them. It is helpful to have a bucket of water and a pile of grass near this station if more than one group is doing this activity. This will allow the instructor to reset the bottles quickly in between groups.
 - Place a set of drying materials and a large paper bag (containing a scenario envelope and a representative object) at each station.

Lesson Vocabulary

Bilge – Is the lowest inner part, or bottom point, on a boat, and is designed to collect excess water. A pump inside the bilge then helps remove any accumulated water into the surrounding body of water.

Livewell – Is a tank found on many fishing boats that are used to keep bait and caught fish alive. It works by pumping freshwater from the surrounding body of water into the tank, as well as keeping the water aerated.

Procedure

◆ Warm Up (5 minutes)

- Divide students into 5 groups.
- Ask students, “What are some ways that we can protect our lakes and rivers from Aquatic Invasive Species?” **Take 2-3 answers**, responses may vary: inspection stations, Clean, Drain, Dry (CDD), education, only recreating in the same waterbody.
- A combination of all of these methods help to keep Aquatic Invasive Species from spreading across Montana. Clean, Drain, Dry is an important AIS prevention method created by the Stop Aquatic Hitchhikers!™ campaign that conveys that before leaving a water access all recreational users should:
 - **CLEAN** all visible aquatic plants, animals, and mud from all equipment.
 - **DRAIN** the watercraft bilge, livewell, motor, and other water containing objects.
 - **DRY** everything for at least five days or wipe with a towel before reuse.
- Explain that they are going to practice what it is like to try and Clean, Drain, Dry an object. Ask one student from each group come to the front, to pick up a bottle of water, and to return to their group.
 - Tell each student with a bottle that they will have one minute to Clean, Drain, and Dry their object as best as they can with the provided supplies (sponges, towels, brushes, and spray bottle) and that their group members can give them suggestions as they work.
- After the students attempt to CDD their bottle for 1 minute, stop them wherever they are in that process. Ask group members who were doing the CDD process how it felt to try and complete that task in 1 minute?
 - **Take 2 responses:** Students might say it was stressful or they did not have enough time. Was it easy? No.
- Stress that all community members need to operate with the assumption that the local water bodies they enter are infested with AIS and so they need to practice CDD after each exposure. As a result, they need to be careful and to take as much time as they need to **CDD EVERYTHING** that may have been in contact with the water **BEFORE** they leave the water access location. If they plan on going to a second location in the same day, then they should consider using a second set of gear if they cannot adequately CDD the objects they used in the water at the first location.
- What watercraft, water gear, and water toys might we need to CDD before we leave a water access? **Take 5 responses:** answers may vary (ex. boats, kayaks, paddle boards, paddles, boat trailers, canoes, waders, fishing gear, duck decoys, water toys, boogie boards, rope, cars, shoes, etc.).
 - Take these answers in a timely manner and move right into the next step.
- Before moving on to the next activity, ask the students to bring the bottles back to the instructor.



◆ The Activity (8 minutes)

- Now they will use their prior knowledge and apply what they learned about Clean, Drain, Dry to decide how best to respond to different CDD scenarios relating to different watercraft, water gear, and water toys.
- Ask the students to take out the materials in the plastic bins. Explain that each group was given an object and an envelope with 1 scenario card and 1 set of scenario response cards.
- **(3 minutes)** Students will read through their specific scenario card and choose which scenario response card would be the best course of action to respond with. They need to support their decision with reasoning and evidence from the scenario card.
- **(5 minutes)** Each group will take one minute to share their object, scenario card, the scenario response card they chose, and where it would best to CDD their watercraft, water gear, or water toy.

◆ Wrap Up (2 minutes)

- There are many kinds of watercraft, water gear, and water toys out there that we need to CDD before we leave a water access point.
- How might not practicing CDD on our own or at inspection stations impact our lives?
 - **Take 2-3 responses:** Spread AIS, would not be able to access our favorite recreation spots, hurt economy, etc.
- What are some ways you or we as a community can help to get more people to practice CDD?
 - **Take 2-3 responses:** Education, signs at water access sites, broadcasting about CDD through other media platforms, encourage people to stop at inspection stations.

Extensions

Students can:

- **create an informational sign** about many different watercraft, water gear, and water toys and how to CDD them.
- **design** their own response plan to different CDD scenarios. Students can do research on their own to back up their plans.
- **work** with the Montana Fish, Wildlife, and Parks to post CDD messaging at local fishing areas, boat launches, and rafting areas.

Online Resources

Stop Aquatic Hitchhiker's website:

<http://stopaquatichitchhikers.org/>

Montana Fish, Wildlife and Parks Aquatic Invasive Species website:

<https://cleandraindry.mt.gov/Watercraft-Inspections>



Photo credit: Leon Robers / Public Domain

Water infected with invasive mussels and other AIS can be transported in toys like squirt guns and inflatable flotation devices. It is best to let them fully dry before using them again.



Photo credit: Viking Air Ltd.

Seaplanes are used for a variety of industries such as travel, tourism, firefighting, and shipping. They must also be Clean, Drained, and Dry prior to landing in local water bodies.



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Seaplane Pilots Association website:

<https://www.seaplanepilotsassociation.org/invasive-species/>

Lakes Commission Aquatic Invasive Species Website:

<https://lakescommission.wordpress.com/issues/aquatic-invasive-species/>

National Wildfire Coordinating Group Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations: <https://www.nwccg.gov/sites/default/files/publications/pms444.pdf>

Seaplane Bases in the U.S. website:

<http://www.seaplanebase.com/USA/Montana/>

Acknowledgements

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SEAPLANE

Scenario: Since there is a small community of seaplane owners and even a seaplane school in Montana, Fish Wildlife and Parks (FWP) is planning to land a seaplane on Flathead Lake to train local inspectors how to detect AIS on such a watercraft. The seaplane that will be arriving is flying from the Puget Sound in Washington. Seeing as Flathead Lake is just over 400 air miles from the Puget Sound (the average distance sea planes can fly before needed to stop), the pilot has planned to stop at Lake Pend Oreille in Idaho, before finishing the last 100 air miles to Flathead Lake. Lake Pend Oreille is infested with invasive Eurasian watermilfoil, Curly-leaf pondweed, and Flowering rush, whereas Flathead Lake is only infested with Curly-leaf pondweed and Flowering rush.

How can the pilot prevent the introduction of Eurasian watermilfoil to Flathead Lake and to prevent the spread of Curly-leaf pondweed and Flowering Rush into new areas of the lake?

Scenario Response #1:

Since Montana only requires the people who own or manage a body of water to determine whether or not a person can land a seaplane there, the pilot just has to receive approval for landing the seaplane from Fish, Wildlife, and Parks and the Confederated Salish and Kootenai Tribes who both manage Flathead Lake.

Scenario Response #2:

The pilot should get permission to land on Flathead Lake, but should not check for aquatic invasive species before landing. This way, if there are any AIS on the boat the people who are learning about AIS can see the invasive plants and know where to look when inspecting seaplanes.

Scenario Response #3:

The pilot should only inspect the seaplane for AIS before taking off from Lake Pend Oreille, as going from saltwater to freshwater should mean there could not be any contamination from Puget Sound.

Scenario Response #4:

The pilot should inspect the seaplane for water inside of the seaplanes compartments, mud, and vegetation before takeoff from the Puget Sound and Lake Pend Oreille. This will prevent cross contamination between each new body of water. The pilot should then get permission to land in Flathead Lake from Fish, Wildlife, and Parks and the Confederated Salish and Kootenai Tribes who both manage Flathead Lake.



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Clean, Drain, Dry Challenge

Teacher Resources (2 of 6)

FIRE TANKER TRUCK

Scenario: A forest fire has broken out in the Flathead National Forest near Bigfork. Due to high winds, the emergency response staff called in extra fire tanker trucks from Missoula County, outside of the Flathead Basin. According to the current AIS rules and regulations for vehicles entering the Flathead Basin, emergency response vehicles that can transport water DO NOT need to stop at inspection stations when responding to emergencies.

How can the emergency response staff coordinate best with their fire tanker trucks to prevent spreading AIS while responding to the emergency?

Scenario Response #1:

The response teams should:

- Fill the fire tanker trucks with water from municipal sources (fire hydrants) or from water bodies that are AIS free and in the Flathead Basin.
- Avoid spraying water into water bodies (ponds, lakes, rivers, streams, wetlands, seeps, and springs).
- Clean, Drain, and Dry truck and equipment after operations by:
 - Power washing the inside of the tank with 140° water keeping in contact with a surface for 2 minutes.
 - Dry gear in the hot sun until it feels completely dry to the touch.
 - Soak or spray surfaces with a chemical solution (hoses, smaller connecting joints where hoses attach to fill the tank or spray).

Scenario Response #2:

The response teams should:

- Take water from the water source closest to the fire, the response needs to be as fast as possible.
- Spray the water all over the area, since the water is coming directly from the local watershed.
- Clean, Drain, and Dry truck and equipment after operations by:
 - Power washing the inside of the tank with 140° water keeping in contact with a surface for 2 minutes
 - Dry gear in the hot sun until it feels completely dry to the touch
- Soak or spray surfaces with a chemical solution (hoses, smaller connecting joints where hoses attach to fill the tank or spray).

Scenario Response #3:

The response teams should:

- Fill up the tanker trucks before leaving Missoula County so that they are ready to go upon arrival.



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Clean, Drain, Dry Challenge

Teacher Resources (3 of 6)

CAR/BOAT/JET SKI/HITCH SET

Scenario: A family living in Montana is making their way from eastern Montana to western Montana on a family vacation. They have two vehicles with hitches one carrying a boat for fishing and the other holding two water skis. They stop for a short visit at Tiber reservoir (invasive zebra or quagga mussel larvae were detected in 2016) to camp and take their watercraft out on the reservoir for a few days. After their stay at Tiber, they are hoping to visit Hungry Horse Reservoir and then Flathead Lake.

When should the family get their boat, jet skis, hitches, and rear areas of their cars decontaminated and inspected?

Scenario Response #1:

The family should get their boat, jet skis, hitches and rear areas of their cars decontaminated at the Fish Wildlife and Park (FWP) station when they leave Tiber Reservoir. After that they should be okay to visit Hungry Horse Reservoir and Flathead Lake without stopping at other FWP inspection stations because they do not have any known zebra mussels on or in them.

Scenario Response #2:

The family should get their boat, jet skis, hitches and rear areas of their cars decontaminated for ANY aquatic invasive species at the FWP station when they leave Tiber Reservoir. They should then stop at inspection stations before they cross the continental divide, and before they enter any water body in the Flathead Basin which includes Hungry Horse Reservoir and Flathead Lake.

Scenario Response #3:

The family does not need to stop at any decontamination or inspection stations of any kind before leaving Tiber Reservoir and visiting any other water body in Montana, because they can self-decontaminate and inspect their boat, jet skis, hitches, and rear areas of their car.

Scenario Response #4:

The family should get their boat, jet skis, hitches and rear areas of their car inspected at FWP inspection stations before they enter any new body of water. If there are any aquatic invasive species, animals or plants, the inspection stations will be able to find them before they enter a new body of water.



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Teacher Resources (4 of 6)

KAYAK

Scenario: Someone who lives in Virginia is making their way across the country to participate in a competitive kayaking race on Flathead Lake! Their water bodies at home have no aquatic invasive species (AIS) of any kind, so they have never heard of aquatic invasive species before. Stopping for the evening in Minnesota, they decide to take their kayak out onto Lake Minnetonka (infested with Eurasian watermilfoil). Continuing on they finally reach the North Dakota – Montana boarder. Passing through Wibaux, they encounter their first Fish Wildlife and Parks (FWP) inspection station. An inspector asks the kayaker if they have ever had their kayak in a water body with AIS. The kayaker, unsure of what that means, says no.

What should the inspector do?

Scenario Response #1:

The inspector should let the kayaker pass without inspection. If they said that they have never been in a water body with AIS then their watercraft (kayak and paddle) and gear (life vest) should be fine!

Scenario Response #2:

The inspector should do a full inspection of all watercraft and gear, because it is required for all out of state visitors with watercraft and gear to get an inspection. The FWP inspector should also educate the visitor as they do their inspection about how to look for and remove AIS and what AIS are. An inspector should never assume every visitor knows about AIS.

Scenario Response #3:

The inspector should perform a full inspection of all watercraft and gear anyway. The visitor could be lying.

Scenario Response #4:

The inspector should do an inspection of the kayak, but since the visitor said they have never been in a waterbody with AIS they do not have to look too hard for AIS on the kayak.



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FISHING GEAR/INFLATABLE TOYS/SQUIRT TOYS SET

Scenario: A Montanan family living in the Flathead Watershed is planning their yearly summer trip. The family wants to go fly fishing from shorelines and let their younger kids play in the water with inflatable tubes and squirt toys. The family hopes to spend 2 days at Beaver Lake (infested with invasive Eurasian watermilfoil and Fragrant waterlily), 2 days at Tally Lake (AIS free) and then 4 days at Flathead Lake (infested with Curly-leaf pondweed and Flowering rush).

How should the family plan their trip to prevent spreading AIS?

Scenario Response #1:

The family should be sure to inspect their boat and fishing gear for any mud, water, or vegetation before leaving each access area to the lakes they visit.

Scenario Response #2:

Since the family lives in the Flathead Basin they do not have to inspect their boat, fishing gear, or toys before leaving an access area. Only people coming into the Flathead Basin have to perform an inspection for AIS before launching.

Scenario Response #3:

The family should plan on bringing extra sets of fishing gear and toys so they can air dry their wet supplies for the recommended 5 days or bring plenty of extra towels and a scrub brush to properly clean, drain, and dry their gear, toys, and boat. If using the towels, they should make sure that the towels dry properly before using them again. Next, the family should plan to inspect their boat, fishing gear, and toys for mud, water, or vegetation before leaving the water access area. After fishing, any unwanted bait, fish parts, and packing materials should be disposed of in the trash, not dumped onto the ground or back in the water. After Flathead Lake they should inspect everything one last time before leaving the access area.

Scenario Response #4:

The family should make sure to inspect their boat, fishing gear, and toys for any mud, water, or vegetation before leaving the water access of Beaver Lake since it is infested with AIS. They do not need to inspect anything after Tally Lake because it is AIS free. They can head right to Flathead Lake to finish their trip.



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Teacher Resources (6 of 6)

Scenario Answer Guide

Scenario: Sea Plane

Response # 4

Scenario: Fire Tanker Truck

Response #1

Scenario: Car/Boat/Jet Ski/Hitch Set

Response #2

Scenario: Kayak

Response #2

Scenario: Fishing Gear/Inflatable Toys/Squirt Toys Set

Response #3



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