



Masonville Mitigation Rotation

GRADE LEVEL: 6- 12

TIME: 45 MIN

SUMMARY

In this lesson, students will be introduced to the concept of mitigation by studying mitigation projects at Masonville as part of the Dredged Material Containment Facility (DMCF) construction. They will understand Masonville mitigation projects have benefitted numerous species in a variety of ways.

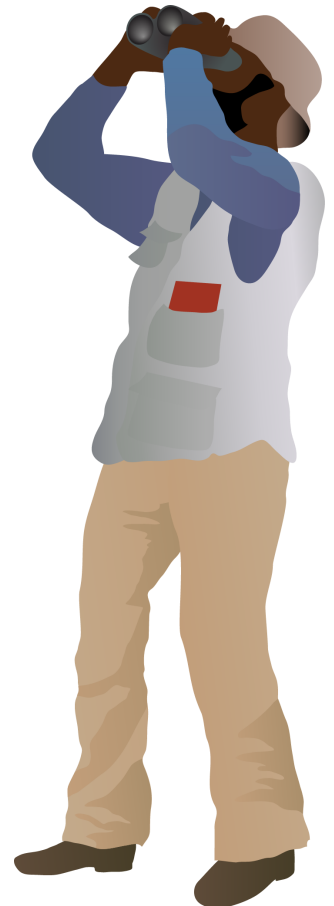
OBJECTIVES

1. Learn about the Masonville DMCF and related mitigation projects.
2. Identify different animals and plants that have benefitted from the Masonville mitigation projects, and describe the benefits.

VOCABULARY

- **Acre** - A unit of land area equal to 4,840 square yards (0.405 hectare). For a point of reference, one football field is 1.32 acres.
- **Benefit** - To receive an advantage.
- **Cargo** - Goods carried on a ship, aircraft, or motor vehicle.
- **Cargo Ship** - Any ship which is not a passenger ship, a ship of war and troopship, a ship which is not propelled by mechanical means, a wooden ship of primitive build, a fishing vessel or a mobile offshore drilling unit.
- **Draft** - The vertical distance between the water surface and the bottom of the ship.
- **Dredging** - The process of removing sediment from shipping channels.
- **Dredged Material** - The sediment removed from the shipping channels.
- **Dredged Material Containment Facility** - A placement site for sediment removed from shipping channels. DMCFs are planned, constructed, and monitored by government agencies.
- **Endangered Species** - A species of animal or plant that is seriously at risk of extinction.

- **Geotextile Fabric** - A strong synthetic fabric usually used in civil engineering construction projects (such as highway or dam building) that stabilizes loose soil and prevents erosion.
- **Habitat** - The natural home or environment of an animal, plant, or other organism providing the required food, water, shelter, and space for survival.
- **Mitigation** - In environmental work, these are projects or programs intended to offset the known impacts to an existing historic or natural resource.
- **Monitoring** - Observing and checking the progress or quality of a measurable indicator over a period of time; keeping the indicator under systematic review.
- **Patapsco River** - A river in central Maryland that flows into the Chesapeake Bay whose mainstem is 39 miles (63 km) long.



- **Reef Ball** - A structure made of a special marine friendly concrete that is designed to mimic a natural reef system. It is placed in the water to provide habitat and shelter to marine species.
- **Seining** - The process of catching organisms with a fishing net that hangs vertically in the water and has floats at the upper edge and sinkers at the lower.
- **Shipping Channels** - Areas in the water that are maintained to a depth that can accommodate cargo ships. They are marked by buoys and identified on nautical charts (so captains know where to travel).
- **Uplands** - An area of high or hilly land primarily vegetated by large trees.
- **Urban** - A town or city.
- **Watershed** - A region or area from which all water ultimately drains into the same body of water.
- **Wetland**- Ecosystems containing water, specialized soils, and plants adapted to living in water-saturated soils. Marshes, swamps, and bogs are types of wetlands.
- **Wildlife Refuge** - An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly regulated.

MATERIALS

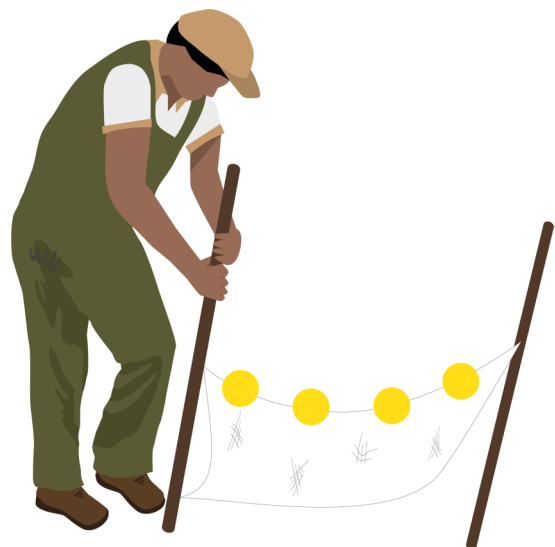
- Masonville species lists
- Markers/highlighters, pens
- Station Packages (Provided by MES):
 - *Cleaning Up the Cove*: Photos of trash removed from the cove; information about how the geotextile layer, soil capping, and how they worked around the trees so as not to suffocate the roots
 - *Wetland Restoration and Construction*: Information about the acreage of restored and newly constructed wetland areas; Information about the benefits of wetlands
 - *Trash Interceptors*: Trash Wheel spinner board
 - *Reef and fish habitat*: information about the numbers of reef balls and acreage of improved habitat; Information from the Cox Creek map activity lesson plan about reef balls; miniature reef balls

- *Terrestrial Habitat and Tree Planting*: information about the acreage of restored uplands and list of tree species planted; Information about the Masonville trees; tree ID book; tree cookies
- *Education Center and Urban Wildlife Refuge Partnership*: U.S. Fish and Wildlife Service fact sheet

BACKGROUND

In order to keep the Port of Baltimore open for business, the Maryland Department of Transportation Maryland Port Administration must ensure that shipping channels are deep enough for cargo ships to travel through without running aground. Shipping channels in the Chesapeake Bay and the Baltimore Harbor must be dredged because the Chesapeake Bay has an average depth of only 21 feet, and as a result the approach channels to the Port of Baltimore are naturally too shallow to accommodate ships that require a maximum draft of 50 feet.

Dredging is the process of removing sediment from shipping channels using construction equipment. The sediment that is removed must then be placed in a dredged material placement site which is regulated and monitored to protect the surrounding environment. Prior to construction, placement sites are carefully planned and designed, and potential impacts to the environment are assessed before they can receive dredged material. If the assessment identifies ways that the environment, such as a wetland habitat will be impacted during construction, mitigation is then



required in the form of projects or programs intended to offset the known impacts to an existing historic or natural resource. Because the construction of the Masonville DMCF enclosed space that had been open water habitat in the river, mitigation at Masonville serves to counterbalance the site construction impact on habitat and wildlife. The Masonville DMCF has a 141-acre footprint that used to be 130 acres of tidal open water and river bottom, 1 acre of vegetated wetland, and 10 acres of upland. Mitigation projects encompass the restoration of 70 acres of water, including the placement of 2,000 reef balls and restoring 20 acres of shallow water habitat; as well as the enhancement or creation of 54 acres of land, including 11 acres of wetlands and one acre of fringe marsh.

ACTIVITY

1. **Engage/Elicit (15 min):**

Introduce students to the concept of dredging in the Baltimore Harbor and the existence and background of the Masonville DMCF based on the Teacher Guide Introduction.

2. **Explore (20 min):**

In small groups, students will be rotating between six different stations that provide information about some aspect of mitigation at Masonville. The students will have copies of the list of species documented at Masonville. At each station, they must look at the information provided and determine which species are benefitted by that type of mitigation. Students should be able to identify several species that benefit and be able to defend their choice of species. The groups will only have about 3 minutes at each station and will then rotate to the next station.

3. **Explain (10 min):**

At the end, each group will give an example of one species that benefits from each mitigation project and provide a one-sentence explanation for why/how that animal benefits. No two groups can use the same animal example (groups should select a few animals that benefit from each type of mitigation rather than focus on just one species, as all groups must have different animal examples).

4. **Evaluate/Wrap-Up (15 min):**

After the groups have rotated through the stations, take 10-15 minutes for students to present the species that they believed benefitted from each mitigation project, and for short debriefs about each type of mitigation.

DIVE DEEPER

Have students engage in a group discussion to answer the following questions:

1. What is the overall impression that students have of mitigation at Masonville? Does it appear to be positive? Do they think it is serving the purpose of offsetting the known impacts of the DMCF construction to the existing natural resources in the area?
2. There's a word for how many different kinds of animals are at a site: biodiversity. Do the students feel that there is good biodiversity at Masonville? What can that tell us about the quality of the habitat?
3. Was there any mitigation effort that surprised the students (that they didn't expect would be included)? Are there any mitigation they would include if they were designing the project?
4. Are there other examples of industry development and environmental mitigation that students are aware of? In their communities or near their schools?

