



HOME SWEET HABITAT

FRESHWATER WETLANDS



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wildlife and our
conservation programs!



Rhode Island Division
of Fish and Wildlife



Rhode Island Division
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Outdoor Education



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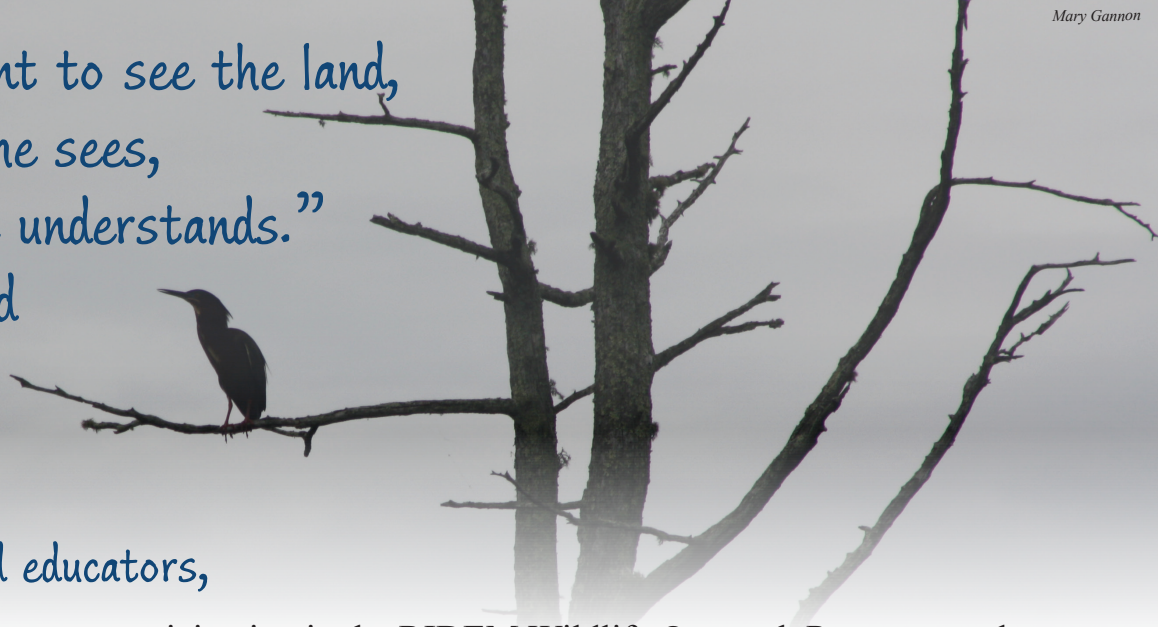
Rhode Island
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Wild Rhode Island Explorer.
For more information, visit
dem.ri.gov/wildlifeoutreach.



“Teach the student to see the land,
understand what he sees,
and enjoy what he understands.”
- Aldo Leopold



Dear Rhode Island educators,

Thank you so much for your participation in the RIDEM Wildlife Outreach Program, and for incorporating conservation education into your teaching practice! Through your participation in this program, you are nurturing the growth of our next generation of environmental stewards and advocating on behalf of Rhode Island’s diverse and amazing wildlife. On behalf of our wild creatures, big and small, thank you.

The Wildlife Outreach Program has been growing in leaps and bounds since its inception in 2017. Coordinating this program has been the most enjoyable and rewarding whirlwind I could imagine. Most of our program participants have been elementary and middle school students, and the requests from teachers across the state keep rolling in. I am so happy that Rhode Island’s educators are invested in connecting their students to the natural world right in their own backyards!

To meet this growing need and interest, the Wildlife Outreach Team has developed our very own Rhody Critter Kits. With the help of these kits, we will be able to reach more students each year, and provide teachers with the tools and resources they need to incorporate wildlife-focused lessons into their curriculum. The kits are not limited just to science lessons, but could be incorporated into art, reading, writing, and social studies as well. The wonderful thing about these kits is that you can tailor them to fit your individual class’s needs. I hope you will get creative and have fun learning with the help of these kits!

When we create connections to nature in a memorable, enjoyable way, we inspire responsible stewardship and care. As educators, you are incredibly important cultivators of those connections. Keep up the good work!



Best wishes,
Mary Gannon

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When one tugs at a single thing in nature, he finds it attached to the rest of the world.” -John Muir



Hello wonderful educators!

We couldn't be more excited to introduce you to our Rhody Critter Kit Program! While we always enjoy visiting schools in person, there are only two of us, and so many students who deserve to learn about the interesting and important wildlife that inhabit our state.

Necessity drove us to create these kits, and thank goodness it did. We strive to reach every community in Rhode Island and have now created a fun and interactive way to do so! We all rely on the resources that nature provides and are all responsible for conserving it, no matter our age. Introducing these important concepts to students today will help shape caring and responsible individuals in the future.

The Rhody Critter Kits aim to encourage students to explore the natural world around them with an open mind and observational eye. The resources provided are designed to be adapted to individual class needs, so please use them however you see fit!

Since joining the RIDEM Fish & Wildlife Outreach Team, I have had the opportunity to share our conservation work with students across the state and see their eyes grow wide with inspiration. Seeing misinformation and fear turn into awe and curiosity is one of the greatest transformations to witness. Through these kits, I hope your students are able to learn and grow in the same way. After all, knowledge is the key to growth!

Thank you for sharing in the education of future conservationists through our Rhody Critter Kit Program and we hope you have fun!



*Kind regards,
Gabrielle DeMeillon*

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Our mission is to ensure that the Freshwater and Wildlife Resources of the State of Rhode Island will be conserved and managed for equitable and sustainable use.

About Us



D. Birch

setting seasons, size limits, hunting methods, and daily limits for the harvest of game species like white-tailed deer, wild turkey, waterfowl, and furbearers.

As part of a larger network of recreational opportunities in Rhode Island, hunting and fishing play an important role in connecting people with nature, supporting quality of life and family traditions, and attracting tourism. Anglers and hunters purchase around 70,000 licenses, permits, stamps, and tags each year and contribute more than \$235 million to Rhode Island's economy. Revenue generated from license and permit sales support Rhode Island fish and wildlife conservation programs.

The DFW is primarily funded through the Federal Wildlife and Sport Fish Restoration Program (WSFR), which is administered through the U.S. Fish & Wildlife Service. This program uses taxes placed on firearms, ammunition, and archery equipment to help fund avian and mammalian research and conservation programs, habitat acquisition, and outreach and education programs.



C. Raithel

Annual appropriations for WSFR's State Wildlife Grants (SWG) Program provide an additional, smaller, yet less restricted pot of money that can be put toward conservation of all Species of Greatest Conservation Need (SGCN) as identified in the [RI Wildlife Action Plan](#). The list of SGCN includes game and non-game species, and also provides much needed attention to amphibians, reptiles, and invertebrates. It is our goal to responsibly manage and steward our state's wildlife resources, safeguarding them in perpetuity.



S. Perreca

A photograph of a forest stream with mossy rocks and trees. The stream flows through a dense forest with tall trees and a thick canopy. The water is clear, reflecting the surrounding greenery. The foreground is filled with fallen leaves and moss-covered rocks.

Home Sweet Habitat: Freshwater Wetlands

Food, water, shelter, space. All animals, great and small, require these four things to survive! In this kit, students will learn about Rhode Island's beautiful habitats, the importance of biodiversity, current habitat conservation and restoration efforts in RI, and what they can do to be good habitat stewards.

What's included in this kit?

- Information about Rhode Island's wetland habitats
- Interactive activities
- Sample lesson plans
- PowerPoints
- Photos and videos
- Show and tell items

Next Generation Science Standards

LS1A	Structure and Function
LS2A	Interdependent Relationships in Ecosystems
LS2C	Ecosystem Dynamics, Functioning, and Resilience
LS4C	Adaptation
LS4D	Biodiversity and Humans
ESS3A	Natural Resources
ESS3C	Human Impacts on Earth Systems

Are you using this kit online only?

After using these materials in your classroom, please fill out our feedback form, available on the Rhody Critter Kits page.

Are you borrowing the physical kit?

Please be sure to fill out the feedback form and materials checklist (included in the bin) to ensure all items have been returned.

Freshwater Wetlands Kit Materials

Item	Talking Points
Laminated plant specimens	Wetland plants have some cool adaptations to help them grow “with their feet wet.” Ask students if they recognize any of these plants. Did they know that only certain types of plants grow in wetlands? All of these specimens are plants native to RI. Biologists want to encourage diverse habitats of native plants because those plant communities best support wildlife.
Beaver skull replica	Beavers, like all rodents, have very strong incisors (front teeth). The orange layer on the outside of the incisors is a strong, protective coat of enamel. They use their flat molars for chewing and grinding their favorite food, plants!
River otter skull replica	River otters are efficient predators. How might their skull and tooth shape tell us what they eat?
Duck skull replica	Ducks (and all birds) don’t have teeth! Instead, they have tiny grooves and ridges inside of their beak, which helps them to filter out plants, seeds, and bugs from the wetland muck while foraging.
Beaver and otter pelts	Beaver and otter fur is very dense, which helps keep them warm and dry. Invite students to check out the fluffy undercoat by gently parting the fur with their fingers.
Small paint trays	Use these paint trays as “rivers” to build mini beaver dams using twigs, leaves, clay, and pebbles. Test your students’ skills as ecosystem engineers!
<i>Song of the Water Boatman and Other Pond Poems</i>	Read this book of beautifully illustrated poems aloud with your students to learn about the creatures that live in wetlands!
<i>Freshwater Wetlands: A Guide to Common Indicator Plants of the Northeast</i>	This illustrated guide will help you identify common wetland plants of the Northeast, perfect to take in the field if you have a pond or wetland near your school or learning space.
<i>Squish! A Wetland Walk</i>	This beautiful book celebrates the diversity of life found in wetland habitats.
<i>Dragonflies & Damselflies of Rhode Island</i>	Students will be amazed to flip through this colorfully illustrated publication from RIDEM Division of Fish and Wildlife, learning the very quirky and cool names of our state’s dragonflies and damselflies!
Dragonfly exuvia	An exuvia is the papery shell left behind when dragonfly larvae climb out of the water onto wetland plants and shed their exoskeleton to become an adult dragonfly. Here is an example, found in a RI wetland.
Laminated cutouts of wood ducks, eggs, ducklings, and nesting box	Use these for a field monitoring simulation in the Duck Detectives activity!



Introduction: Everyone Needs a Home

A habitat is an animal's home, or the place where they live. Habitats are made up of the four **resources** that all animals need to survive: food, water, shelter and space. Without these four components, our native wildlife would not be able to persist. Habitat can be found all throughout Rhode Island. It can be large or small, wet or dry, and can even be an urban backyard!

For example, a skunk might be able to survive in the city by finding food in garbage cans, gardens or city green spaces. Water can be found gathered in dips in the ground or any item that can collect water, like a flower pot or other containers. Raised sheds or brush piles can be used as shelter, and as long as there aren't too many other animals in the habitat, there is space.

While some animals are perfectly comfortable adapting to city life, others aren't so flexible. Species that are sensitive to disturbance or that require a very particular habitat, such as the American woodcock, northern diamondback terrapin, New England cottontail, or eastern spadefoot toad need a little extra help. In Rhode Island, we manage habitat to meet basic habitat needs, with a special focus on the more sensitive critters, also known as our Species of Greatest Conservation Need (SGCN).

Read on to learn more about wildlife habitat!

Habitat Fun Facts

- Nearly 60,000 acres have been protected as Rhode Island State Management Areas
- Forests cover 59% of Rhode Island. That's about 393,000 acres.
- Most of Rhode Island's forests are privately owned.
- The length of Rhode Island's shoreline on the Narragansett Bay and Atlantic Ocean measures at 400 miles!
- Freshwater wetlands cover about 11% of Rhode Island (about 55,000 acres).
- There are approximately 3,400 acres of salt marsh habitat in Rhode Island.



Threats to Habitats

Habitat Loss and Fragmentation

The largest threat that all wildlife faces is habitat loss and **fragmentation**. Rhode Island is a small state with a big population that is growing day by day. More people means more houses and businesses, and less space for wildlife. Space is important to animals because it is where all of their resources are stored. If habitat is broken up, or fragmented, into little pieces by roads or houses, it means that animals may not be able to reach one of the resources they need to survive, or may have to risk crossing a road to get to it.

Disease/Pests

There are many diseases and pests that can affect trees, which play an important role in providing habitat for wildlife. American chestnut blight and dutch elm disease are caused by different kinds of fungus. Pests like the hemlock wooly adelgid and nematodes, have devastated hemlock trees and led to beech leaf disease, which has recently made its way to Rhode Island. In the past we have seen two major outbreaks of spongy moth caterpillars, which killed many of the acorn-producing oak trees in Rhode Island. If these trees disappear from our landscape, they take with them the food and shelter that our native animals depend on.

Invasive Species

Invasive species are plants or animals that were brought to an area where they did not originally belong. This can happen by accident or on purpose. Phragmites, autumn olive, oriental bittersweet and Japanese knotweed are just a few of the invasive plant species that occur in Rhode Island. They grow very quickly and can take over the space, nutrients and sunlight that our **native** plants need to survive. Our native animals have adapted to living with our native plant species, in fact, some pollinators can only survive if they have access to one specific plant. Controlling and preventing the spread of invasive plants is important to protecting habitat in Rhode Island.



Climate Change

Just like humans, the earth can become sick. While we might get a stomach ache or fever, the earth displays its symptoms as **climate change**. Hotter summers, more extreme storms and less rainfall are all signs of the effects of climate change. This is due to too much carbon in the atmosphere. While the earth can tolerate a small amount of carbon, humans have been adding more through generating electricity, driving cars, and making new products. All of these things produce excess carbon dioxide. Habitats have become accustomed to a certain **climate**, or temperatures and rainfall over time, and when these things change quickly, many habitats are unable to adapt. Sea level rise can decrease shoreline habitat, drier weather can eliminate vernal pools, and extreme storms can knock down long standing trees.

Habitat Conservation Work In Rhode Island

Since the biggest threat to wildlife is habitat loss and fragmentation, the RIDEM Division of Fish & Wildlife is doing its part by helping protect over 60,000 acres of habitat throughout the state in Wildlife Management Areas. These places are set aside as wildlife habitat to ensure that our native species will always have access to the food, water, shelter and space that they need to survive. Most of the larger Management Areas are located in the western part of Rhode Island, and some are connected to conservation land in neighboring states. Linking up with other conservation land helps make sure that the habitat is connected, like pieces of a puzzle, so that animals don't have to cross roads or go through neighborhoods to reach the resources they require.

Land purchased by the RIDEM Division of Fish & Wildlife is funded by hunters and anglers through the Wildlife and Sport Fish Restoration Program. A portion of the money spent on hunting and fishing equipment is distributed to each state in the U.S. and must be used to support wildlife through habitat acquisition, restoration, research and hunter education. This federal program along with funds generated through state hunting and fishing licenses is what allows our state to protect, conserve and restore our native wildlife and their homes.

Throughout this packet, we have highlighted some specific habitat conservation and restoration projects.



How Can You Be a Habitat Hero?

Help clean up and protect wetlands

Cleaning up a pond or stream can be turned into a fun and helpful activity that you can do on your own or with friends. Bring a trash bag on your next outing and pick up litter as you explore. Everyone, big or small, has a voice, and you can help decide what happens with our wetlands. Do some research and find out how you can help protect a wetland habitat near you. Countless wildlife species will benefit from efforts to keep wetlands clean!

“Reduce, Reuse, Recycle”

We know that excess carbon in the atmosphere is the driving force for accelerated climate change, and we know what activities produce carbon. Reducing our carbon emission by carpooling, riding bikes or taking a bus can help the habitats in Rhode Island. Reusing and recycling things means that less materials need to be created, so less carbon is put into the air by factories. Using reusable water bottles and cups is a great first step. There are lots of “zero waste” blogs and resources out there to explore other ways to make simple swaps in our daily routines, personal care products, and cleaning habits that will collectively help wildlife habitat.

Spread the word: Habitats are important!

The more you share your knowledge and excitement for our beautiful habitat, the better! A lot of people are simply unaware of the amazing natural resources we have in Rhode Island, and the challenges they face.

Make your backyard, school yard, or community green space wildlife-friendly

Most of Rhode Island’s habitat is privately owned, which means it is important for everyone to protect and steward the habitat they have in their own backyards. You don’t have to own 100 acres to make a difference. There are plenty of simple things you can do in small spaces, even around the school yard! Planting native wildflowers, shrubs, and trees (even in a tiny urban garden plot) is *critical* for pollinators, birds, and other wildlife. Walk around your yard and try to identify plants; you can borrow a field guide from the library or use the SEEK app on a smartphone. Avoid using pesticides, or poisons, as these can harm our native wildlife. Create shelter by putting out bird houses or leaving brush piles on your property. Most importantly, make sure you give wildlife plenty of space! If you have a wild visitor, be sure to watch them from a distance so they feel comfortable and safe in the habitat you have provided!



Freshwater Wetlands

Freshwater **wetlands** are places where the ground is either permanently or temporarily covered in water. They can be fed by groundwater, rainwater or snowmelt and by examining their depth, soil saturation and plant profile, they are categorized as either swamps, ponds, rivers, vernal pools or bogs. As one of the four resources that all living things need to survive, freshwater is invaluable. Some animals only visit these habitats occasionally, while others must spend their entire lives in or along the edges of wetlands due to their unique adaptations. Aside from providing habitat for wildlife, wetlands also prevent flooding by absorbing water during heavy rainfall. They filter out toxins, hold onto water during droughts, and are a great place to view wildlife!

What is a swamp?

Swamps are places where the soil is permanently saturated or covered with water. They are usually located next to ponds or rivers. Swamps are considered forested wetlands and can be distinguished from other wetlands by their woody vegetation, such as red maple and Atlantic white cedar. They are home to seasonal visitors, like waterfowl (ducks, geese and swans) and shorebirds. Many birds use swamps as resting sites during their migration periods.

What is a river vs. a pond?

Both rivers and ponds are a permanent source of water for wildlife. **Rivers** are flowing bodies of water that are fed by snow melt, rain, streams or springs. They move through channels and connect to larger water bodies or meet with the sea.

Ponds have stagnant, or standing water, and are formed by a variety of natural forces. For example, kettle ponds were formed by glaciers which left behind big depressions in the landscape as they melted. Beavers can create ponds by damming up flowing water and flooding new areas. Sometimes ponds can be created by people, such as retention ponds or impoundments. Ponds may have small streams flowing in or out but do not have a current. Ponds and rivers are excellent habitat for river otters, muskrats and brook trout. Beaver ponds are especially attractive to wood ducks, since they love to nest in tree cavities above the water. A variety of plants grow in, under or beside ponds and rivers such as pickerel weed, floating heart and the bright red cardinal flower.



What is a vernal pool?

The word “vernal” comes from the Latin word for spring! **Vernal pools** are only filled with water for part of the year, which comes from snowmelt and rain. When the summer and fall come along, the weather gets warmer and there is less rain, so the pool dries up. Some animals are specially adapted to vernal pools and need them to reproduce and survive, like fairy shrimp. Vernal pools have no fish, so the animals that live there have one less predator to worry about! Usually, vernal pools are surrounded by moss-covered trees with splayed roots, and the surrounding area has moist soil which provides important habitat for wood frogs and spotted salamanders outside of their breeding season. They can be very small or very large but they only ever hold shallow water for a short period of time.

What is a bog?

A **bog** is a wetland that is formed slowly over time. The most common plant found in a bog is called sphagnum moss. When this bright green moss dies, it decomposes into a mucky soil called **peat**, and new moss grows on top of that. Over time, the peat forms layers one on top of the other like a lasagna. All of those layers can spread out over water in a wetland to make a floating mat of moss. Walking on a bog is a lot like trying to walk on a big floating sponge. Bogs can be found as rings around ponds or over low areas that hold water all year long.

Bog soil is nutrient deficient; bog plants are specially adapted to tolerate these conditions. Cranberries, blueberries, white cedar and black spruce trees are commonly found in bogs. Bogs are also home to carnivorous plants like the sundew and the purple pitcher plant. The sundew’s leaves have sticky hairs that trap insects long enough for the plant to “digest” them. The pitcher plant’s leaves look like little green water pitchers, with tiny hairs inside that trap bugs in a digestion juice made by the plant. Spotted turtles, ribbon snakes, the ringed boghaunter dragonfly, (all Species of Greatest Conservation Need) can be found in bog habitats.



Wetland Conservation Work in Rhode Island

Water Control Structures

Migratory birds, like ducks, often use freshwater wetlands to rest and eat on their journey. Dabbling ducks, like ring-necked ducks and American black ducks need the water level to be low enough so that they can reach the vegetation under the water just by dipping their heads down, since they are not adapted to diving. When beavers dam up the flow of water to an area too much, it makes the water too deep for the ducks and doesn't allow aquatic vegetation to grow. This is why the Division of Fish and Wildlife maintains **water control structures** in several human-created wetlands, called impoundments. Impoundments were created in the 1950s and 1960s to create habitat for waterfowl. The water control structures allow biologists to raise and lower the level of the water, as needed. During certain times of the year, biologists lower the water level so that mudflats are exposed. This way plants can grow and produce the seeds that ducks need and love to eat. When the ducks arrive, they can increase the water level by adding baffles to the control structure, which restricts the flow of water. This makes it so the plants are a few inches below the water, just the way the dabblers like!



Mike Stritz

Providing this habitat gives migratory birds a place to eat and rest in safety on their long flight.

Phragmites Removal

Phragmites (pronounced *frag-mite-ees*) is a species of plant that is not native to Rhode Island. It was accidentally introduced from Europe and has taken over spaces where our native wetland plants would grow. If phragmites grows too thick, it can even prevent animals from reaching the water. RIDEM biologists have been working hard to cut down this invasive grass in the Great Swamp Management Area, to make room for our native plants to grow. By cutting several times per year and carefully spot treating

areas with herbicide, stands of phragmites can be reduced. This benefits all of the wildlife that permanently or temporarily rely on this freshwater habitat.



Le Loup Gris - Wikimedia Commons



Vocabulary

Bog – wetland formed over time from accumulated organic material (peat); characterized by spongy, floating mats of moss and low nutrient soil

Climate – weather conditions that prevail in an area over a long period of time

Climate change – a change in global or regional climate patterns due to increased concentration of carbon dioxide in the atmosphere

Fragmentation – when a habitat is separated into small pieces by roads or other human development

Invasive species – plant or animal species brought to an area where they did not originally occur, resulting in negative impacts on native species (predation, competition for resources, etc.)

Migratory species – a species that seasonally moves from one geographic area to another

Native species – plant or animal species that normally lives in a geographic area and has adapted to live in that ecosystem

Peat – the accumulated decomposed organic material that forms the soil base of bogs

Pond – a wetland permanently inundated by open, standing water, often fed by flowing water, without a current; created by natural depressions in the ground, human engineering, or beaver activity

Resources – materials (both living and non-living) that occur in nature that can be used by humans for sustenance or economic gain

River – flowing bodies of water that are fed by snow melt, rain, streams or springs; flow through channels and connect to larger water bodies or meet with the sea

Swamp – a wetland that is permanently saturated with water, characterized by woody vegetation (shrubs or forested)

Vernal pool – a wetland that fills seasonally with snowmelt, rainwater, and groundwater, and only holds water for less than 6 months out of the year; typically in forests

Wetland – habitat in which the soil is covered by or saturated with water for all or part of the year

Water control structure – an engineered structure used to manipulate the flow of water in or out of a human constructed wetland in order to influence water levels and habitat conditions



Quick Links

Wildlife Fact Sheets

Learn about Rhode Island's wildlife with RIDEM's one page fact sheets.

<http://www.dem.ri.gov/wildlife>

RIDEM Office of Water Resources

Learn about Rhode Island's wetlands and water resource protection initiatives.

- <https://dem.ri.gov/environmental-protection-bureau/water-resources>
- <https://dem.ri.gov/environmental-protection-bureau/water-resources/waters-wetlands/rhode-island-wetlands>

USFWS National Wetlands Inventory

Check out this cool interactive map to see where wetlands are located near your school or community! "The Wetlands mapper is designed to deliver easy-to-use, map like views of America's Wetland resources. It integrates digital map data along with other resource information to produce current information on the status, extent, characteristics and functions of wetlands, riparian, and deepwater habitats."

<https://www.fws.gov/program/national-wetlands-inventory/wetlands-mapper>



Lesson 1: Wading Through Freshwater Wetlands

Theme

Wetlands are diverse and they are sensitive to change, therefore scientists must closely observe them in order to protect them.

Learning Objectives

In this lesson, students will learn how observation connects to conservation and the importance of wetlands in Rhode Island. Students will practice their observational skills and understand the importance of classification in conservation. Students will be able to define the term “wetland” and will gain awareness of how the RIDEM Division of Fish & Wildlife helps protect Rhode Island’s natural resources.

Corresponding Activities for this Lesson

- Eye of a Scientist

Materials

- Wading Through Freshwater Wetlands PowerPoint
- Wetland plant photos
- Laminated plant specimens

Lesson

- 1. Explain to students that today we will be learning about the difference between freshwater wetland types in Rhode Island and how biologists at the RIDEM Division of Fish and Wildlife are protecting them.**
 - Explain that a wetland is a kind of habitat. Ask students what is a habitat? What are four things that all animals need in their habitat to survive? (food, water, shelter and space)
- 2. Many habitats are sensitive to change, especially wetlands, therefore scientists must closely observe them in order to protect them.**
 - Play “Eye of a Scientist” observation game.



- 3. After playing the game, ask students if anyone has ever seen a freshwater wetland.**
 - After students have had a chance to share their thoughts, explain that wetlands, are areas of the land that are wet! They can be spongy or mucky and shallow or deep and usually lie in a lower part of the land.
 - Have students close their eyes and try to remember what the wetland looked like, sounded like, smelled like. Was the water still? Running? Muddy? Clear? Were there trees or was it open? Was the ground soft or hard? Ask students to share out their memories of wetlands.

- 4. Explain that by observing these different traits, just like you did, scientists can classify wetlands, or organize them, into different groups.**
 - Only special kinds of water-loving plants grow in wetlands, and some of them are truly strange and amazing! Taking a closer look at these plants can give scientists a lot of clues as to what kind of wetland they are surveying and what they need to do to protect it.
 - Pass around photos and laminated specimens of wetland plants and read descriptions. Ask if anyone recognizes any of these plants.

- 5. Ask students if they know the names of some different types of freshwater wetlands that can be found in RI.**
 - Walk through each habitat: swamps, ponds, rivers, vernal pools and bogs on the PowerPoint.

- 6. Walk through the slides about creating, protecting, and restoring wetland habitats in Rhode Island.**



Eye of a Scientist

Prep

This activity will introduce students to the practice of observation, and corresponds to the Wading Through Freshwater lesson plan.

How to

- Tell the class you will be testing their skills of observation. Observing something simply means looking at it very carefully and trying to notice little details.
- First test them by having them close their eyes and try to guess how many windows are in the room without looking (you could also use lights or other objects they see daily). If they don't guess correctly, explain that observational skills can be practiced and that is what scientists do every day!
- Next tell the class you are going to step out of the room (or just have them close their eyes) and you are going to change one thing about your outfit. (ex. Put up your hair, untie your shoes, turn around your name tag...) When you come back in the room, the class will have to use their powers of observation to figure out what is different.
- Pair up the class and have them stand back to back. Tell them they each have ten seconds to change one thing about their outfit, then they will turn and face each other and try to observe what was changed.
- Ask the class to think about how they noticed the difference. Looking closely and carefully at something like they did with this activity is exactly what scientists do! They compare what resources are available in an area over time in what is called a habitat assessment. This careful observation can help scientists notice changes or small details, which allows them to understand how things work (or are not working) and how to fix them! You can practice being a scientist anytime, anywhere by carefully examining the world around you, just like you did today!



Lesson 2: Wetland Wildlife - Wood Ducks

Theme

Wood duck populations declined in the past, but thanks to human ingenuity, they have made an amazing recovery.

Learning Objectives

In this lesson, students will gain an understanding of the relationship between different species of wetland animals and how the habitat supports them. Students will learn how animals have adapted to live in wetlands in Rhode Island and the definition of a keystone species.

Corresponding Activities for this Lesson

- Duck Detectives
- Two Ducks and a Merganser (Two Truths and a Lie)

Materials

- Wetland Wildlife PowerPoint
- “Fieldwork Feature: Wood Duck Boxes” video on our YouTube channel (RI Department of Environmental Management > Playlists > Home Sweet Habitat: Freshwater Wetlands)

Lesson

- 1. Explain to students that today we will be learning about the animals that use freshwater wetlands in Rhode Island and how biologists at the RIDEM Division of Fish and Wildlife are helping them.**
- 2. Ask students if there are any activities that people might like to do in wetlands? Collect answers from students to get them thinking about their personal connection.**
 - Examples might include swimming, kayaking, fishing, boating, catching frogs etc
- 3. Ask students what humans need water for.**
 - Examples might include drinking, bathing, washing, watering crops, brushing teeth etc.



4. Ask students which animals use wetlands. Why would animals use wetland habitat?

- Many animals use water as a home (fish and frogs), as a resource for drinking (deer, bobcats), or as a place to find food (otter and mink). Raccoons even use water to wash their hands! Water is one of the four resources that all living things need to survive, so it is very important for us to protect it however we can!

5. Review background of wood ducks.

- What do wood ducks eat? Seeds, fruit, aquatic insects and acorns and nuts on land
- Where do wood ducks live? Swamps, freshwater marshes and beaver ponds
- Wood ducks stay in the south during the wintertime and migrate north to nest in Rhode Island. Some wood ducks stay in the same place all year round.
- What preys on wood ducks? Birds of prey, black rat snakes, red foxes, and raccoons are all nest predators and will eat their eggs

6. Review nesting behavior and play video of leaping chicks embedded in the PowerPoint.

7. Go over the historical declines in the wood duck population and the methods the RIDEM Division of Fish and Wildlife and other states implemented to help boost their population.

- Ask students if anyone has ever seen a wood duck nesting box.
- Follow up with the Duck Detectives and Two Ducks and a Merganser activities.



Two Ducks and a Merganser

Prep

During the fall, biologists journey out into wetlands to monitor Rhode Island's population of wood ducks by checking up on man-made nest boxes. To reduce stress, they wait until the ducks have left for the season, then they open up the side of the box, which has a special hinge, to peek inside and look for evidence of hatched ducklings! They carefully sift through the nesting material to find and count the leathery membranes that make up the inner part of the eggshells. The more membranes, the more successfully hatched eggs! Hooded mergansers like to use the nest boxes, too, so biologists must carefully examine the eggshells and membranes to figure out what kind of bird was using the box. Sometimes both species lay eggs in the same box, so biologists have to be very good at determining which eggs are truly wood ducks and which are mergansers!

How to:

Explain to students that you hope they paid close attention to the wood duck lesson, because now they will quiz each other on what they learned through this fun game. This activity is based on the game "Two Truths And A Lie." Students will make three statements about wood ducks, two of which are true and one that is made up. The rest of the class must determine which of the three statements is false (the merganser among wood ducks).

*For younger students, teachers can act as the leader. See the next page for a list of truths and lies.

Example:

1. Wood ducks nest in hollowed out trees.
2. Ducklings are brightly colored.
3. You are allowed to hunt wood ducks in Rhode Island.

Answer: Duckling are not brightly colored, they are drab which helps them camouflage! Tip: Encourage students to think about their diet, behavior, habitat and conservation efforts.

TRUTHS (FACTS):

- Wood ducks are herbivores.
- Wood ducks nest in holes in trees.
- Wood ducks live in wetlands.
- Male wood ducks are brightly colored.
- Female wood ducks are brown.
- Chicks are drab brown in color.
- Wood ducks are allowed to be hunted in Rhode Island, with lots of rules, and you need a license to do so.
- Wood ducks are protected under the Migratory Bird Treaty Act.
- Snakes will eat wood duck eggs.
- Females wood ducks will nest in the same location every year.
- Wood duck chicks can survive jumping nearly 50 feet from their nest to the ground.
- Wood ducks lay between 8 and 15 eggs.
- Female ducks are called hens.
- Male ducks are called drakes.
- Some wood ducks are migratory.
- Wood ducks nest in the spring.
- Beavers help create habitat for wood ducks.
- Wood ducks feed by “dabbling.”
- Female wood ducks will line their nest with down feathers from their bodies.
- Wood ducks almost disappeared due to habitat loss and unregulated hunting.

LIES (FICTION)

- Wood ducks are mammals.
- Wood ducks nest on the ground.
- Female wood ducks are brightly colored.
- Wood ducks live in the desert.
- You can keep wood ducks as pets.
- Wood ducks are predators.
- Wood ducks lay 2 eggs.
- There are no wood ducks in Rhode Island.
- Wood ducks are not allowed to be hunted in Rhode Island.
- Beavers are predators of wood ducks.

Learn more about this program:

<http://www.dem.ri.gov/programs/bnatres/fishwild/pdf/wood-box-summary.pdf>



Duck Detectives

Prep

Lesson 2 and Two Ducks and a Merganser will prep students for this activity!

Materials:

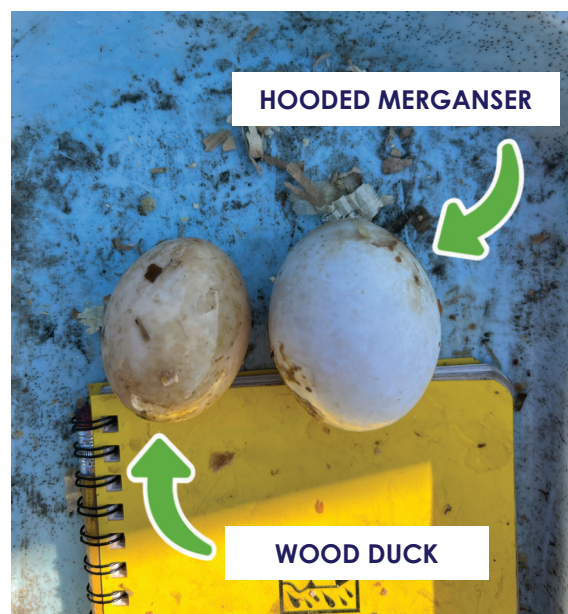
- Wood duck box cardboard cutout
- Laminated wood duck and hooded merganser egg cutouts
- Laminated wood duck and hooded merganser chicks (and other critters)

How to:

Explain to students that they will be modeling real life bird observations done each year by RIDEM Division of Fish and Wildlife biologists and staff. In reality, biologists check nest boxes at the end of the nesting season to count eggshells, but for this activity, we'll be checking in real time. They will be checking a wood duck box for nesting activity! However, they won't just be on the lookout for wood ducks. Hooded mergansers also use wood duck boxes for nesting...and they will even lay their eggs in a wood duck's nest! Sometimes, a mama wood duck will be taking care of her own babies and also a few stray hooded merganser babies. This type of nesting strategy where a parent of one species takes care of the babies of another species is called brood parasitism.

Pass around or hold up the cutouts of the wood duck eggs and the hooded merganser eggs. Can students spot the difference between the two? Wood duck eggs are oval and beige colored. Hooded merganser eggs are rounder and bright white.

Next, pass around the cutouts of the chicks, and challenge students to spot the differences between the wood duck and the hooded merganser. Wood duck chicks have dark brown bodies with pale yellow bellies and faces. They have a thin brown stripe behind their eye. Hooded merganser chicks have a dark brown body and pointier beak. Their heads are dark and poofy on top, and tan on the bottom.



Once everyone feels comfortable identifying the eggs and chicks, explain that each day, we'll be checking the nest box to see who has been laying their eggs in it.

Egg clutch size for wood ducks is typically 6-16 eggs; for hooded mergansers, it's 5-13 eggs. Birds will lay one egg a day until their clutch is complete. There are infinite combinations you can put together for this activity. For example, you could set up a scenario with just wood duck eggs, or just hooded merganser eggs. Maybe you have a wood duck nest with 10 wood duck eggs, and one hooded merganser egg, or vice versa. It's up to you!

Each day, add an egg to the nest until you reach your desired clutch size and species combination. Ask students to check the nest each day, and figure out who's been nesting there. Keep a tally on the board, or create a table to record the number of eggs from each species.

When the egg clutch is complete, it's time to hatch! In real life, it takes over a month for mama ducks and mergansers to incubate their eggs, so we're speeding up the process a bit for our imaginary nest box. The entire nest will hatch over a 24 hour period, and within the next day or so, the chicks will leap out of the box and follow their mother to the water. Before students come in, replace eggs with their respective, adorable chick!

Add in some fun twists!

In nature, not every egg or chick makes it. They are very susceptible to all types of predators! To add in a predation event, remove some of the eggs from the box before students check the next day, simulating a nest predator (such as a black rat snake) sneaking a snack overnight.

Wood ducks and hooded mergansers aren't the only critters to use nest boxes. Screech owls, kestrels, tree swallows, bluebirds, squirrels, and mice have all been found using our wood duck boxes. We've included cutouts of these animals to add into the box before or after the nesting period is over to show that many different species benefit from nesting boxes!



Lesson 3: Wetland Wildlife - Beavers

Theme

Wetlands provide habitat for many species of wildlife in Rhode Island.

Learning Objectives

In this lesson, students will learn how animals have adapted to live in wetlands in Rhode Island and the definition of a keystone species. Students will gain an understanding of the relationship between different species of wetland animals and how the habitat supports them.

Corresponding Activities for this Lesson

- Build Your Own Beaver Dam
- Beaver Puppet Craft -- Learn how to create this craft while learning about beavers with our [“Creature Crafts” video](#) on our YouTube channel (RI Department of Environmental Management > Playlists > Home Sweet Habitat: Freshwater Wetlands)

Materials

- Wetland Wildlife PowerPoint
- Beaver skull replica and pelt
- Paint trays
- Sticks and leaves
- Soil, Play-Doh, or clay

Lesson

- 1. Explain to students that today we will be learning about the animals that use freshwater wetlands in Rhode Island and how biologists at the RIDEM Division of Fish and Wildlife are helping them.**
- 2. Ask students if there are any activities that people might like to do in wetlands? Collect answers from students to get them thinking about their personal connection.**
 - Examples might include swimming, kayaking, fishing, boating, catching frogs etc
- 3. Ask students what humans need water for.**
 - Examples might include drinking, bathing, washing, watering crops, brushing teeth etc.

4. Ask students which animals use wetlands. Why would animals use wetland habitat?

- Many animals use water as a home (fish and frogs), as a resource for drinking (deer, bobcats), or as a place to find food (otter and mink). Raccoons even use water to wash their hands! Water is one of the four resources that all living things need to survive, so it is very important for us to protect it however we can!

5. Review history of overharvest of beavers in the U.S.

- Beavers were harvested heavily for their fur and nearly disappeared. Let students gently touch the fur to see how soft and warm it is. When used sustainably, beavers provide a great resource to keep us warm!

6. Ask students what adaptations beavers have that help them to survive.

- Physical (fur, webbing) vs. behavioral adaptations (building dams etc)
- Show everyone the beaver skull and ask students to make some observations out loud.

7. Discuss benefits/conflicts with beavers.

- Explain that the RIDEM Division of Fish and Wildlife manages the beaver population to prevent conflicts and allow collection of natural resources in a sustainable way.

8. Beavers are a keystone species. The habitat that they create also supports many other animals.

- A keystone is the piece that holds everything together, and if removed, could make everything fall apart.
- Many other animals, including wood ducks, depend on the wetlands that beavers create, and if they were to go extinct, many other animals would be affected by the loss.
- Beavers are the only animal, aside from humans, that change their habitat to fit their needs. They are important to have in the ecosystem, but it is also important to keep their populations in check in order to maintain balance.

9. Follow up with the Build a Beaver Dam activity. Afterwards, watch the “Creature Crafts” video and create your own beaver puppets with paper bags!



Build Your Own Beaver Dam

Materials:

- Paint trays
- Sticks and leaves
- Soil, Play-Doh, or clay
- Water

How to:

Break students up into small groups to work together to build their beaver dams. Invite students to get creative and think like a beaver as they try to build a dam that will successfully stop water from flowing down the river.

Once students have finished building their dams, gather everyone together to test them out, pouring water into the paint trays and seeing if the dams work.

After all of the dams have been tested, discuss with students what worked or didn't work about their designs. Did they think this was an easy or hard task? Hopefully this will inspire newfound appreciation for the engineering expertise and ecosystem services beavers provide!