

Mussel Walk Activity



Clean, Drain, Dry Challenge

Do you ever wonder what it takes to properly Clean, Drain, and Dry watercraft, gear, and toys that have been in our lakes and rivers?

◆ 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 that have been in local water bodies, what objects need to be Clean, Drained, and Dried, and how to apply Clean, Drain, Dry knowledge to 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 after 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 ways to get more people to practice CDD.

Materials

Warm Up / Activity / Wrap Up

- The 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 plain water
 - 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 CDD Challenge Inquiry Stations and stage the bottles.
 - Fill the plastic bottles with water and put a few pieces of plants inside. Wet the bottles on the outside and stick a few plants to them, as well. It is helpful to be near a water sources if you will be running this activity multiple times.
 - Stage the bottles and drying materials outside where you want to perform the warm up.
 - Stage the CDD Challenge Inquiry Stations with the representative objects and scenario cards.

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 to Clean, Drain, Dry an object. Ask one student from each group to pick up a bottle of water, and to return to their group.
 - Tell each student with a bottle that they will have 30 seconds 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 30 seconds, 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 30 seconds?
 - **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 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 why it was the best response.

◆ 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.



Photo credit: Leon Robers / Public Domain

Water infested 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.

Online Resources

Stop Aquatic Hitchhiker's website:

<http://stopaquatic hitchhikers.org/>

Montana Fish, Wildlife and Parks Aquatic Invasive Species website:

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



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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: Fish Wildlife and Parks (FWP) is planning to land a seaplane on Flathead Lake to train inspectors how to detect AIS on seaplanes. The seaplane that will be arriving is flying from a Washington port in the Pacific Ocean. On the way, the pilot will need to stop and refuel because Flathead Lake is too far away to fly to in one trip. The pilot will stop at Lake Pend Oreille before the last 100 miles to Flathead Lake. The highly invasive Eurasian watermilfoil is common in Lake Pend Oreille but has not been observed at Flathead Lake.

How can the pilot prevent the introduction of Eurasian watermilfoil to Flathead Lake?

Scenario Response #1:

The pilot just needs approval to land 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 the Pacific Ocean.

Scenario Response #4:

The pilot should clean and inspect both the inside of the seaplane for water and the outside for mud and plants before takeoff from each location. This will prevent cross contamination between each new body of water. The pilot should get permission to land in Flathead Lake from Fish, Wildlife, and Parks and the Confederated Salish and Kootenai Tribes who both manage Flathead Lake.



Clean, Drain, Dry Challenge

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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 local fire fighters called in extra fire tanker trucks from Missoula County, which is outside of the Flathead Basin. Currently emergency response vehicles that can transport water DO NOT need to stop at inspection stations when responding to emergencies.

How can the fire fighters prevent spreading AIS with their fire tanker trucks while responding to the emergency?

Scenario Response #1:

The response teams should:

- Fill the fire tanker trucks with water from municipal sources (i.e. fire hydrants).
- Avoid spraying water into water bodies (ponds, lakes, rivers, streams, wetlands).
- Clean, Drain, and Dry truck and equipment after operations by:
 - Power washing the inside of the tank with 140° water 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 any water source, AIS contaminated or not, the response needs to be as fast as possible.
- Clean, Drain, and Dry truck and equipment after operations by:
 - Power washing the inside of the tank with 140° water 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).



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Clean, Drain, Dry Challenge

Teacher Resources (3 of 6)

CAR/BOAT/JET SKI/HITCH SET

Scenario: A family living in Idaho is making their way to western Montana for a family vacation. They have two vehicles. One towing a boat and the other towing two jet skis. They stop for a short visit at the Snake River (invasive zebra or quagga mussel adults and larvae were detected in 2023) to take their watercraft out on a local reservoir. After their stay at the reservoir, they are planning 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 a local Idaho boat inspection station when they leave the Snake River 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 zebra mussels.

Scenario Response #2:

The family should get their boat, jet skis, hitches and rear areas of their cars decontaminated at a local Idaho boat inspection station when they leave the Snake River 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 when leaving the Snake River reservoir.

Scenario Response #4:

The family should only get their boat, jet skis, hitches and rear areas of their car inspected at an inspection station when they enter any new body of water. Since they will be stopping at FWP inspection stations later in their trip they do not need to get decontaminated when they leave the Snake River reservoir.



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Teacher Resources (4 of 6)

KAYAK

Scenario: You are a property owner on a small Montana lake volunteering at the public access point to the lake to help inspect incoming watercraft. A person visiting from Virginia is here to paddle for the day before going to compete in a kayaking race tomorrow on Flathead Lake. You ask them if they have ever been in water that has AIS. The kayaker, unsure of what that means, says no. They then mention that they stopped at a lake in Minnesota to practice on their way here.

What do you do?

Scenario Response #1:

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

Scenario Response #2:

You should do an inspection of the kayak and gear, because it is required for all out of state visitors with watercraft and gear to get an inspection. You should also educate the visitor as you do your inspection. Show them how to look for and remove AIS, and tell them what AIS means.

Scenario Response #3:

You should perform an inspection of the kayak and gear anyway. The visitor said they had not been in any water with AIS, but they might not have been aware of AIS infestations.

Scenario Response #4:

You should do an inspection of the kayak, but since the visitor said they have never been in water with AIS you do not have to look that hard.



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FISHING GEAR/INFLATABLE TOYS/SQUIRT TOYS SET

Scenario: A family living in the Flathead Watershed is planning their yearly summer trip. The family plans to go fly fishing and play in the water with inflatable tubes and squirt toys. The family hopes to spend 2 days at Beaver Lake (has AIS), 2 days at Tally Lake (probably AIS free) and then 4 days at Flathead Lake (has AIS).

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

Scenario Response #1:

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

Scenario Response #2:

Since the family lives in the Flathead Basin they do not have to inspect their fishing gear and water toys before leaving an access area.

Scenario Response #3:

The family should be sure to inspect their fishing gear and water toys for any mud, water, or vegetation before leaving the access area of the lakes they visit. They should bring towels and cleaning tools to properly clean and dry the fishing gear and water toys between each lake.

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. Lastly, they should inspect everything one last time before leaving the access area of Flathead Lake.

Scenario Response #4:

The family should make sure to inspect their fishing gear and water 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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Scenario Answer Guide

Scenario: Sea Plane

Response # 4

The pilot should clean and inspect both the inside of the seaplane for water and the outside for mud and plants before takeoff from each location. This will prevent cross contamination between each new body of water. The pilot should get permission to land in Flathead Lake from Fish, Wildlife, and Parks and the Confederated Salish and Kootenai Tribes who both manage Flathead Lake.

Scenario: Fire Tanker Truck

Response #1

The response teams should:

- Fill the fire tanker trucks with water from municipal sources (i.e. fire hydrants).
- Avoid spraying water into water bodies (ponds, lakes, rivers, streams, wetlands).
- Clean, Drain, and Dry truck and equipment after operations by:
 - Power washing the inside of the tank with 140° water 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: Car/Boat/Jet Ski/Hitch Set

Response #2

The family should get their boat, jet skis, hitches and rear areas of their cars decontaminated at a local Idaho boat inspection station when they leave the Snake River 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: Kayak

Response #2

You should do an inspection of the kayak and gear, because it is required for all out of state visitors with watercraft and gear to get an inspection. You should also educate the visitor as you do your inspection. Show them how to look for and remove AIS, and tell them what AIS means.

Scenario: Fishing Gear/Inflatable Toys/Squirt Toys Set

Response #3

The family should be sure to inspect their fishing gear and water toys for any mud, water, or vegetation before leaving the access area of the lakes they visit. They should bring towels and cleaning tools to properly clean and dry the fishing gear and water toys between each lake.

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. Lastly, they should inspect everything one last time before leaving the access area of Flathead Lake.



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