RHODY CRITTER KITS

HOME SWEET HABITAT

FORESTS

RHODE ISLAND FISH & WILDLIFE

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Rhode Island Division of Fish and Wildlife

Rhode Island Division of Fish and Wildlife Outdoor Education

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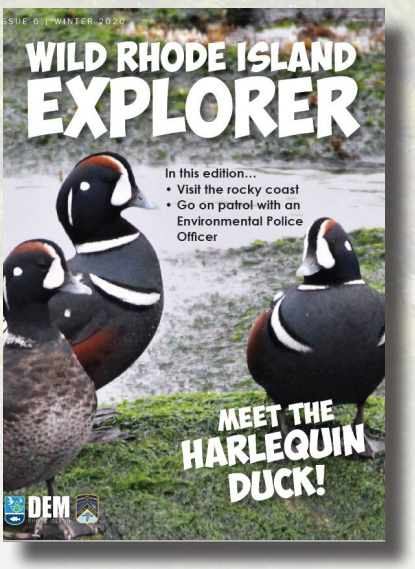
Rhode Island Department of Environmental Management



Read, learn, and explore! Sign your school up for a FREE subscription to our quarterly magazine for kids, Wild Rhode Island Explorer. For more information, visit dem.ri.gov/wildlifeoutreach.

RHODE ISLAND FISH & WILDLIFE

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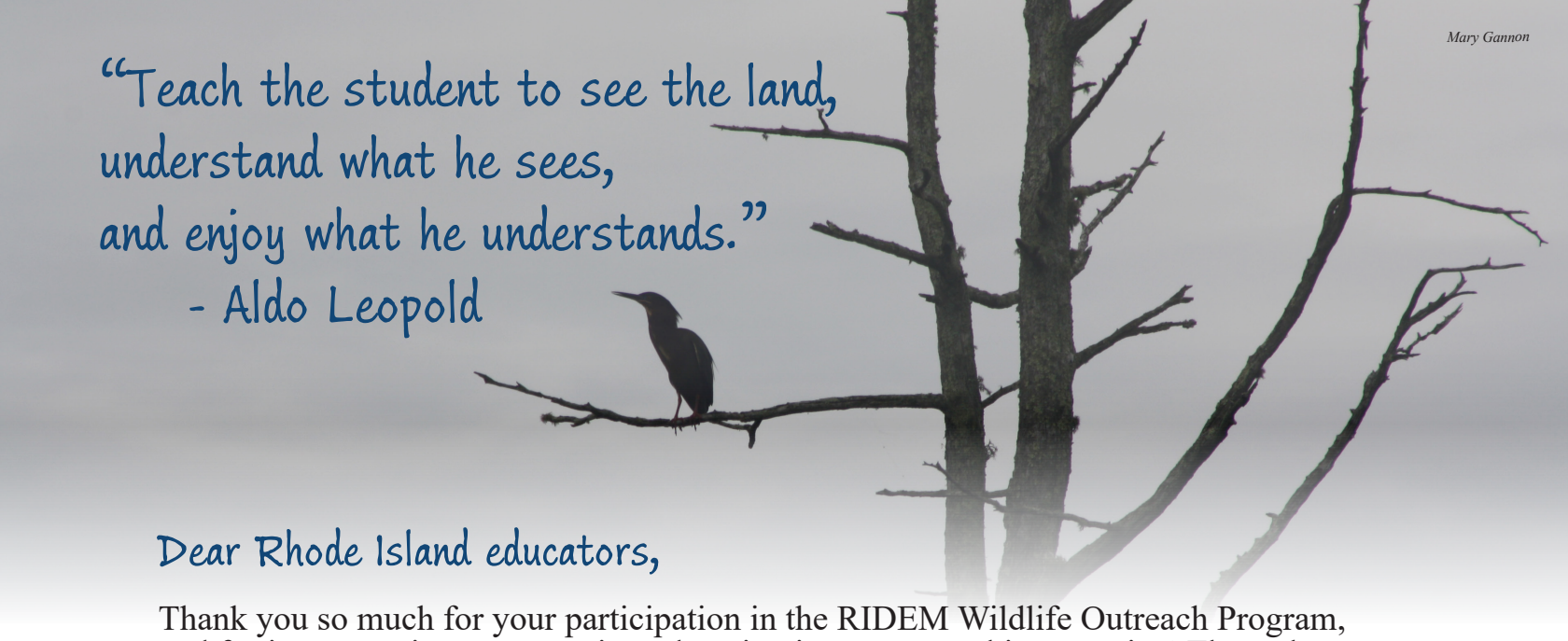
U.S. FISH & WILDLIFE SERVICE

Office of CONSERVATION INVESTMENT

Partnering to fund conservation and connect people with nature

WILDLIFE & SPORT FISH RESTORATION

Cover/Inside cover: Mike Stultz; Rhody Critter Kits logo by Nick Pires



"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 for Rhode Island's diverse and amazing wildlife. On behalf of our wild creatures, big and small, thank you!

The Wildlife Outreach Program has grown in leaps and bounds since its inception in 2017. Coordinating this program has been the most enjoyable and rewarding whirlwind I could imagine. In the wake of the COVID-19 pandemic, our team created these the Rhody Critter Kits to connect with teachers and kids, and keep Rhode Islanders engaged with our natural resources. Now more than ever, it's critical to get children outdoors, engaged with the world around them. It's been a joy to help facilitate these connections and to see this program grow! With your help, we've been able to connect thousands of students from diverse communities to our local wildlife, a feat which could not be accomplished by our tiny team alone.

These kits are not limited just to science lessons, but can be incorporated into art, reading, writing, and social studies lessons as well. We built them with room for flexibility and creativity, so you can tailor them to fit your individual class's needs. We hope the design of the kits inspires you, and encourage you and your students to have FUN with them!

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. Every time I meet with educators who have used these kits, I am encouraged and inspired by your dedication. Thank you again!

Best wishes,
Mary Gannon

Wildlife Outreach Coordinator
Rhode Island Department of Environmental Management
Division of Fish and Wildlife

Mary.Gannon@dem.ri.gov | 401-782-3700

Gabrielle DeMeillon

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

Biological Technician
Rhode Island Department of Environmental Management
Division of Fish and Wildlife

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Mike Stultz

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

The Division of Fish and Wildlife (DFW) protects, restores, and manages the freshwater and wildlife resources of the state. We share management responsibility of more than 60,000 acres of land, including over 25 State Management Areas, and are responsible for thousands of species. We serve a wide and diverse segment of the public from outdoor recreationists (e.g., hunters, hikers, mountain bikers, wildlife watchers) to the general public (e.g., backyard birders, public concerned with nuisance wildlife, municipalities, legislators). In addition, we are responsible for the State's public hunter education programs and overseeing all hunting and trapping in the state. This includes 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.

S. Petrarca

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's Office of Conservation Investment. 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.


Mike Stultz

Home Sweet Habitat: Forests

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 forest 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.

Forest Kit Materials

Item	Talking Points
New England Forests Through Time book	This book of dioramas from the Harvard Forest shows how New England's forest habitat has changed over the course of history. Great social studies connection!
Eastern Forests and *Eastern Trees* field guides	Use this field guide to identify the trees growing around your school.
Forest Forensics book	This book has interesting information about the clues to the past you can find on a forest walk in New England. Great for connecting natural resources to local history!
Keeping a Nature Journal book	This book has some fun ideas on getting your students started on creating their own nature journals through art and writing. This book can be used with any of the Rhody Critter Kits!
Bobcat pelt and skull replica	When talking about young forest wildlife, invite students to take a close look at the bobcat skull and gently touch the pelt. What about the bobcat's skull indicates that they are excellent predators?
Fisher pelt and skull replica	Fisher are found across RI in mature forest habitat. When discussing the animals that live in each forest age class, invite students to gently touch the fur. Fisher often get a bad reputation because they are widely misunderstood. They are actually quite shy and are important predators in the ecosystem.
Critter finger puppets (14)	Use these adorable puppet friends to act out The Story of a Forest activity.
Laminated "Story of a Forest" cards	Use these cards to help facilitate The Story of a Forest activity.
Acorns, hickory nuts, beech nuts, and pitch pine cones	Most people are familiar with acorns, but RI's trees make nuts and seeds of all shapes and sizes, all of which are important for wildlife!
Laminated New England cottontail and Eastern cottontail cards	Use these for the Invasive Species Game
White-tailed deer antler	Male deer lose their antlers during the winter months and regrow them each spring. Deer can be found in forests of all ages from field edges to mature woodlands.
Laminated leaves	When talking about different forest age classes, pass around these laminated leaves to give students context for what the trees in each succession stage look like. Do they recognize any of these leaf shapes? Extend the lesson by searching for leaves around your school and trying to identify them.
Laminated snake skin shed	All snakes shed their old skin as they grow. The dry layer of skin comes off inside out, like taking off a shirt over your head. Sometimes, snakes lose their skin in one piece, leaving behind a ghostly replica!
Cottontail skull replica	When discussing the New England and Eastern cottontails, invite students to observe this skull replica. What about the skull indicates that this animal is a herbivore? Even though rabbits have large incisors like beavers and muskrats, they are not rodents. They are in a separate group of mammals called lagomorphs. Check out the hidden second pair of upper incisors that sets them apart!
Deer vs. rabbit browse display case	Deer and rabbits like to eat the same things, but have different dental arrangements. Based on the way a leaf or twig has been browsed (bitten), you can solve the mystery as to who stopped by for a snack!
YouTube playlist	Visit RIDEM's YouTube channel to view educational videos related to this kit. @rhodeislanddem

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.

Read on to learn more about wildlife habitat!

Habitat Fun Facts

- Over 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.


Mike Schipritt

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 woolly 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

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, and 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, food resources may shift, 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.


Mary Gannon

How Can You Be a Habitat Hero?

Help clean up and protect wetlands!

Habitat loss is the greatest threat to all wildlife. 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 speeding up 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 that habitat is 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. *(Check out our Quick Links page for resources on native plant gardening.*) 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 birdhouses or leaving brush piles in your garden. 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!


Mary Gannon

Forests

When most people think of forest, they imagine tall trees growing in a big cluster. However, forests, just like people, are all unique in appearance and age over time. The process in which forests evolve over time, from grassland, to shrubland, to young forest to mature forest is called **succession**. Each stage in a forest's growth is distinct and is characterized by the different plants and animals that use it. It is important to understand and maintain connected and diverse forests to ensure there is enough habitat for each and every one of our native species.

What happened to the forest?

Indigenous people of the Narragansett, Nipmuck, Niantic, Wampanoag, and Manissean tribes were the first stewards of Rhode Island's habitat, and continue that stewardship today. They used wildlife and plant resources for survival by hunting, trapping, fishing, gathering native plants, and farming. Indigenous people in southern New England actively managed habitat through burning of dead underbrush to create space for agriculture or promote the growth of desirable native plant species. When European settlers first arrived in America, Rhode Island's landscape was mostly covered in vast forests. There was an abundance of habitat for wildlife to live in and resources were plenty. The forests ranged in age, size and density due to natural occurrences such as fires from lightning strikes, floods from beavers and hurricanes knocking down trees. After these events, the forest would "reset" and begin to grow anew. This created a diverse landscape and a variety of habitat for different animals.

The settlers thought that the forests were endless so they began to cut them down to build homes and create fields for crops and livestock. They hunted animals for food and fur. As time went on, more Europeans began arriving to America and cleared more and more land. 60-80% of the New England's forest was cut down between 1830-1880. The remaining forest was frequently cut for lumber and fuel.

Around the 1850's, many fields were abandoned as people moved to new areas and found new jobs. The fields began to quickly grow into young white pine forests. As the white pines grew into middle aged forests, people realized that the pine wood was valuable as lumber for creating shipping crates and so they were cut down and harvested for **timber**.

Clear cutting, or removing all of, the white pines made way for the hardier "hardwood" trees to take over, such as oaks, cherries and maples. These fast growing trees grew in tight clumps, creating dense thickets. Areas that had been cut earlier grew tall trees that shaded out the **understory** and became mature forests. The landscape started to look like a quilt with different aged patches of forests covering Rhode Island.

Our forests have now matured to be about the same age across the state. Remnants of the impacts of the early settlers can be found in the stone walls that once divided farmland but now reside among mature forests. We now suppress fires and stop floods to protect our homes, however, these occurrences are a natural part of the ecosystem and are necessary to create the diverse forests that existed before settlers arrived, and upon which our native wildlife depend.


Kelly Colgan Azar

Who lives in the forest?

As forests grow, they support different types of animals because each stage provides different types of food and shelter. Forest landscapes require disturbance in order to have each of these stages present to support all of the different species of wildlife in Rhode Island. Many wildlife species will utilize multiple stages of forest succession.

Plant stage: 0-5 years
Wildlife examples: insects, pollinators, mice, hawks, snakes and bluebirds

Shrub stage: 6-25 years
Wildlife examples: American woodcock, box turtles, songbirds, bobcats, New England cottontail rabbits, snakes

Young forest: 26-50 years
Wildlife examples: deer, skunks, foxes, whip-poor-wills, over 40 species of songbirds, snakes

Mature forest: 51-150 years
Wildlife examples: deer, turkeys, raccoons, owls, black bears

Climax forest: 150-300 years
Wildlife examples: pileated woodpeckers, wood thrushes, fishers, squirrels


Mike Stultz

Forest Conservation Work in Rhode Island

Selective Cutting

The RIDEM Division of Fish and Widllife selectively cuts areas periodically to replicate the natural disturbance that would occur as a result of hurricanes or fire. This is one way to reset the forest. American woodcock, New England cottontail rabbits, and many songbird species do not thrive in a mature forest; they need the shelter and protection of thick young forests to escape predators. Division biologists work with State foresters to decide the best place to create new young forest. They use machines to cut down all but a few trees in the area, and leave **slash** (branches and limbs) on the ground. The remaining trees will drop seeds to start the regeneration process, and the slash left on the ground will protect the soil from drying out and the small seedlings from being eaten by deer. **Snags** (standing dead trees) are also left to provide habitat for cavity nesting birds, bats, mammals, and insects. Biologists stagger these cuts over time. In the Great Swamp Management Area, a section of habitat is cut on a rotating schedule. This ensures that all of the forest is not the same age. From above it appears like a quilt with different stages of forest in each patch, providing diverse habitat for all of the animals in the area.

Prescribed Burns

Nicholas Farm Management Area is unique because it contains pitch pine barren habitat, which is a unique and rare forest type in the state. Pitch pines have evolved to benefit from forest fires. They have thick, fire-resistant bark and their pine cones open more readily when subjected to fire. Humans have suppressed fires since settlers first arrived, limiting the pitch pine seeds from releasing and spreading, and allowing white pines to take over the area. To help restore this unique habitat, the RIDEM Division of Fish and Wildlife carefully burns sections of the forest, eliminating the white pines which can't tolerate the heat, and making way for new pitch pines to grow. Specially trained firefighters set up boundaries and keep a close watch as the fire burns. Restoration of pitch pine barren contributes to the conservation of various songbirds, pollinators, and the plant species upon which they rely for survival. Burning has also used to restore coastal shrubland habitat on Dutch Island, and is being used to restore and maintain habitats around the state.

Forest Vocabulary

Clear cutting – a habitat management strategy that involves the cutting and removal of most of the mature trees in a specified area to create the disturbance necessary to establish young forest habitat; typically, a number of healthy seed trees are left to encourage regeneration, snags are left as structural habitat, and slash is left on the ground to protect the soil and emerging tree seedlings

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.)

Prescribed burn – a habitat management strategy that involves mimicking natural disturbance by setting and extinguishing a carefully controlled fire to burn dead organic material and undesirable species (white pine), with the goal of restoring pitch pine barren or other early successional habitats

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

Slash – branches and limbs of trees left on the ground after a clear cut to protect the soil and emerging seedlings

Succession – the process in which forests evolve over time, from grassland, to shrubland, to young forest to mature forest

Timber – wood harvested from the forest to use in various products (building, heating, etc.)

Understory – the shorter layer of vegetation that grows beneath mature trees in the forest

Quick Links

The Young Forest Project

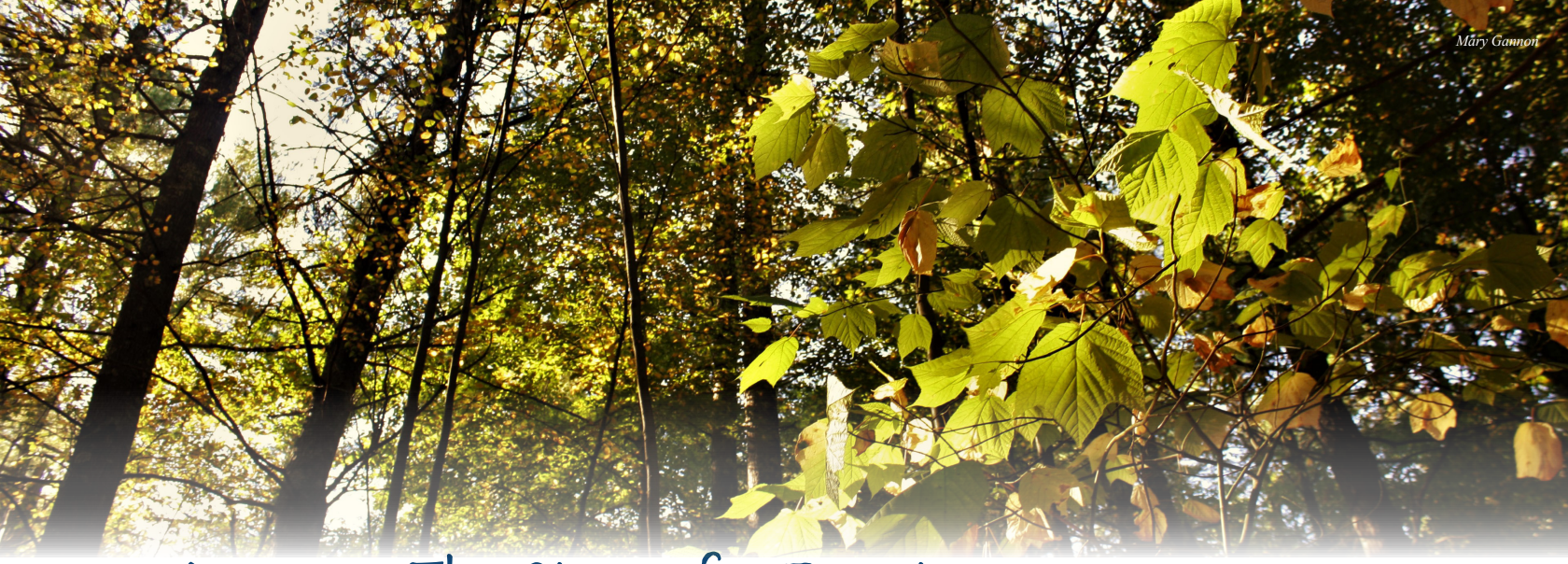
Learn about region-wide efforts to create young forest habitat.
https://youngforest.org/

Wildlife Fact Sheets

Learn about Rhode Island's wildlife with RIDEM's one page fact sheets.
http://www.dem.ri.gov/wildlife

Harvard Forest Dioramas

Learn about New England's forest history and download images of real life dioramas of each part of the story.
https://harvardforest.fas.harvard.edu/dioramas



Lesson 1: The Story of a Forest

Theme
Forests go through stages of growth and each one is valuable for its unique properties.

Learning Objectives
In this lesson, students will learn about forest succession and the importance of each stage of growth. Students will understand that forests age, mature and reset themselves naturally which creates diverse habitat types. Students will be aware of how the RIDEM Division of Fish & Wildlife helps protect Rhode Island's natural resources.

Corresponding Activities for this Lesson
- Story of a Forest

Materials
- Rhode Island's Forest Story PowerPoint
- Laminated "Story of a Forest" cards
- Puppets for "Story of a Forest" activity
- Bobcat pelt and skull
- Fisher pelt
- Laminated black racer skin shed
- White-tailed deer antler
- Laminated leaves
- Acorns/nuts, pitch pine cones

Lesson
1. **Explain to students that today we will be learning about how forests have changed over time in Rhode Island and how biologists at the RIDEM Division of Fish and Wildlife are protecting them today.**
    - Ask students to define a habitat. What do all animals need to survive? (An animal's home, made up of food, water, shelter and space)
    - Ask students what they picture when they think of a forest. What does the habitat look like? Are the trees big or small? What does the forest sound like?
    - After students have shared their thoughts, explain that forests can look very different depending on the type of forest and age. Some are open with tall trees and some are so thick you can barely walk through!

2. **Walk through Rhode Island's Forest Story slides, explaining that back in time, Rhode Island looked very different than it does today.**
    - Ask students if anyone has ever seen a stone wall in the woods? There is an interesting story about how that wall got there!
    - Before settlers arrived there were vast forests that would maintain themselves naturally through fires and floods.
    - Indigenous people would maintain small areas for agriculture or to harvest food.
    - The settlers thought that the forests were endless so they began to cut them down to build fields for crops and livestock. They built houses for themselves and hunted the animals for food and fur.
    - As more settlers arrived, more forest was cut down, until 50-80% of the forest was cleared (1830-1880). Stone walls marked the lines between properties.
    - Around the 1850's, many fields were abandoned as people moved to new areas and found new jobs. The fields began to quickly grow into young white pine forests, which was then harvested for lumber
    - With the pines removed, space was created for cherries, oaks and other hardwood trees to grow. Pass around the laminated leaves. Does anyone recognize any of the leaf shapes and names?
    - Explain that today, our forests have grown up into old forests with tall trees, because we stop the fires and floods that once would naturally reset them. Old stone walls deep in the forest remind us of the amazing recovery forests have made. Biologists must now help manage the forests, so that it is good habitat for all of Rhode Island's wildlife!

3. **Explain to students that each stage of forest is important because it provides different kinds of food and shelter that are used by difference kinds of animals.**
    - Pass around various nuts and acorns, explaining that trees provide food for wildlife. Can anyone imagine eating these nuts for a snack? Indigenous peoples of the Eastern United States traditionally ate various nuts from the forest in different recipes! Forests not only provide nuts as food, but fruits too, such as blackberries, blueberries, and huckleberries. Forests can provide food for both wildlife and humans!

4. **Go through "Story of a Forest" activity, and show the natural artifacts associated with the animals in the story.**

5. **Walk through the slides about creating, protecting, and restoring young forest and pitch pine habitats in Rhode Island. Pass around pitch pine cones for students to observe.**


Mary Gannon

The Story of a Forest

Prep

This activity uses acting and story telling to illustrate the concept of forest succession. Before starting the activity, explain to students that they will be using their imaginations to tell the story of how a forest changes over time. Ask students why a habitat might change over time. What are some natural events that may cause a forest to change? Are there any human activities that may change a forest habitat, or even stop a habitat from changing?

Materials:

- Laminated story cards
- Wildlife finger puppets

How to

- Divide students into 6 groups, and give each group a story card and the corresponding wildlife finger puppets for their story scene. Explain to students that they will be working together to tell the whole story, and that each group has one chapter of the story. Explain that each group will be working together to present their chapter to the rest of the class. Groups should pick one person to narrate, and assign roles to the other group members. For example, a couple of students could act as the habitat (trees, flowers, etc), and others could portray the animals in the scene either through acting or with the finger puppets. Encourage students to draw or construct scenery and add their own creative flair!

- For younger students, the educator can read the story out loud, and students can take turns acting out the story. Assess the needs of your students and feel free to get creative!

- After giving students ample time to prepare, ask each group to present their story chapter in order. At the end of the story, debrief with students on the story's events.

The Story of a Forest

Story Chapters

1. Once upon a time, there was a forest. It had old, tall trees with big trunks and beautiful branches. Pines, beeches, oaks, and maples shaded the forest floor with their branches. Ferns grew underneath them in the cool shade, and it was easy to walk between their wide trunks. A black bear passed through the forest in the fall to munch on acorns and beech nuts, but didn't find too many small plants to nibble on. Red squirrels chattered from the tree tops. Once in a while, you could hear the loud drumming of a pileated woodpecker building its nest in a tree trunk.

2. One summer, during a big storm, a bolt of lightning hit one of the pine trees and started a fire. The forest went up in flames! The bats that roosted in the big, old trees flew away to escape danger. Deer ran as fast as they could from the fire. The fire burned and burned, and eventually stopped. What used to be a forest was now a barren wasteland filled with ashes!

3. Winter came and blanketed the ashy ground with snow. When spring came, the sunlight shone on the big open space where the forest once stood. Tiny grass shoots began to poke out of the soil. By the end of the summer, the grass had grown tall. Wildflowers added splashes of color to the green grass. Butterflies fluttered around the flowers, and bluebirds swooped overhead. At night, a red fox wandered through the meadow in search of mice. What used to be a forest was now a big meadow!

4. Five years passed, and the meadow began to change. Blueberry and huckleberry bushes grew up, and the grass grew less and less. Briars grew into little thickets. A box turtle slowly feasted on the berries and mushrooms. A cardinal hopped among the shrubs, safely hidden in the thicket. What used to be a meadow was now a shrubland!

5. Fifteen years passed and the shrubland had changed. Tall, skinny birches and aspens grew in the bright sun. Many of the shrubs got bigger, and the thickets got more tangled. The tiny trees grew so close together, you could barely see between them! Cottontail rabbits hid from predators in the thickets. The young trees and shrubs rang with the beautiful spring songs of many birds. A bobcat quietly rested in the shelter of the trees. A woodcock snuck around under the shrubs, camouflaged in the leaf litter. What used to be a shrubland was now a young forest!

6. Fifty years passed, and the young forest grew older. The birches had disappeared, replaced by the oaks that had grown bigger. The forest floor was shaded, but still had some plants and shrubs growing in the understory. The calls of ovenbirds and wood thrushes echoed among the trees. At night, a great-horned owl hooted from the tall trees. A young raccoon scrambled up a tree, running away from a hungry fisher. What used to be a young forest was now a mature forest again!

The Story of a Forest Part 1: Climax Forest

Once upon a time, there was a forest. It had old, tall trees with big trunks and beautiful branches. Pines, beeches, oaks, and maples shaded the forest floor with their branches. Ferns grew underneath them in the cool shade, and it was easy to walk between their wide trunks. **A black bear** passed through the forest in the fall to munch on acorns and beech nuts, but didn't find too many small plants to nibble on. **Red squirrels** chattered from the tree tops. Once in a while, you could hear the loud drumming of a pileated woodpecker building its nest in a tree trunk.

The Story of a Forest Part 2: Setback

One summer, during a big storm, a bolt of lightning hit one of the pine trees and started a fire. The forest went up in flames! The **bats** that roosted in the big, old trees flew away to escape danger. **Deer** ran as fast as they could from the fire. The fire burned and burned, and eventually stopped. What used to be a forest was now a barren wasteland filled with ashes!

The Story of a Forest Part 3:

Plant Stage

Winter came and blanketed the ashy ground with snow. When spring came, the sunlight shone on the big open space where the forest once stood. Tiny grass shoots began to poke out of the soil. By the end of the summer, the grass had grown tall. Wildflowers added splashes of color to the green grass. **Butterflies** fluttered around the flowers, and bluebirds swooped overhead. At night, a **red fox** wandered through the meadow in search of **mice**. What used to be a forest was now a big meadow!

The Story of a Forest Part 4:

Shrub Stage

Five years passed, and the meadow began to change. Blueberry and huckleberry bushes grew up, and the grass grew less and less. Briars grew into little thickets. A **box turtle** slowly feasted on the berries and mushrooms. A **cardinal** hopped among the shrubs, safely hidden in the thicket. What used to be a meadow was now a shrubland!

The Story of a Forest Part 5:

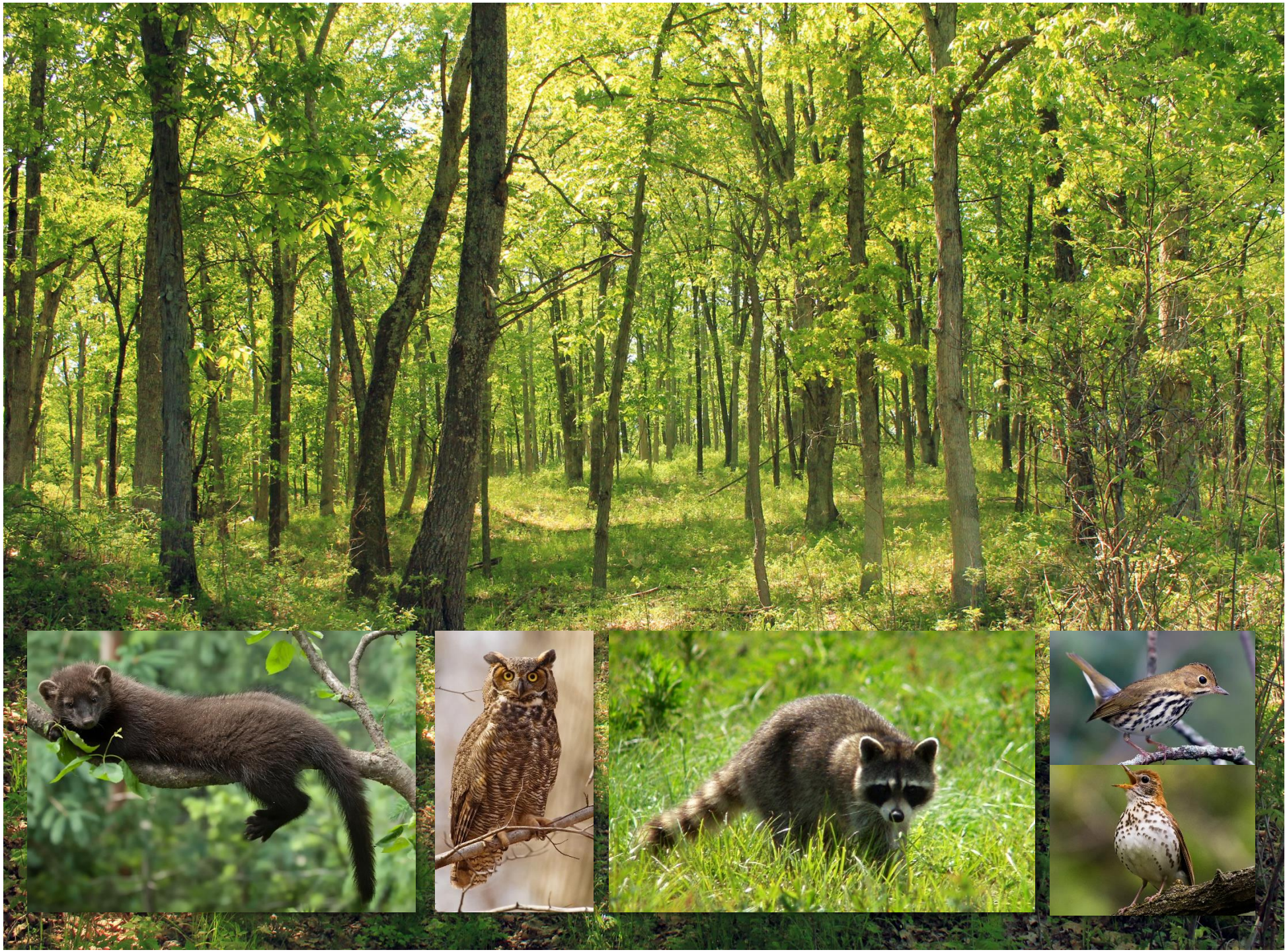
Young Forest

Fifteen years passed and the shrubland had changed. Tall, skinny birches and aspens grew in the bright sun. Many of the shrubs got bigger, and the thickets got more tangled. The tiny trees grew so close together, you could barely see between them! **Cottontail rabbits** hid from predators in the thickets. The young trees and shrubs rang with the beautiful spring songs of many birds. A **bobcat** quietly rested in the shelter of the trees. A woodcock snuck around under the shrubs, camouflaged in the leaf litter. What used to be a shrubland was now a young forest!

The Story of a Forest Part 6:

Mature Forest

Fifty years passed, and the young forest grew older. The birches had disappeared, replaced by the oaks that had grown bigger. The forest floor was shaded, but still had some plants and shrubs growing in the understory. The calls of ovenbirds and wood thrushes echoed among the trees. At night, a **great-horned owl** hooted from the tall trees. A young **raccoon** scrambled up a tree, running away from a hungry **fisher**. What used to be a young forest was now a mature forest again!



Lesson 2: Young Forest Wildlife: New England Cottontail

Theme

Focusing on conserving one "umbrella" species can help protect many other animals that utilize their same habitat. It is important to maintain habitat that supports our native species so that they can continue to thrive in Rhode Island.

Learning Objectives

In this lesson, students will learn about how the unique characteristics of a young forest support a wide range of species. Students will also learn that in order to conserve young forest wildlife, we must protect and maintain the unique habitat on which they rely. Students will be aware of how the RIDEM Division of Fish & Wildlife helps protect Rhode Island's natural resources.

Corresponding Activities for this Lesson

- Forest Succession Dance
- Invasive Species Game

Materials

- Young Forest Wildlife PowerPoint
- Invasive Species Game cards
- Bobcat pelt/skull replica
- Laminated black racer shed
- Cottontail rabbit skull replica
- Deer vs. rabbit browse display case

Lesson

1. **Explain to students that today we will be learning about young forest wildlife and how biologists at the RIDEM Division of Fish and Wildlife are helping to protect the habitat that supports them.**
    - Just like people, forests age over time, and during the different stages of life, called stages of "succession," they support different kinds of wildlife. Forests can look very different depending on the type and age. Some are open with tall trees, these are very old, "mature" forests and others are so thick you can barely walk through, these are "young" forests!

2. **For younger students, run through the Forest Succession Dance activity. Older students could also do the activity, or could solely review the stages of forest succession in the PowerPoint.**

3. **Ask students which animals they think might live in a young forest, then reveal the slide with pictures of young forest wildlife species.**
    - Explain that many animals use young forests because they provide a safe place to hide from predators with their thick and tangled brush and lots of food in the form of berries and other plants.
    - Show students bobcat pelt/skull and black racer snake shed, allowing them to gently handle the items.
    - In this lesson, we will be learning about the New England cottontail.

4. **Ask students what they think wild rabbits eat? Show the first slide about the New England cottontail.**
    - Spring & summer: Rabbits eat grasses, clover, sprouts, dandelion
    - Autumn & winter: Rabbits eat buds, stems, apple/birch bark

5. **Ask students what would eat a rabbit, then reveal the rabbit predator slide.**
    - Fisher, coyote, mink, fox, and raptors (birds of prey) all eat rabbits!

6. **Ask students why they think young forests are good habitat for rabbits?**
    - Protection from predators, places to eat and places to rest!

7. **Show the slide comparing New England vs. eastern cottontails. Ask students if they can spot any differences between photos on the slide. Show students the rabbit skull replica.**
    - New England cottontails are a native species. They belong in Rhode Island and have been here forever.
    - Eastern cottontails were introduced for hunting stock from the southern United States; they are invasive species. They were introduced to an area where they don't belong.
    - Eastern cottontails are bigger and use the food and shelter that New England cottontails need.

8. **Play the Invasive Species Game to demonstrate problems with invasive species.**

9. **Explain to students that to help the New England cottontail, the RIDEM Division of Fish and Wildlife is working with partners to help boost and monitor New England cottontail populations.**
    - There is a captive breeding program in which rabbits are bred in zoos then introduced to the wild, first in protected outdoor pens and then released to join wild populations across New England.
    - Some wild rabbits are trapped on Patience Island in Narragansett Bay and introduced to mainland populations. These rabbits get special collars that allow biologists to see where they go. They use big antennae to track the collars and learn more about the rabbits.
    - The RIDEM Division of Fish and Wildlife is working with the University of Rhode Island to locate any populations of New England cottontails in Rhode Island by performing pellet surveys. This is where volunteers and biologist pick up rabbit pellets and use genetic testing to see if it belongs to New England or Eastern cottontail rabbits.
    - Show students the rabbit vs. deer browse display case. Can anyone tell the difference between the two types of browse and pellets?
    - Explain that rabbits snip their food like a pair of scissors, making a clean cut with their top and bottom front teeth. Their pellets look like round M&Ms. Deer don’t have any front teeth on the top of their mouth, so their browse looks messy and torn. Deer pellets are more oval-shaped, like a peanut M&M. Explain to students that being able to identify signs of different animals is an important skill to have when studying wildlife.


Mary Gannon

Forest Succession Dance

Prep

This activity could be used at any time during the mini unit on forests. It could be used as a pre-lesson activity to introduce students to the concept of forest succession, during the lesson to illustrate the concept, or as a post-lesson activity to review. Get creative by adding music or nature sounds in the background! Before starting the activity, remind students that habitats change over time if left undisturbed.

How to

- For each stage of forest succession, have students "dance" or act like the dominant plant type of that stage. You can also designate a few students to act out the different types of animals that would live in each habitat. Project or pass around pictures of the animals for inspiration.
- **Bare soil:** Lie down flat on the ground *(Ants)*
- **Small herbaceous plants / native grasses:** Squat or kneel and wiggle your fingers above your head like grass blowing in the breeze *(Garter snake, monarch butterfly, box turtle, meadow vole, red-tailed hawk, dragonfly, bluebird, fox, bumblebee, American woodcock, deer, wild turkey)*
- **Shrubs:** Squat or kneel and spread your arms out to the side, clustering together and letting your arms intertwine *(American woodcock, towhee, yellow warbler, New England cottontail, bobcat, deer, black bear)*
- **Young forest:** Stand up in the same spot, still close together and letting your arms intertwine. Some students may remain shrubs. *(Deer, black racer, skunk, black and white warbler, ruffed grouse, whip-poor-will, black-billed cuckoo, New England cottontail)*
- **Mature deciduous forest:** Spread your arms out to the side and take 3 steps backwards so that there is space between you and your neighboring tree. Some students may remain young trees or shrubs. *(Deer, wild turkey, wood thrush, raccoon, great horned owl, black bear)*
- **Climax coniferous forest:** Spread your arms out to the side and take 5 steps backwards so that there is a lot of space between you and your neighboring tree. All students become mature trees. *(Pileated woodpecker, black-capped chickadee, squirrel, fisher)*
- Wrap up the activity by asking students to review the stages of forest succession they just acted out. Did they expect that a meadow habitat to turn into a forest? What might have happened to the meadow if someone came to mow it every year? What might happen to a young forest if a wildfire happened? If a mature forest was protected forever, would the habitat change?


USFWS

Invasive Species Game

Prep

This activity uses a familiar game, musical chairs, to illustrate how wildlife species compete for resources, and the impacts an introduced or invasive species can have on native species.

Materials

- 6 Chairs (or some sort of place markers)
- 6 New England cottontail (NEC) necklaces
- 6 Eastern cottontail necklaces
- Music of choice

* Cottontail necklaces are included in the Home Sweet Habitat bin. Templates are also provided here to print and create your own.

How to:

- Set up 6 chairs, back to back by twos:

1	2	3
4	5	6

- Choose 6 Students to be New England cottontails. Give them NEC necklaces and explain that these are native species, they belong here.
- Play one round of musical chairs. Once music has stopped, all the NECs should have seats. Explain to the class that this is how an ecosystem should function with its native species. There is enough space and resources for all of the animals to survive. But… Sometimes animals get introduced from another location. These are called non-native species. These animals can be introduced by accident, like rats on ships, or on purpose like the case with Eastern cottontails, introduced for hunting stock. Non-native species sometimes don't have much of an impact, but sometimes they can become invasive. Let's see what happens when we introduce a non-native animal to our ecosystem.
- Choose one student to be an Eastern cottontail. Give him/her an Eastern cottontail necklace.
- Play another round. One student should be knocked out (usually a NEC); they have not survived. Continue introducing one new Eastern cottontail for each round you play until there is only one NEC left.
- Ask the students that were NECs how they felt when they were kicked out of their habitat. One NEC survived; ask if they had to fight really hard to keep their spot. This is exactly what is happening with our native NEC. Eastern cottontails are taking over their space and resources, making it difficult for them to survive.
- By creating new habitat and introducing more NECs into the ecosystem we hope that they will be able to find new homes and be able to build up their population!

Invasive Species

Eastern Cottontail

Native Species

New England Cottontail

Lesson 3: Young Forest Wildlife: American Woodcock

Theme

Focusing on conserving one "umbrella" species can help protect many other animals that utilize their same habitat.

Learning Objectives

In this lesson, students will learn about how the unique characteristics of a young forest support a wide range of species. In this lesson, students will learn how the American woodcock, has adapted to live in young forests. Students will also learn about the interconnectedness of the resources within a habitat. Students will be aware of how the RIDEM Division of Fish & Wildlife helps protect Rhode Island's natural resources.

Corresponding Activities for this Lesson

- Habitat Circles Game
- Reading Aldo Leopold's "Skydance"

Materials

- Young Forest Wildlife PowerPoint
- Bobcat pelt/skull replica
- Laminated black racer shed
- Cottontail rabbit skull replica

Lesson

1. **Ask students if they can remember from the last lesson what a young forest is and who lives there.**
    - Young forests are made up of tightly grouped shrubs and small trees. They last less than 20 years before changing into mature forests and are important for many different kinds of wildlife. American woodcock use the shelter of young forests for nesting and rearing their young. The food, water, and shelter in young forests are important to the survival of our native young forest species. What would happen if one of those resources disappeared?
    - Play Habitat Circles Game

2. **Show the young forest wildlife slide.**
    - Explain that many animals use young forests because they provide a safe place to hide from predators with their thick and tangled brush and lots of food in the form of berries and other plants.
    - Today we will focus on a young forest species that needs a little extra help, the American woodcock.

3. **Show students the American woodcock slides. Ask the class to describe the woodcock and explain what each body part helps him with.**
    - Very large, flexible beak for digging for worms
    - Tongue with rough edges
    - Wings for flying
    - Camouflage coloration for protection/hiding
    - Big eyes to find food/see
    - 360° field of vision
    - All of these adaptations help the woodcock to survive
    - Ask the class if anyone has had to adapt before (Ex. Had to put on more clothes to stay warm, learn a new language, etc.)

4. **Have students read the folk names for the woodcock on the slide or write names on the board:**
    - Peentmeister, Timberdoodle, Hokumpoke, mudbat, bogsucker
    - Ask students to try to read names – save bogsucker for last.
    - Ask students what bogsucker might mean.
    - Woodcock love to eat worms, spiders, crickets, beetles and ants from muddy areas around wetlands.
    - Remember woodcock have a specially adapted long, flexible beak to get food.

5. **Explain that woodcocks migrate – another adaptation**
    - Migration is the seasonal movement of an animal from one place to another
    - Ask the class if they know of any other animals that migrate. (Ex. Ducks, geese, elephants, whales etc.)
    - Why do these animals migrate? (To find food, avoid harsh weather/ seasons, to have babies)

6. **Read the "Skydance" excerpt by Aldo Leopold.**
    - Ask the class what sound the woodcock made in the story-PEENT!
    - Explain that the woodcock does this in the springtime to try to find a mate
    - Once they find a mate they lay about 4 eggs right on the ground
    - Ask the class why the eggs need to be camouflaged – predators
    - Fox, skunk, crow, mink, racoon, snake, owl – will eat adults, too!

7. **Explain that the RIDEM clear cuts areas periodically to replicate the natural clearing that would occur as a result of hurricanes or flooding.**
    - The map on the slide shows the Great Swamp Management Area.
    - The sections are dated by year of the last clear-cut. You can see each patch is at a different stage of forest succession.
    - The DEM will continue to rotate cutting through these sections to ensure that there are always various stages of forest present in this area.
    - The current sections of young forests will only last about 25 years before turning into a mature forest and will no longer be useful to young forest wildlife.

8. **What is an umbrella species?**
    - Umbrella species are animals that, when protected, indirectly protect other animals that share their same habitat. Just like when you hold an umbrella over your head, it protects some of the space around you as well. Even though we may not be aiming to protect the songbirds, mammals and reptiles that live in a young forest, when we conserve habitat for woodcock we help all of the animals that live around them in the same way!
    - The American woodcock is an umbrella species because they protect all of these other animals that share young forest habitats!


Mary Gannon

Habitat Circles (Modified from Project WILD)

Prep

Review the essential components of habitat that all wildlife species need to survive: food, water, shelter, and space.

How to

- Have students count off 1 to 4. Designate each numbered group as one of the four habitat components (All the ones as water, all the twos as food, etc.).
- Have each group stand in a different area of the room or outdoor space. Ask students if they think if this is a good arrangement for all of the parts of our habitat. If you were an animal, do you think it would be easy or hard to find everything that they need if you had to travel to different places to get food, water, shelter, and space?
- Discuss some examples of habitat needs for different species. For example, a tree provides both shelter (place to build a nest, tree cavities) and food (acorns, nuts, and seeds) for squirrels. Wildlife need to have everything close enough so that they can escape predators or avoid using too much energy to travel in search of food or water.
- Ask students to all stand in a big circle, making sure they are standing next to someone from a different habitat group.
- Run a long piece of rope or yarn around the circle of students, asking everyone to hold onto the rope. Tie the ends together to complete the circle. Make sure everyone is spaced out enough so that the rope is taut, making a nice round circle, or a complete habitat. All of our habitat components are now close together.
- Discuss with students what they think would happen to our habitat if there was a drought. Ask all of the students in the water group to let go of the rope. What does the habitat look like now? Is it complete?


Mike Stultz

- Discuss with students what happens when one habitat component is in short supply. How does this affect wildlife? How could this also affect people?

- Ask everyone to grab onto the rope again and play out a different scenario. Explain that a big highway was built in our habitat. How might that highway affect our four different habitat components? Who should let go of the rope this time? Some of each habitat component would be diminished, since certain animals will not be able to cross the highway to get to everything that they need. If the highway separates animals from a key water or food source, most of the students would let go of the rope.

- Explain that connectivity of habitats is critical for the survival of wildlife species because connection of habitat components makes it far less challenging for wildlife to survive.

Variation

- Follow the first three steps above, then have students stand in a circle, shoulder to shoulder. Ask everyone to turn to their right and at the same time take one step towards the center of the circle.
- Ask students to place their hands on the shoulders of the person in front of them. On the count of three, everyone will slowly sit down on the knees of the person behind them to create a lap sit circle. The circle should support itself because all of the components of our habitat are working together!
- Add in some scenarios! For example, in our pretend habitat, during a drought year, ask the water students to remove themselves from the circle. The circle will mostly likely collapse or become pretty messy! Other scenarios include water pollution, loss of open space due to development, etc.

About Project WILD

Project WILD's mission is to provide wildlife-based conservation and environmental education that fosters responsible actions toward wildlife and related natural resources. All curriculum materials are backed by sound educational practices and theory, and represent the work of many professionals within the fields of education and natural resource management from across the country.

To attend a FREE training workshop, email kimberly.sullivan@dem.ri.gov.

The Sky Dance

By Aldo Leopold

Knowing the place and the hour, you seat yourself under a bush to the east of the dance floor and wait, watching against the sunset for the woodcock's arrival. He flies in low from some neighboring thicket, alights on the bare moss, and at once begins the overture: a series of throaty peents spaced about two seconds apart, and sounding much like the summer call of the nighthawk.

Suddenly the peenting ceases and the bird flutters skyward in a series of wide spirals, emitting a musical twitter. Up and up he goes, the spirals steeper and smaller, the twittering louder and louder, until the performer is only a speck in the sky.

Then, without warning, he tumbles like a crippled plane, giving voice in a soft liquid warble that a March bluebird might envy. At a few feet from the ground he levels off and returns to his peenting ground, usually to the exact spot where the performance began, and there resumes his peenting.

Additional Resources
&
Activities

Forest Word Search

S D E V I S A V N I N T M C B
E W M T Q S U H A W I C L J Q
C U T Y E X A M B M Y I Y N K
R U M Y K Z A J B H M W F O G
U N V I U G F E A A K N H I K
O D I W H S R V T M Q T Q T T
S E B T N S Y E B Q U O V A Z
E R Y Y I R J G A Q P S V R E
R S R F A S U C C E S S I O N
Z T U C L J Z B G T M Z T T H
N O I T A T N E M G A R F S I
U R Q M M I Z H W G W Z A E M
O Y N Y Y V W L B C W L C R Z
D D P E H E E H U B S F A F U
N E M D V O X L P C L S E Y S

e

Can you find all of these words?

climate
fragmentation
burn
resources
slash
succession
understory
timber
invasive
restoration