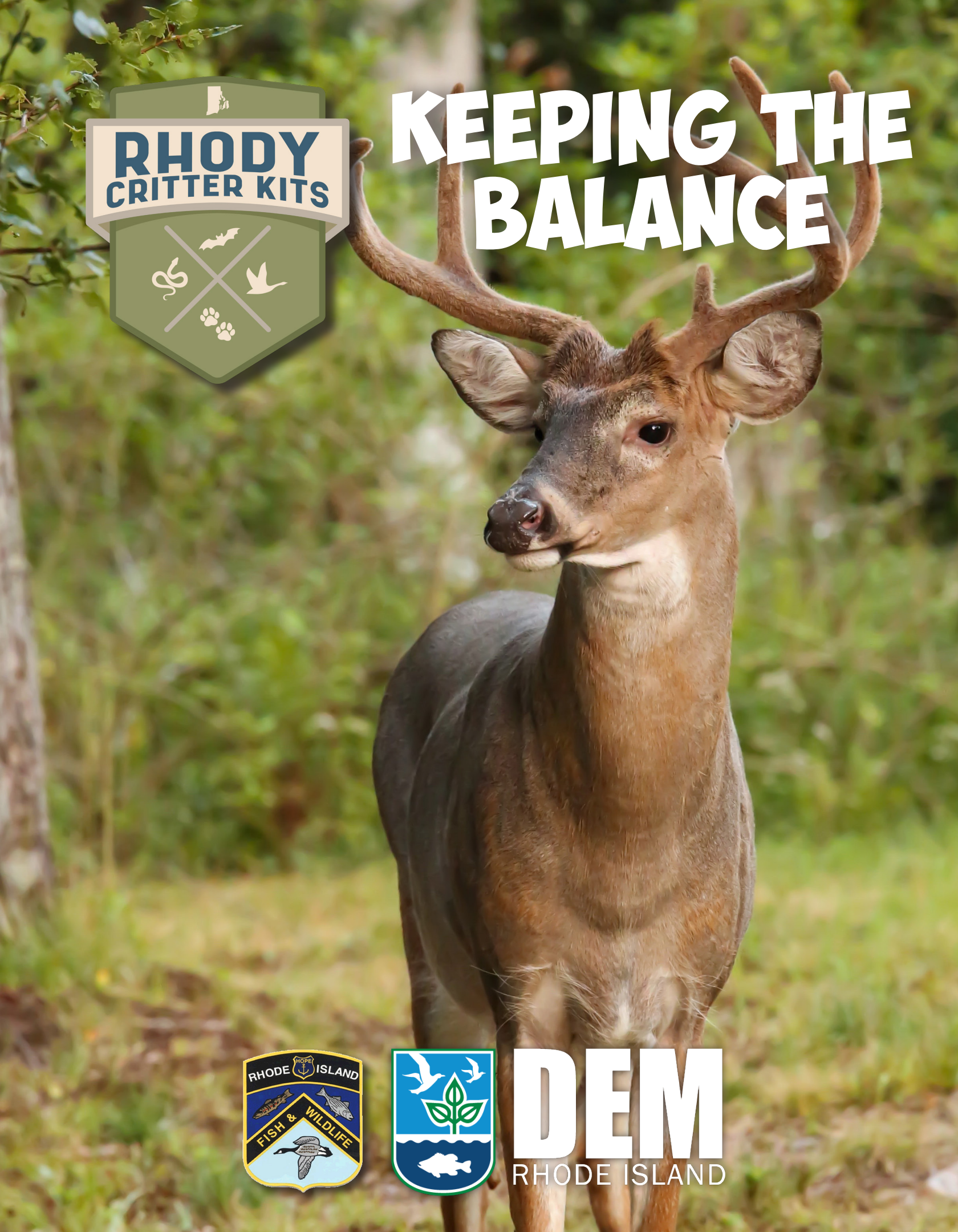
RHODY
CRITTER KITS
KEEPING THE
BALANCE
RHODE ISLAND
HOPE
FISH & WILDLIFE
DEM
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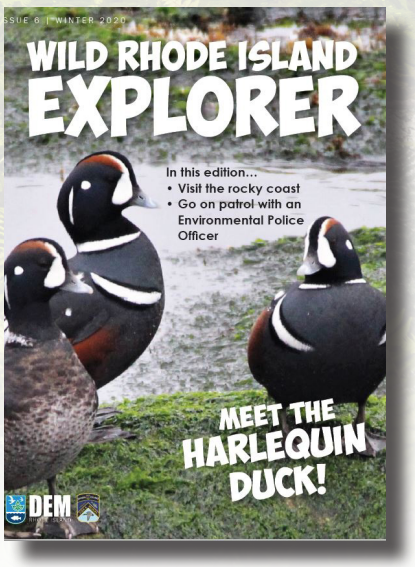
Learn more about Rhode Island's wildlife and our conservation programs!

Rhode Island Division of Fish and Wildlife

Rhode Island Division of Fish and Wildlife Outdoor Education

@RI.fishandwildlife

YouTube 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

DEM RHODE ISLAND

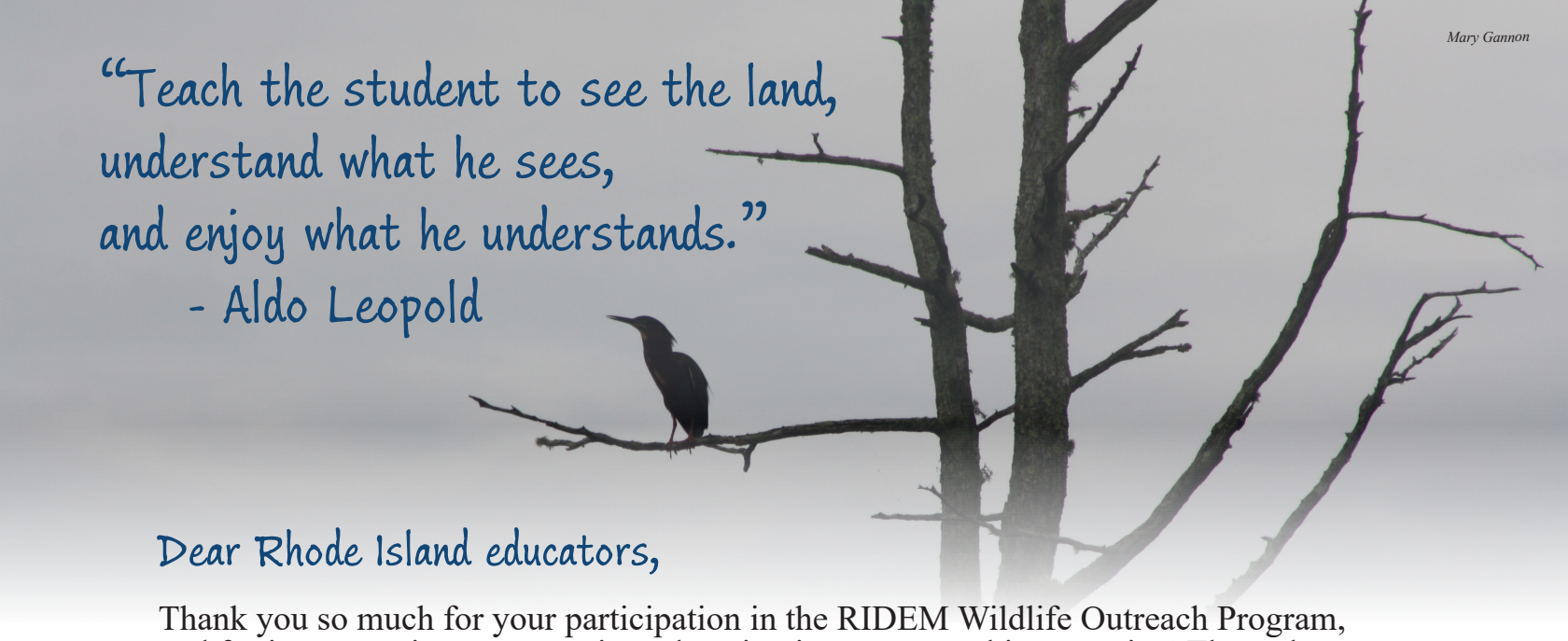
U.S. FISH & WILDLIFE SERVICE

Office of CONSERVATION INVESTMENT

Partnering to fund conservation and connect people with nature

WILDLIFE & SPORT FISH RESTORATION

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



Mary Gannon

"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

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!

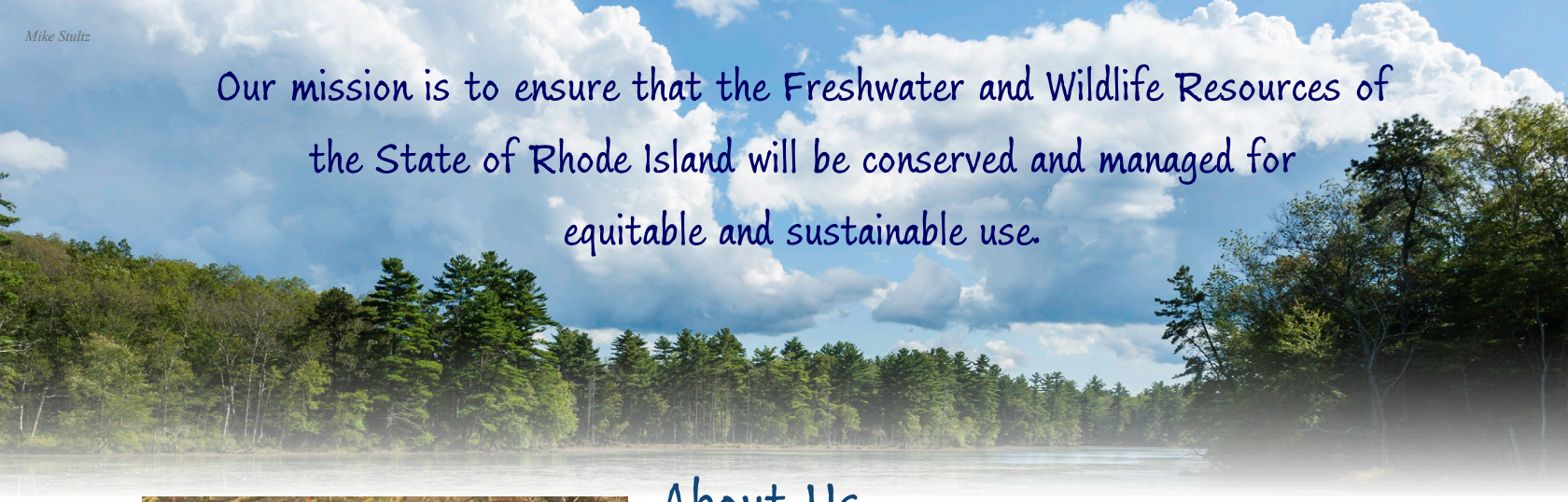
Since joining the RIDEM Fish & Wildlife Outreach Team, I have had the opportunity to share our conservation work with students across the state and see their eyes grow wide with inspiration. Seeing misinformation and fear turn into awe and curiosity is one of the greatest transformations to witness. 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

Gabrielle.DeMeillon@dem.ri.gov | 401-782-3700



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 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.


S. Petrarca

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'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.

Dean Birch

Keeping the Balance

Managing wildlife is one big balancing act. Everything is interconnected in nature, so maintaining that balance can get very tricky. In this kit, students will learn about wildlife populations, carrying capacity, and how the needs of the ecosystem align with the needs of people.

What's included in this kit?

- Information about the history of wildlife management and current conservation philosophies and techniques
- Interactive activities
- Sample lesson plans
- PowerPoints
- Photos and videos
- Natural artifacts

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 kit bin from the Division of Fish and Wildlife office?

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

Kit Materials

Item	Talking Points
Pelts, skulls, antler, and turkey feathers	Use these items for hands on exploration and illustration of lesson plans. Allow students to gently handle these items.
I am Coyote	This book follows the journey of a coyote as she becomes part of the range expansion of coyotes in North America.
Pocket Naturalist track guide and Peterson *Animal Tracks* guide	Biologists often observe tracks in the field. Use these guides to learn various tracks and to solve the track detective sheet scene.
Track detective sheet scene	Spread this sheet on the floor or a large table and challenge students to decipher what happened and who walked by in the "snow."
Wildlife track stencils	Use these for craft time, or to make your own track detective scenes.
Which Furbearer Am I? laminated cards	Use these cards for a fun guessing game to learn about Rhode Island's furbearers.
All About Turkeys	A great prelude to the Terrific Turkeys activity!
Bear-ly There	This book tells the story of a bear visiting a backyard, getting into a little bit of mischief, and then being safely scared away by the humans who live there. A great example of how coexisting with wildlife is perfectly possible through awareness and changing our behavior.
Coyote shaker	Use this to illustrate Lesson 3 and safe "hazing" techniques for nuisance wildlife.


Dean Birch

Introduction: It's All About Balance!

Over the course of human history, wild animals have played an important role. They have long provided valuable resources for food, clothing, shelter and tools. They have been viewed as friends and enemies, sources of inspiration and fear. At one time, wildlife resources were viewed as infinite, unaffected by human harvest and use. This led to the severe decline of many wildlife species in Rhode Island and across North America, resulting in the need for intensive restoration work and the implementation of legislation to protect these resources. Our wildlife populations are precious, and it is imperative that we manage them sustainably and with care for future generations.

This isn't an easy task! Managing wildlife is one big balancing act. Everything is interconnected in nature, so keeping the balance can get very tricky. Balancing the needs of the ecosystem intersects with balancing the needs of people. All creatures need food, water, shelter, and space, but some need more than others, or are highly specialized for a particular configuration of these things. Striking the right balance requires sound scientific practices and a lot of patience! In Rhode Island, we manage and conserve both game (hunted) and nongame (not hunted) species, over 60,000 acres of habitat, and determine hunting regulations to ensure respect for our state's natural resources.

Read on to learn more about wildlife management!

A Timeline of Land Use, Wildlife Conservation & Management in Rhode Island

Indigenous people live, farm, hunt, trap, and fish for survival. The Narragansett, Wampanoag, Niantic, Nipmuck, Manissean, and Pequot tribes all relied on natural resources in Rhode Island. Members of these tribes are still here today, continuing their cultural practices and relationship to wildlife resources.

Pre-1600

Extensive European settlement leads to forest habitat removal for agriculture, overhunting/trapping of game, and removal of predators (wolves, mountain lions).

1740

Peak levels of deforestation. Market hunting of waterfowl and other birds becomes popular, resulting in the overharvest of many bird species and subsequent population declines.

1830

Image: Harvard Forest

Farms have increasingly been abandoned as people move to cities for work, or westward for better farming opportunities. Forests begin to regenerate and are logged for timber.

1910

Image: Harvard Forest

President Franklin D. Roosevelt signs the Duck Stamp Act. This act makes it a requirement of all waterfowl hunters ages 16 and up to purchase a Federal Duck Stamp each year. The proceeds of Duck Stamp sales (98 cents out of every dollar), goes towards purchasing or leasing wetland habitat for the National Wildlife Refuge system.

1934

Image: USFWS

President Franklin D. Roosevelt signs the Pittman-Robertson Act. This act places an excise tax on firearms and ammunition, with a later extension to archery equipment. The proceeds of this excise tax, paid by the manufacturers, are allocated to each state by the United States Fish and Wildlife Service. The funds acquired must be used for habitat acquisition, management, and restoration, research and monitoring of bird and mammal species, and hunter education.

1937

Coyotes expand their range from the central United States to Rhode Island to fill the ecological niche that was left open when wolves were eradicated by colonists.

1960

Beavers return to Rhode Island's watersheds thanks to conservation efforts and laws put into place to protect them and their habitat!

1986

Image: Cheryl Reynolds, Courtesy of Worth A Dam CC BY-SA 3.0

The Rhode Island Division of Fish and Wildlife continues to protect, restore, and manage wildlife populations and their habitats.

Present day

Image: Sarah Petrarca

1636

First European settlement in Rhode Island founded by Roger Williams.

1800

The American black bear disappears from Rhode Island due to habitat loss and human pressure.

1900

The Lacey Act, the first federal legislation for wildlife, is signed. This Act made it "unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants that are taken, possessed, transported, or sold."

1918

Image: Library of Congress

The Migratory Bird Treaty Act is passed. This Act states that "it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior."

1935

The "Rhode Island Division of Fish and Game" is established, including law enforcement officers. In 1978, the Division of Fish and Wildlife and the Division of Law Enforcement would become distinct divisions at RIDEM.

1956

A Hunter Education program is established in Rhode Island to ensure safe and ethical hunting in the state.

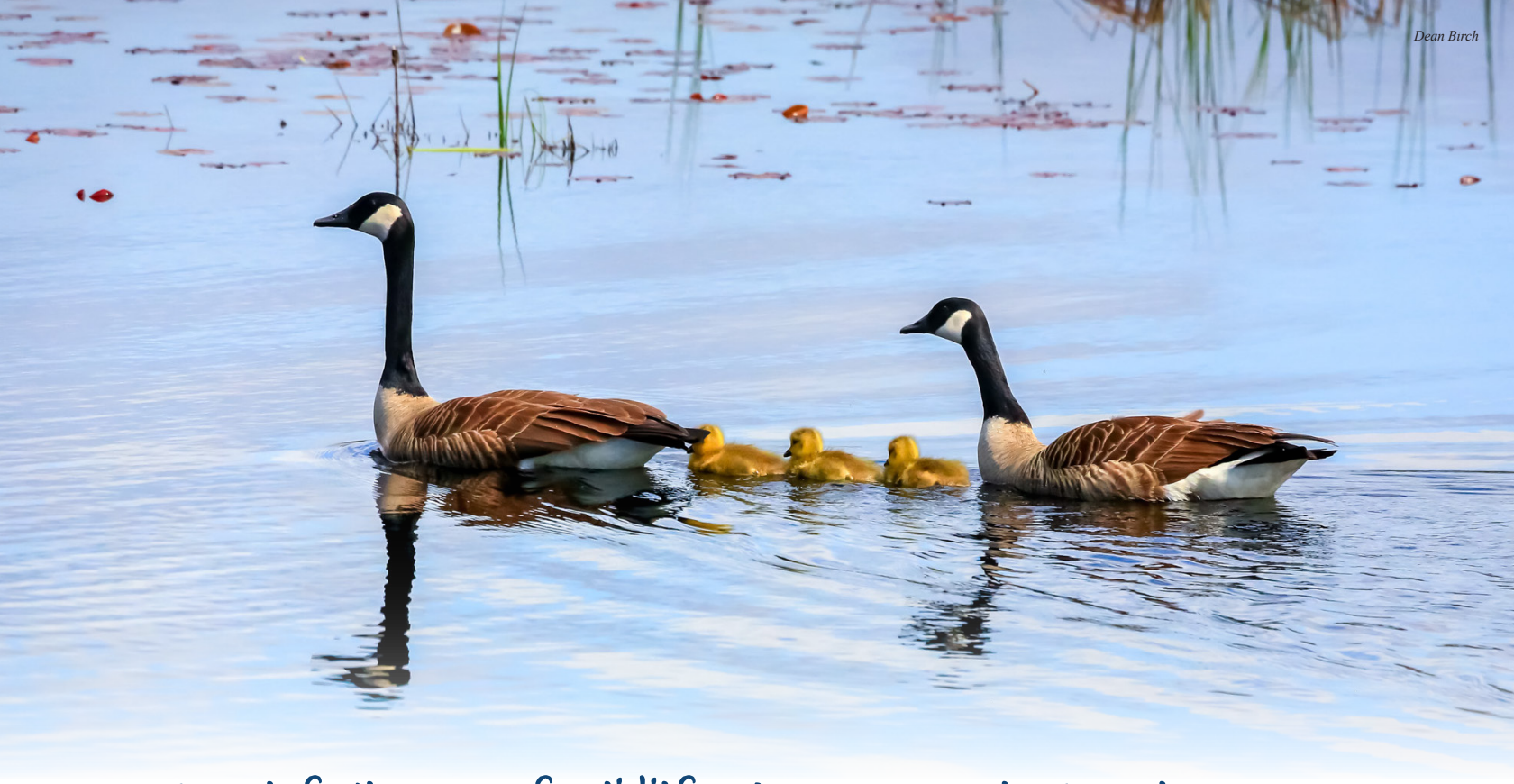
1973

The Endangered Species Act is signed, further protecting America's endangered and threatened wildlife and their habitats.

2000

Image: Gabrielle De Meillon

State Wildlife Grants are established to support conservation of Species of Greatest Conservation Need, as determined by the Rhode Island Wildlife Action Plan. This plan includes birds, mammals, invertebrates (terrestrial and aquatic), fish, reptiles, and amphibians.



Dean Birch

A Brief History of Wildlife Management in America

Pre-colonial Times and European Colonization

Prior to European colonization, America possessed vast wildlife resources. In Rhode Island, Indigenous people of the Narragansett, Nipmuc, Niantic, Wampanoag, and Manissean tribes utilized these resources for survival by hunting and trapping a variety of animals. There is a lot of historical evidence that Indigenous people in southern New England actively managed habitat through burning of dead underbrush to create space for agriculture or promote the growth of culturally significant native plant species. With the arrival of European settlers, things began to change for America's wildlife populations. The Europeans also hunted and trapped for survival, but began to ship wildlife products back to markets in Europe.

Furbearers were highly sought after for their valuable and warm fur, which was shipped back to Europe to create clothing. This increased demand resulted in increased harvest of a seemingly endless supply. In the early 1700s, as the European population grew in America, settlements began to grow, land was cleared for large-scale farming, and predators were eradicated. Wolves and mountain lions once roamed our forests, but leaders of European settlements placed bounties on these predators, resulting in their extinction in Rhode Island and New England. White-tailed deer and wild turkey populations began to dwindle. This can be difficult to imagine as populations of both species are currently healthy and overabundant in some areas of Rhode Island. The beaver, once found throughout our state, completely disappeared due to deforestation and over-trapping for the creation of felted hats and warm coats in Europe. Black bears disappeared entirely from Rhode Island by the year 1800 due to habitat loss, persecution, and overharvest. Other heavily settled states experienced the same declines in wildlife and habitat resources.This overuse of natural resources continued as European settlers began to move westward across America.


Gerald Krausse

The Turn of the Century

In the late 19th and early 20th centuries, market hunting became prevalent. Instead of hunting just for themselves and their families, market hunters harvested large numbers of animals to sell as a source of income. Market hunting was unregulated, resulting in the systematic and severe reduction of America's waterfowl, bison, deer, seal, whale, and bird populations.

In the early 1900s, the first federal legislation for wildlife conservation was introduced, in response to the decimation of wildlife across the country. The Lacey Act of 1900 was the first federal law written to protect wildlife, and was passed in response to the effects of market hunting. The Lacey Act made it "unlawful to import, export, sell, acquire, or purchase fish, wildlife or plants that are taken, possessed, transported, or sold." The Migratory Bird Treaty Act of 1918 closely followed. This monumental act protects birds from a wide array of dangers posed by humans. The Migratory Bird Treaty Act states that "it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior. Some regulatory exceptions apply." These exceptions include scientific research (with a permit), species that are hunted under strict regulations during set seasons, and artifacts for Native American cultural ceremonies.

The Pittman-Robertson Act

In 1937, the Pittman-Robertson Act was passed. Signed by President Roosevelt, this act placed an excise tax on firearms and ammunition, with a later extension to archery equipment. The proceeds of this excise tax, paid by the manufacturers, are allocated to each state by the United States Fish and Wildlife Service. The funds acquired must be used for habitat acquisition, management, and restoration, research and monitoring of bird and mammal species, and hunter education. A companion act for fisheries conservation, the Dingall-Johnson Act, was signed in 1950. Today, these combined programs are known as the Wildlife and Sport Fish Restoration Program (WSFR). This program has contributed millions and millions of dollars to fish and wildlife conservation across the country. In Rhode Island, this is how we fund the vast majority of our conservation programs.


Dean Birch

Wildlife Conservation Today

Since the signing of the Pittman-Robertson Act, Rhode Island's forests have made a comeback, along with the creatures that call them home. Because of the WSFR Program, we are able to monitor important **game species** such as deer, Canada geese, coyotes, fisher, bobcat, black bear, wild turkey, American woodcock, wintering sea ducks, and wood ducks. These funds have also benefited nongame species like bats and songbirds through data collection and monitoring efforts, such as our annual bat population counts and the Rhode Island Bird Atlas 2.0. Reptiles, amphibians, pollinators, and rare plants have also benefited from the WSFR Program due to all of the habitat that has been purchased by the State of Rhode Island using these funds. This habitat will be protected in perpetuity as refugia for wildlife in the face of development, suburban sprawl, fragmentation, and climate change. These places, called Management Areas, also provide Rhode Islanders with space to enjoy nature, through hunting and fishing, hiking, bird watching, horseback riding, or peaceful observation.

As time has progressed, threats to our wildlife and local biodiversity have evolved. The original scope of the Pittman-Robertson Act did not include **non-game species** like reptiles, amphibians, or invertebrates, which are important members of a healthy ecosystem. Many of these animals are at high risk due to habitat loss, climate change, invasive species, and disease. To help combat these threats, the State Wildlife Grants (SWG) Program was initiated in 2000. The SWG Program has allocated millions of dollars to support conservation of Species of Greatest Conservation Need, as determined by each state's Wildlife Action Plan. Each plan includes birds, mammals, invertebrates (terrestrial and aquatic), fish, reptiles, and amphibians, and must be updated every 10 years.

The Philosophy of Conservation

Current wildlife conservation in America is based on the seven principles of the North American Model of Wildlife Conservation. The United States Fish and Wildlife Service describes these seven principles as follows:

1. **Wildlife is a public resource** - In the United States, wildlife is considered a public resource, independent of the land or water where wildlife may live. The government at various levels has a role in managing that resource on behalf of all citizens and to ensure the long-term sustainability of wildlife populations.
2. **Markets for game are eliminated** - Before wildlife protection laws were enacted, commercial operations decimated populations of many species. Making it illegal to buy and sell meat and parts of game and non-game species addressed a huge threat to the survival of those species. A highly-regulated market in furbearers continues; strict regulations ensure that populations are sustainable and protected.
3. **Allocation of wildlife by law** - Wildlife is a public resource managed by the government. As a result, access to wildlife for hunting is through legal mechanisms such as set hunting seasons, bag limits, license requirements, etc.
4. **Wildlife can only be killed for a legitimate purpose** - Wildlife is a shared resource that must not be wasted. The law prohibits killing wildlife for frivolous reasons.
5. **Wildlife species are considered an international resource** - Some species, such as migratory birds, move across national boundaries. Treaties such as the Migratory Bird Treaty and the Convention on International Trade of Endangered Species (CITES) recognize a shared responsibility to manage these species across national boundaries.
6. **Science is the proper tool for discharge of wildlife policy** - In order to manage wildlife as a shared resource fairly, objectively, and knowledgeably, decisions must be based on sound science such as annual waterfowl population surveys and the work of professional wildlife biologists.
7. **The democracy of hunting** - In keeping with democratic principles, the government allocates access to wildlife without regard for wealth, prestige, or land ownership.

Aldo Leopold & The Land Ethic

Aldo Leopold is considered by many to be the "father of wildlife ecology." He was a conservationist, forester, educator, writer, philosopher, and avid outdoorsman. Born and raised in Iowa, he spent his childhood observing nature and keeping journals of his observations. Leopold later went on to be the first ever game management chair at the University of Wisconsin. He wrote the first textbook in wildlife management, and contributed many articles to scientific journals and popular magazines. He and his family bought an old farm in Wisconsin, and went on to restore wildlife habitat on the farm. Based on his life experiences, Leopold wrote *A Sand County Almanac*, which has become one of the most popular and respected books on conservation. The focus of the book is on the relationship between humans and nature, "a community to which we belong."

One of Leopold's most well-known essays from A Sand County Almanac is entitled "Land Ethic." The essential theme of the essay is caring for people, nature, and building relationships between them. In an ethical community, all members treat each other respectfully, to benefit the community. Leopold frames the community as inclusive of nature: plants, soil, water, wildlife. When we respect all of these things, we exhibit a land ethic. Leopold stressed that humans cannot be separated from the care of nature, as our own well-being is directly connected to that of the natural world.

Leopold believed "we can only be ethical in relation to something we can see, understand, feel, love, or otherwise have faith in." Fostering direct connections to nature, especially for children, is critical if we are to exhibit proper stewardship of our resources.

Looking Ahead

The story of wildlife conservation in our country is far from over. Conservation and management of wildlife resources is a constant balancing act, observing patterns over time and making data-based decisions to benefit our wildlife. Hunting, trapping, and target shooting have contributed millions of dollars to the restoration of wildlife species and habitat across the country, and continue to do so. However, participation in these activities, and perceptions about wildlife resources have both changed over time, and vary depending on where you live.

Fish and wildlife agencies face the challenge of balancing the needs not only of our wildlife, but of our various constituents, from hunters and bird watchers, to students and families. Providing outreach (such as this Critter Kit!) to diverse audiences is a key factor in ensuring that we create a welcoming and supportive environment for our broad constituencies.

In Rhode Island, our wildlife will be affected by increased urbanization, sea level rise, and climate change. Thinking about the infrastructure of our cities, the management of green spaces, the placement of wind and solar energy, and utilizing suburbs and exurbs for habitat connectivity is important now, and into the future. Addressing these issues will require a collaborative effort between the Division of Fish and Wildlife, cities and towns, community groups, non-profit conservation agencies, and individual homeowners and families.


Dean Birch

Ecosystem Interactions

Most of us are familiar with the concept of the food chain. Grass grows in a meadow, which is eaten by a rabbit, which is then eaten by a fox. The energy from the grass is transferred to the rabbit, and the energy of the rabbit is transferred to the fox. In this food chain example, energy flows in one direction, and ends with the top **predator**.

This is a very simplistic way of looking at how ecosystems function, but lacks the complexity that we see in reality. A more accurate representation of energy transfer and interactions within an ecosystem is a **food web**. In a food web, energy is transferred in multiple directions, and multiple connections are represented. The grass from our food chain feeds rabbits, but also provides food for wild turkeys, deer, and insects. Rabbits not only feed foxes, but also coyotes, hawks, owls, bobcats, fishers, and minks. When any of those predators die, they are consumed by beetles, worms, and other decomposers on the forest floor. Those decomposers are eaten by birds, skunks, small mammals, reptiles, and amphibians, which could also be eaten by any of the larger predators. The web is getting bigger and bigger! Things criss-cross and overlap, and some of the creatures in our web have multiple environmental roles, or niches. These interconnections create a healthy, thriving ecosystem, and each member of the food web is important.

Balance and Biodiversity

Wildlife biologists work to keep things balanced in the ecosystem, but instead of thinking about food webs as being made up of individual animals, they look at the big picture of wildlife populations. The goal of wildlife conservation and management is to ensure that there are enough resources (food, water, shelter, and space) in the ecosystem to support healthy populations of as many different species as possible.

We don't want the **population** of one species to grow so large that it negatively impacts resource availability for another species, or cannot sustain itself. For example, if we had too many deer in Rhode Island, many of the plants that other herbivores eat would be munched down by the deer. Eventually, those other **herbivores** would have a hard time finding food. The deer population would increase even more, but eventually, the food resources in the ecosystem wouldn't be able to support such a large population, and we would see a sharp decline, or crash. In this example, the deer population reached its **biological carrying capacity**. The ecosystem could only support a certain number of deer, causing competition for resources. Once a population of animals reaches carrying capacity, unfortunately, some individuals (or many, depending on the circumstances) die, and become food for other creatures.

Likewise, we don't want a population to shrink so much that the species becomes threatened or endangered. An ecosystem is the healthiest when wildlife biologists work to preserve **biodiversity**. Think back to the food web. If the web only contained a hawk, a rabbit, and some grass, then the rabbit would be in trouble if the grass suddenly disappeared, which would then negatively impact the hawk. However, if there are lots of plants, small mammals, reptiles, amphibians, insects, birds, and large mammals in our food web, the hawk and rabbit have a much easier time surviving.

The Role of Hunting and Trapping

In the past, hunting and trapping caused the steep decline of many wildlife species across America, but today, wildlife biologists use them as a tool to balance wildlife populations. Although game species like deer, wild turkeys, ducks, raccoons, foxes, and coyotes are hunted, they are protected by regulations. Game species can only be harvested by hunters and trappers during set seasons, using designated, humane methods, and can only be harvested at a certain limit. For example, turkey hunters are only allowed to **harvest** 2 male turkeys each spring season. This restricts the number of turkeys that are removed from the population, and female turkeys are protected during the spring season because they are laying eggs and tending to their offspring.

Modern hunting and trapping are meant to be sustainable, ethical, and guided by science. Bag limits and season lengths can be adjusted based on data collected by wildlife biologists in response to population growth or decline. Sometimes a population can sustain a higher harvest rate, which may be needed to help keep the balance between biological carrying capacity and **cultural carrying capacity** (the number of animals humans are able to tolerate). For example, the coyote population in Rhode Island is very healthy, and the ecosystem can support these high numbers. Coyotes are adaptable, and are very comfortable taking advantage of resources in suburban and even urban areas. Easy food sources, like dumpster scraps, have helped to raise coyote populations to levels that humans are uncomfortable with in some areas. To help reduce the population size, extensive outreach on coexistence with coyotes is implemented, along with an unlimited bag limit for coyote hunters and trappers, and no closed season on private land (hunting and trapping coyotes on state land is limited by a season). Both of these approaches aim to balance the needs of human communities with that of wildlife. It is important to note that in the case of coyotes, working together as a community to reduce supplemental food resources (like outdoor cat food, trash cans, etc) is the most effective tool for reducing coyote populations. Hunting and trapping are a helpful tool, but certainly are not the only answer. Coexistence strategies are always the first recommended course of action.


Mike Stultz

Talking About Hunting With Your Students

Hunting can be a difficult topic to breach with your students, especially if they do not have personal experience with hunting. The goal of the Division of Fish and Wildlife's outreach and education programs is not to convince everyone to go out and become a hunter, but to spread awareness of the role that sustainable, ethical hunting and trapping have in the science of wildlife management and conservation as a whole. Here are some strategies that our staff use to foster discussion about hunting in a way that is respectful of diverse backgrounds and sensitive to discomfort anyone in the audience might be feeling.

1. Explain the history: Many people who are uncomfortable with hunting don't realize that hunting has come a long way from the old days of market hunting. Acknowledging the past and explaining how we can learn from our mistakes is an important point to make. Making connections to local Indigenous history and uses of wildlife resources is a great way to extend the information in this kit across the curriculum.

2. Emphasize the conservation aspect of hunting: Most hunters are proud of the fact that their license sales and an apportionment of their purchase of firearms, ammunition, and archery equipment go directly into conservation funding. Most hunters strongly support the wise stewardship of land and water resources so that game populations are healthy and sustainable for the future.

3. Connect the forest to the dinner table: The vast majority of hunters eat what they hunt. Hunting is a sustainable way to access nutritious protein sources in their most natural form. When we buy meat at the supermarket (if we choose to eat meat), it's important to remember that it was once an animal living on a farm. Many people prefer to purchase meat that has come from pasture-raised or free range animals that have been raised humanely and allowed to live their lives as naturally as possible. Wild game is as free range and organic as it gets! Connecting hunting with the end result of food is important in acknowledging respect and appreciation for wild game resources.


Sarah Petrarca

4. Connect with nature: Hunting isn't just about the act of harvesting an animal from the wild. It's about connecting with the land and enjoying time in nature too. Most of a hunter's time spent in their tree stand or duck blind doesn't lead to a successful harvest. A lot of that time is spent waiting around! All that time spent outdoors, patiently and quietly waiting for the opportunity to harvest game, is part of why hunters hunt. We've heard some amazing stories from hunters about dawn choruses of song birds, watching the snow fall, or having an owl land in the tree next to them!

5. Distinguish hunting from poaching: Hunters are tasked with the responsibility to follow rules out of respect for other hunters and wildlife. Being a true hunter means that you're not always successful every season, and that you may have to wait until next season for another opportunity. Poachers disregard the rules by hunting out of season, taking too many animals, and using inhumane methods of harvest. This type of behavior is disrespectful to our wildlife. Environmental police officers work to apprehend poachers and protect our precious natural resources.

6. Know your information source: Often, the media paints caricatures of irresponsible hunters, highlights poaching, or unsafe situations. You can probably think of a few scenes in movies that fit this description. For valid information on hunters and hunting, consult sources from organizations that support safe and ethical hunting with support for science and conservation. Some examples include Ducks Unlimited and Backcountry Hunters & Anglers. You can always reach out to the RIDEM Hunter Safety Education staff as well!


Josh Beuth

Conservation Work in Rhode Island: Deer Health Monitoring

How are we managing Rhode Island's deer population?

The DFW is responsible for many aspects of managing deer across the state. The main method of managing deer is through regulated hunting; data is collected during the hunting season at staff-operated check stations and through harvest reports. This is one of our greatest opportunities to interact with our state's hunters. Hunting regulations must be set annually regarding the harvest of deer, and regulations must be updated and published to reflect changes in technology, research, and deer population levels. As regulations are updated, there is a need for updated legislation to strengthen existing laws pertaining to humans and wildlife health. Currently, we estimate deer population size through aerial surveys flown during the winter, and through deer-vehicle collision data. Our deer program is undergoing a restructuring period, developing new trend indices, population estimates, and population models that will be used in the decision-making process to manage deer responsibly. New surveys are being developed to strengthen our knowledge and confidence about the status of Rhode Island's deer population.

What is Chronic Wasting Disease?

Chronic Wasting Disease (CWD) is a devastating neurological disease that affects deer, moose, and elk across North America. It is passed through urine, feces, and saliva, and can persist in the soil for years, subsequently contaminating habitat and further spreading to the population. Monitoring and preventing the spread of CWD has become a major priority of deer biologists across the nation. Though CWD has not yet occurred in Rhode Island, we have taken monitoring measures in order to protect the health of our state's deer population. Biological samples (lymph nodes) are tested from road killed and hunter-harvested deer each year. A collaboration with the Division of Law Enforcement (DLE), meat processors, taxidermists, and hunters has enabled us to receive and process a large number of samples. A CWD prevention and response plan is being created in order to safeguard our deer population, hunting culture, and future of wildlife management in Rhode Island.


Dean Birch

How can you get involved?

Each year, we ask volunteers to help at our deer check stations. Volunteers help collect data, learn how to age deer by tooth wear, and if they would like to participate, extract lymph nodes for CWD sampling from harvested deer. We understand that not everyone may be comfortable with this experience, so there is another way to get involved with deer conservation at a distance! RIDFW annually seeks community science volunteers to submit incidental observations of deer during the months of August and September in order to gather an estimate of fawn recruitment to the population. It's as simple as downloading the Survey123 app and filling out a quick survey when you see a deer of any age, anywhere in the state. Visit dem.ri.gov/reportwildlife to learn more about how to become a community scientist for our deer program and other projects!


Paul Topham

Conservation Work in Rhode Island: Turkey Population Monitoring

Why are we monitoring wild turkey populations?

After decades of population decline and subsequent reintroduction efforts in the 1980s and 1990s, Rhode Island's wild turkey population has increased in recent years. Our state wild turkey population is robust and stable enough to support carefully managed spring and fall turkey hunting seasons. Monitoring the population over the course of time will help guide management decisions to ensure the long term stability and understand population growth and decline trends.

How do we monitor turkeys?

Several methods are used to monitor and determine the status and distribution of wild turkeys in the state, including our annual Turkey Gobbler Survey, summer brood data collection via an online community science survey, spring and fall hunter surveys, and banding turkeys (capturing and releasing turkeys with numbered leg bands). Beginning in 2018, all turkeys are checked using the new online licensing and harvest reporting system. If hunters harvest a banded bird, they must report the band number. These reports provide valuable information. One banded juvenile male turkey made a remarkable journey of 20 miles from West Greenwich to Glocester, where it was harvested! We look forward to partnering with URI to gather more detailed movement data in the coming years. All of these efforts ensure that we have enough information to guide hunting season dates and bag limits, and guarantee a stable and healthy turkey population for years to come.

How can you get involved?

Anyone can participate in the Turkey Gobbler Survey as part of our volunteer program. This involves completing a driving route in the early morning and listening for the sounds of male turkeys gobbling to attract a mate. You can also simply download the Survey123 app and fill out a quick form any time you see a turkey during July and August for our Wild Turkey Brood Survey. This is an easy way to contribute to a large data collection effort to keep an eye on our wild turkeys!


Dean Birch

Conservation Work in Rhode Island: Eastern Coyote Tracking

Why are we studying coyotes?

Since coyotes expanded their range to Rhode island in the 1960s, they have been increasingly on the public radar as their populations have grown. Coyotes now occupy most natural habitats and have become a presence in urban areas as well. As the population has grown, so have human-coyote interactions, which often incite public calls for lethal management. Across the country lethal control has been repeatedly demonstrated to be ineffective. Coyote populations rapidly bounce back to levels sustainable by the food resources present.

How are we tracking them?

Since research began in 2005, the Narragansett Bay Coyote Study (NBCS) has determined that hundreds of thousands of pounds of anthropogenic food subsidies are being provided to RI coyotes each year. Food subsidies increase both coyote population size and habituated (bold) behavior, exacerbating human coyote conflicts. Examples of food subsidies include garbage cans/dumpsters, pet food left outdoors, compost piles, and intentional feeding (which is illegal in Rhode Island). During a partnership with the DFW and USFWS, the NBCS team conducted food removal experiments to determine what happens to packs of coyotes when anthropogenic subsidies are removed. Using GPS tracking collars, and customized iOS tracking apps, changes in territory size, pack size, and urban habitat use were all observed. The study's narrative, updates, maps, photos, and films, will involve and inform the public to safely and sustainably coexist with coyotes in RI.

Where are we studying coyotes in Rhode Island?

In partnership with the NBCS, we tracked coyotes in the Providence area, the suburbs of the East Bay, and rural southern and western Rhode Island. This variety of locations illuminated the differences between the movements of coyotes that have to forage for food naturally versus coyotes that are taking advantage of subsidized food, or in some cases, direct feeding.


Claudia Cooper

Conservation Work in Rhode Island: Bobcat and Black Bear Monitoring

Why are we monitoring bobcat and black bear populations in Rhode Island?

Bobcat and American black bear are both charismatic species that attract widespread public interest. In Rhode Island they are both SGCN, and their abundance appears to be on the rise. American black bears pose a significant challenge to wildlife managers, as they may cause considerable damage to private property, agricultural products, and livestock. An early detection and monitoring system is needed to determine the number of American black bears that are entering RI from neighboring states and to detect if and when reproduction is occurring in the state.

How have we gathered data on black bears?

To learn more about black bears in RI, in partnership with the URI Wildlife Genetics and Ecology Lab, we set up black bear hair stations around the state to catch hair samples from passing bears in order to gather genetic data. Unfortunately, the bears observed in the state did not pass through our hair snare stations, and we were unable to collect hair samples. This is the reality of wildlife research, you never really know what is going to happen! We were able to collect photo data of bears on trail cameras, and continue to collect observations from the public until further research action is determined.

Why are bobcats on the rise in Rhode Island?

To understand the reason(s) for the increase in bobcat populations, and to understand the impact of bobcats on the RI ecosystems, managers must understand the habitat requirements of this species, both in terms of vegetative requirements and prey base. To address these uncertainties, the DFW and the URI Wildlife Genetics and Ecology Laboratory collaborated on a project to determine bobcat abundance, movements, and home range size in RI through the use of GPS collars on captured and released bobcats, and trail cameras set around the state. As a side benefit, this study also provided valuable information about the occupancy of other mammals in RI. Additional data collected as part of a collaborative research project on fishers illuminated that recent changes in Rhode Island's forest structure may also be contributing to bobcat abundance.

Vocabulary

Biodiversity - the variety of all living things found in a place on Earth

Biological carrying capacity - the maximum number of individuals of a species that can be sustained by a given environment

Chronic Wasting Disease (CWD) - a neurological disease that affects deer, elk, reindeer and moose across North America; can dramatically reduce population sizes and have devastating effects on ecosystems

Cultural carrying capacity - the population size of a particular animal that humans are able to tolerate

Deforestation - the removal of trees from the forest by humans to make land available for other uses

Food web - a system of interlocking feeding relationships within a community that represents the transfer of energy from one organism to another

Furbearer - an animal that has been traditionally hunted or trapped for the use of their fur in clothing

Game species - a species that has been traditionally hunted or trapped and utilized as a resource (food, clothing, tools, etc.); currently, game species are protected by law so that they can only be harvested with limits during a set season by hunters/trappers who have purchased a license

Harvest - the removal of organisms from a wild population, often involves hunting or capturing

Herbivore - an animal that gets its energy from the consumption of plants

Non-game species - a species that is not hunted or trapped; non-game species are also protected by various laws preventing harm to individuals and their populations

Population - a group of individuals of the same species living and interbreeding within a given area

Predator - animals that prey on other animals for food

Restoration - the process of repairing areas in nature where biological communities and ecosystems have been degraded or destroyed

Sustainability - the capacity of a biological system to remain diverse and productive over a long period of time

Quick Links

RIDEM Wildlife Observation Reporting

Learn how you can report deer, turkey, coyote, bobcat, and bear observations to the Rhode Island Division of Fish and Wildlife.
http://www.dem.ri.gov/programs/fish-wildlife/wildlifehuntered/wildlifemanagement/wildlife-observations.php

Coyote Smarts

Learn about coexisting with coyotes and RIDEM's collaborative work with the Narragansett Bay Coyote Study. Many of the concepts covered on this site apply to coexisting with other furbearer species like foxes, fishers, raccoons, and skunks.
https://www.coyotesmarts.org/

Wildlife Fact Sheets

Learn about Rhode Island's wildlife with RIDEM's one page fact sheets. Extensive resources on black bears, coyotes, deer, and Canada geese can be found in our management and response guides, also on this webpage.
http://www.dem.ri.gov/wildlife

BearWise

Black bears are becoming more common in Rhode Island, but being "bearwise" will help residents avoid problems with bears. Learn about strategies to coexist with black bears.
https://bearwise.org/

Lesson 1: Learning from the Past

Theme

Human activities can significantly impact wildlife, for better or worse. Wildlife species are considered a renewable resource that must be used and conserved wisely.

Learning Objectives

Students will learn about the timeline of wildlife conservation history in America, with a small lens focus on the effects of European colonization on wildlife in New England. Students will learn about the issues posed by the overexploitation of natural resources and the effects of wildlife regulations and restoration.

Corresponding Activities for this Lesson

- Tragedy of the Commons

Materials

- Bowls
- Tokens, beads, or beans (something small to represent fish for Tragedy of the Commons activity)
- Black bear skull
- Beaver skull and pelt
- Wildlife conservation history laminated cards

Lesson *(This lesson can be taught multiple ways, depending on the age group):*

1. **Explain to students that today we will be learning about the history of people and wildlife in America, but with a special focus on Rhode Island. Tell students that to start things off, they will be working together to create a living timeline of events.**
    - There are 17 events total that span from pre-1600 to present day. Events are represented on two sets of cards. One set is designed for younger students; events

are numbered, and also include the date of the event with pictures. The other set is designed for older students; events are dated and include some discussion prompts.
- Depending on the number of students, assign pairs or individuals to one of the 17 events in the lesson outline.

2. **For younger children: Ask everyone to work together to hold up their cards and stand in order from number 1 to 17. When students have arranged themselves in order, ask the group or individual holding each card to describe the pictures on the card and maybe take a guess what is going on in the picture.**
   - After students have described what is on their card, explain the event. Descriptions of each event can be found in the notes section of the PowerPoint.
   - As you work your way through the timeline, ask students if they have ever heard of any of these events. How do they feel about each one?
   - When you reach the bear and beaver events, pass around the bear and beaver artifacts for students to explore.

3. **For older children: Give the students some time to learn about the event they were assigned and gather information on it. This may require the use of additional resources such as books or websites.**
   - Information on the events does not need to be written down as long as after the allotted time the student has a good understanding of their event.
   - Alternatively, students could work together to create a bulleted list of facts or a graphic organizer to share information about their event.
   - Bring everyone back together as a group to arrange their events in order. Ask each group to teach their peers about their event as the experts on that event. Support or supplement information as needed.

4. **After students have completed the timeline activity, follow up with the Tragedy of the Commons activity to illustrate the effects of overexploitation of wildlife resources.**

(1) Before 1600

Before 1600, indigenous people lived, farmed, hunted, trapped, and fished for survival in Rhode Island. There were six tribes in the state, the Narragansett, Wampanoag, Niantic, Nipmuck, Manissean, and Pequot, that used natural resources, like fish to eat, beaver pelts to make clothing, and trees to build shelter. Members of these tribes still live here today and continue to use wildlife resources as part of their culture.

(2) 1636

In 1636 Roger Williams founded the first European settlement in Rhode Island. He settled in Providence, where he bought land from the Narragansett tribe on the Narragansett Bay.

(3) 1740

In 1740, settlers cut down forests to build colonies and to create room to grow crops. They hunted and trapped as many animals as they could because there were no laws or limits. Many people also killed our native predators, like wolves, mountain lions, and bears.

(4) 1800

In 1800, the American black bear disappeared from Rhode Island because of habitat loss and other human impacts. Forests disappeared and were replaced by farms and houses, and bears were chased away or killed because people didn't understand the way they acted, so they were afraid. The green on the maps shows where black bears lived before European settlement (top), and after (bottom). Since we have learned more about their behaviors, and many forests have grown back, today black bears are beginning to return to Rhode Island!

(5) 1830

In 1830, the greatest amount of forest was cut down to make room for more colonists to move in and raise their livestock and crops. People started to hunt more animals than they needed so that they could send them back to Europe, or sell them to make a profit. This was called market hunting. Market hunting led to the overharvest of many birds which caused their populations to shrink.

(6) 1900

In 1900 the Lacey Act was signed. This was the first law put into place by the federal government to protect wildlife. Basically, it states that it is against the law to buy, or sell, or travel with any wildlife that was taken or sold illegally. This allowed the government to limit the number of animals being hunted, sold or transported, which ended market hunting.

(7) 1910

By 1910, many farms were abandoned because people moved to cities where there was more work, or moved westward for better farming opportunities. Trees began to grow back, and forests took over the fields that were no longer being maintained. Once they grew large enough, people harvested the trees for timber and used them for building material.

(8) 1918

In 1918, the Migratory Bird Treaty Act was passed. Basically, it states that it is illegal to hurt, hold or have wild birds or their parts, like feathers, eggs or nests, unless you have a special permit. In the 1900s, feathers were in high demand for women's fashion, especially for hats. Because so many people wanted feathered hats, many birds were killed just for their beautiful feathers, which is not a responsible way to hunt. This law made it so only a limited number of people can hunt birds, so they are harvested sustainably.

(9) 1934

In 1934, President Franklin D. Roosevelt signed the Duck Stamp Act, which required all waterfowl hunters to purchase a Federal Duck Stamp each year. The money that these hunters spend on the Duck Stamp (98 cents out of every dollar), goes towards buying wetland habitat so that ducks, geese and swans will have a clean and healthy place to live.

(10) 1935

In 1935, the “Rhode Island Division of Fish and Game” was created, which included law enforcement officers. Game wardens and environmental police officers help make sure that everyone is obeying the laws that protect wildlife. They look out for poachers, who are people who take animals illegally. Poachers don’t follow rules and might take too many animals and sell them, which is against the Lacey Act, or harvest birds without permits, which you need to have according to the Migratory Bird Treaty Act.

(11) 1937

In 1937, President Franklin D. Roosevelt signed the Pittman-Robertson Act. This act places a tax on firearms, ammunition, and archery equipment. The money from this tax, is split up and given to each state by the by the federal government. The states must use the money to buy, manage or restore habitat, do research on bird or mammal species, or educate the public about hunting.

(12) 1956

In 1956, the hunter education program was created in Rhode Island to ensure safe and ethical hunting in the state. Hunters are trained on how to use the natural resources in the state responsibly and are taught about the important role they play in managing wildlife populations. With our large predators gone from Rhode Island, the wildlife populations could grow so much that they could become unhealthy, hunters help keep the balance.

(13) 1960

In 1960, coyotes were first seen in Rhode Island, after they expanded their range all the way from the central United States to the east coast. Wolves and mountain lions used to help control the small mammal populations in the east, but when they disappeared, they left their job open. This allowed the rabbit, squirrel, and mouse populations to grow. Upon their arrival, coyotes found the open job and took the place of the wolves and mountain lions by keeping the small mammal populations balanced.

(14) 1973

In 1973, the Endangered Species Act was signed. If scientists are studying an animal and they see that it is at risk of going extinct, they can list it as “Endangered” or “Threatened”. Once it is on the list, both the animal and its habitat are given extra protection, and more research and conservation work are done to help the population to recover.

(15) 1976

In 1976, beavers returned to Rhode Island after being trapped nearly to extinction for their warm and waterproof pelts. Beavers are an important part of the ecosystem because when they flood areas to create their homes, they also create habitat for many other wetland animals, like turtles, ducks and frogs!

(16) 2000

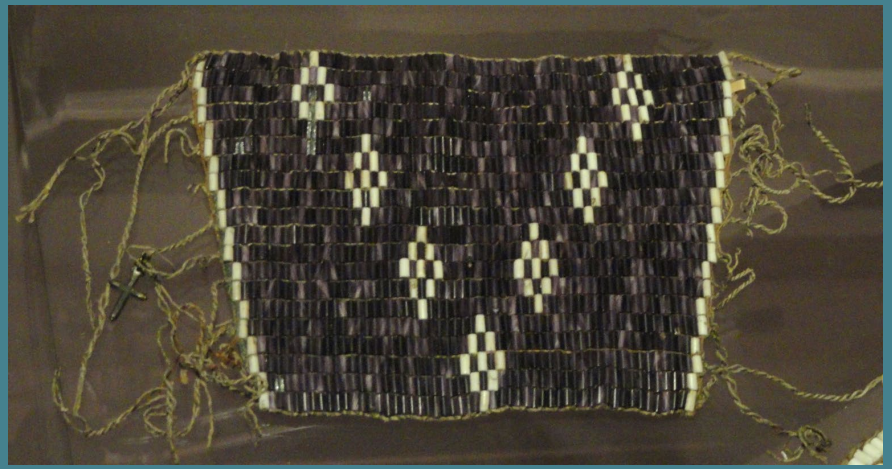
In 2000, State Wildlife Grants were provided to help animals that could be at risk of becoming endangered, called Species of Greatest Conservation Need (SGCN). These animals may need help because there are not as many as there once were, or because their habitat is disappearing. To receive this grant, each state created a Wildlife Action Plan to figure out what animals need the most help, why they need help, and how we are going to help them!

(17) Present Day (Today!)

Today, the Rhode Island Division of Fish and Wildlife continues to protect, restore, and manage wildlife populations and their habitats. Thanks to the laws put into place in the past and the lessons we have learned, many of Rhode Island’s native species have recovered and both the animals and their populations are thriving!

LIVING TIMELINE CARDS:
LOWER ELEMENTARY

Before 1600



1636

1740

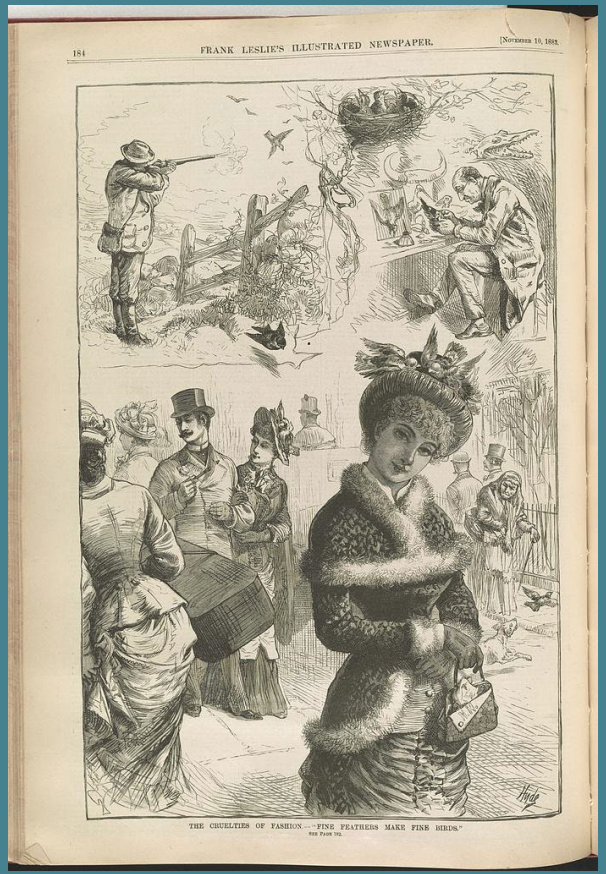
1800

1830

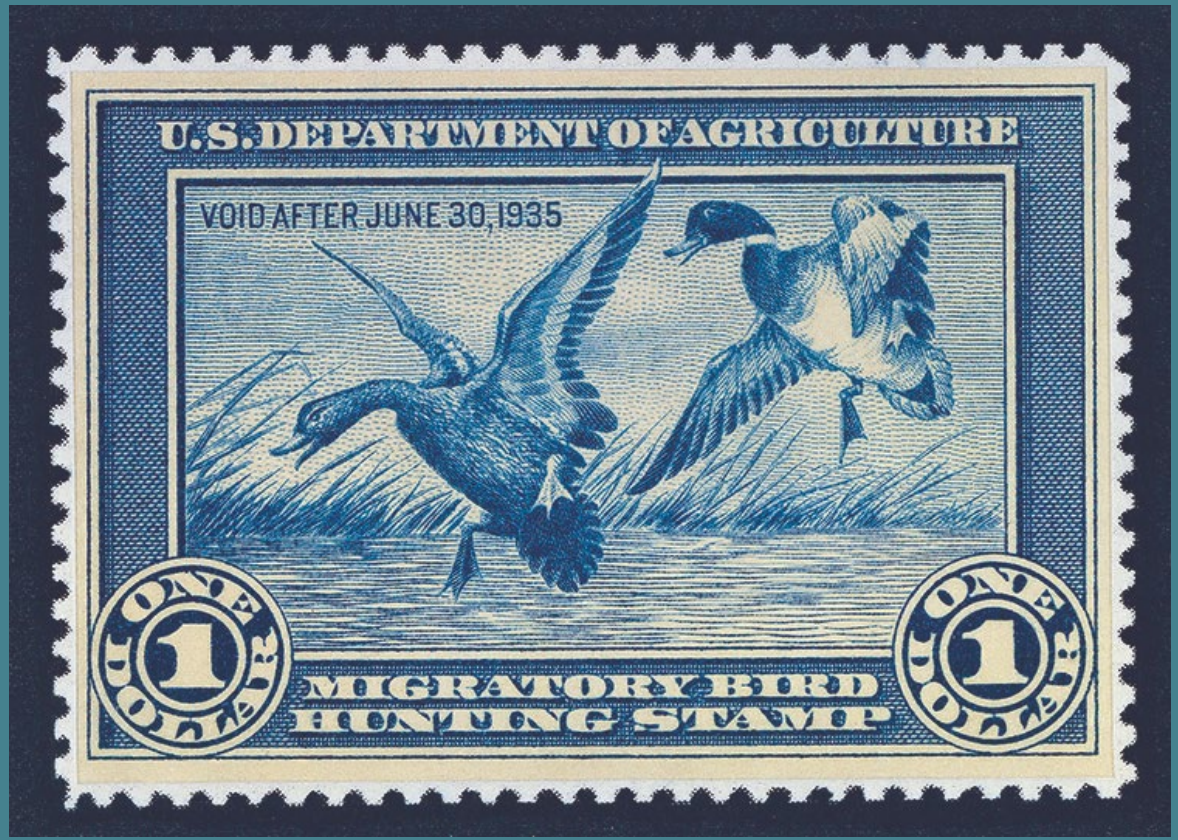
1900

1910

1918


184 FRANK LESLIE'S ILLUSTRATED NEWSPAPER. [November 10, 1883.
THE CRUELTIES OF FASHION.—"FINE FEATHERS MAKE FINE BIRDS."

1934


U.S. DEPARTMENT OF AGRICULTURE
VOID AFTER JUNE 30, 1935
ONE DOLLAR
1
MIGRATORY BIRD
HUNTING STAMP
ONE DOLLAR
1

1935

1937

WILDLIFE & SPORT FISH RESTORATION

1956

1960


ALASKA
CANADA
0 500
MILES
Vancouver
Pacific Ocean
1900 – 1950
Chicago
New York
Washington
1880 – 1930
Historical Range
Santa Barbara
1940 – 1990
Atlantic Ocean
Gulf of Mexico
MEXICO
COYOTE RANGE
BEFORE 1700
EARLY 1900s
TODAY
EXPANSION ROUTE

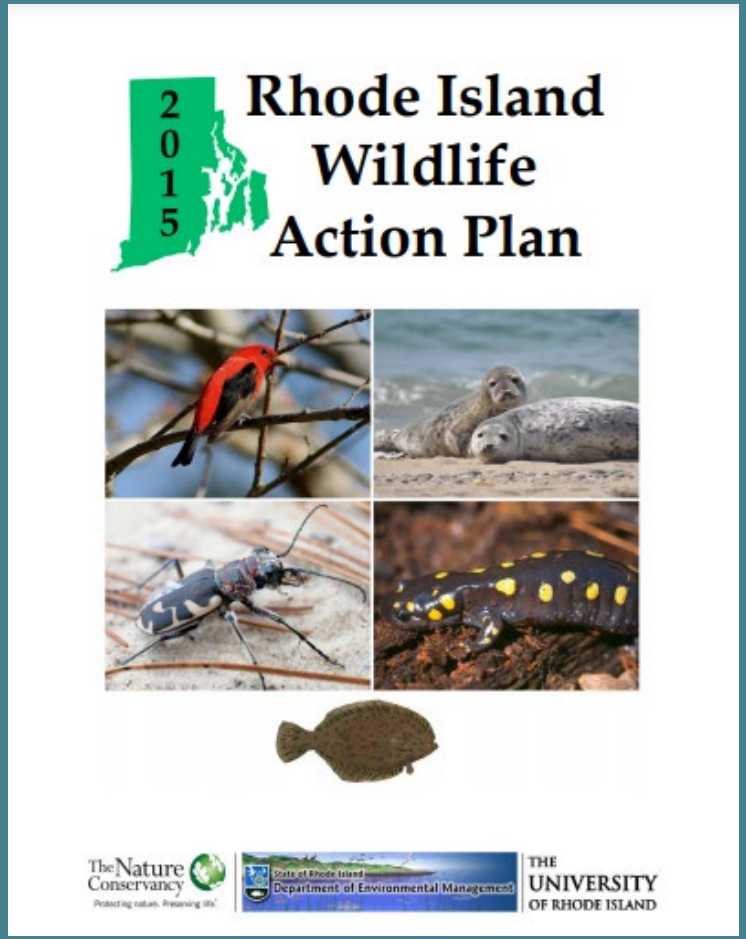
1973

U.S.
FISH & WILDLIFE
SERVICE

DEPARTMENT OF THE INTERIOR

1976

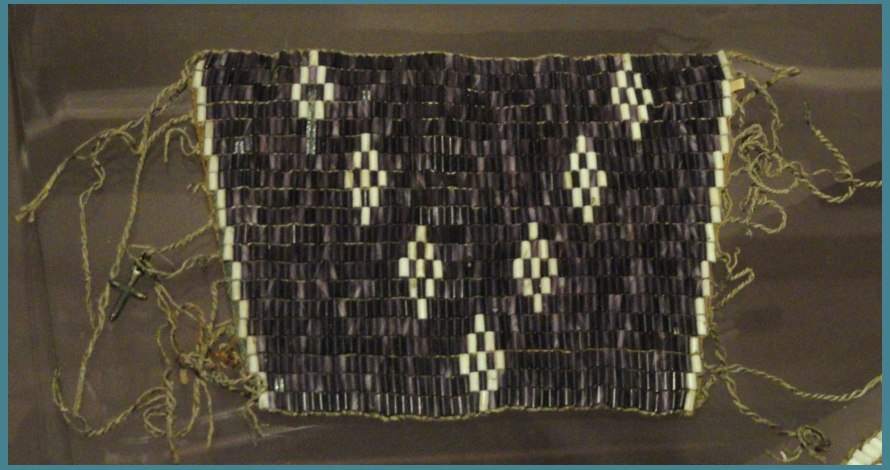
2000


2015
Rhode Island
Wildlife
Action Plan
The Nature Conservancy
Protecting nature. Preserving life.
State of Rhode Island
Department of Environmental Management
THE
UNIVERSITY
OF RHODE ISLAND

Present Day

LIVING TIMELINE CARDS: UPPER ELEMENTARY

Before 1600



- Which Native American tribes traditionally call Rhode Island home?
- How did Native American people use wildlife resources?

1636

- Who was Roger Williams?
- Where did he settle in Rhode Island?

1740

- How did European settlers use the land and wildlife?
- How did European settlers view large predators like wolves?

1800

- What caused black bears to disappear from Rhode Island?

1830

- What is market hunting? How did it affect wildlife populations?
- Why was much of Rhode Island's forest cut down at this time?

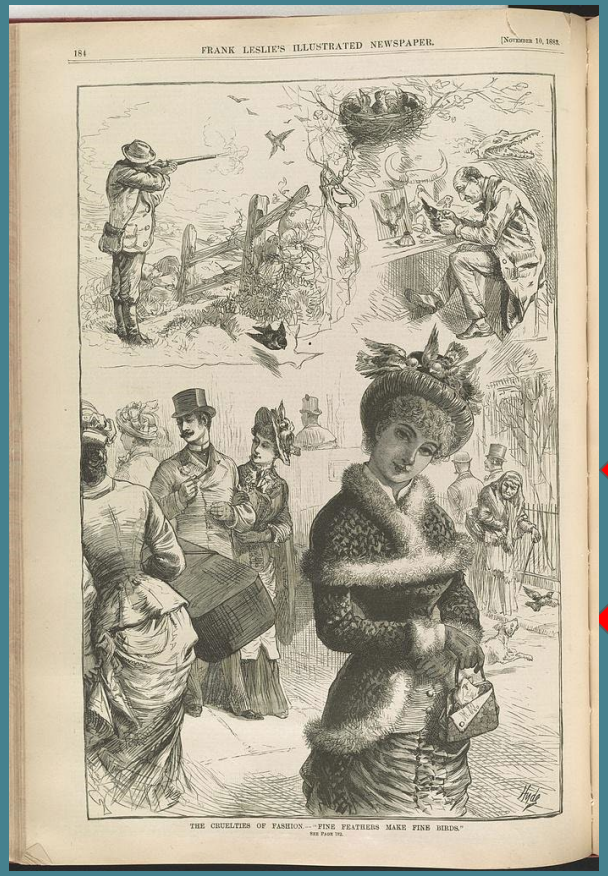
1900

- What was the Lacey Act?
- How did it help wildlife?

1910

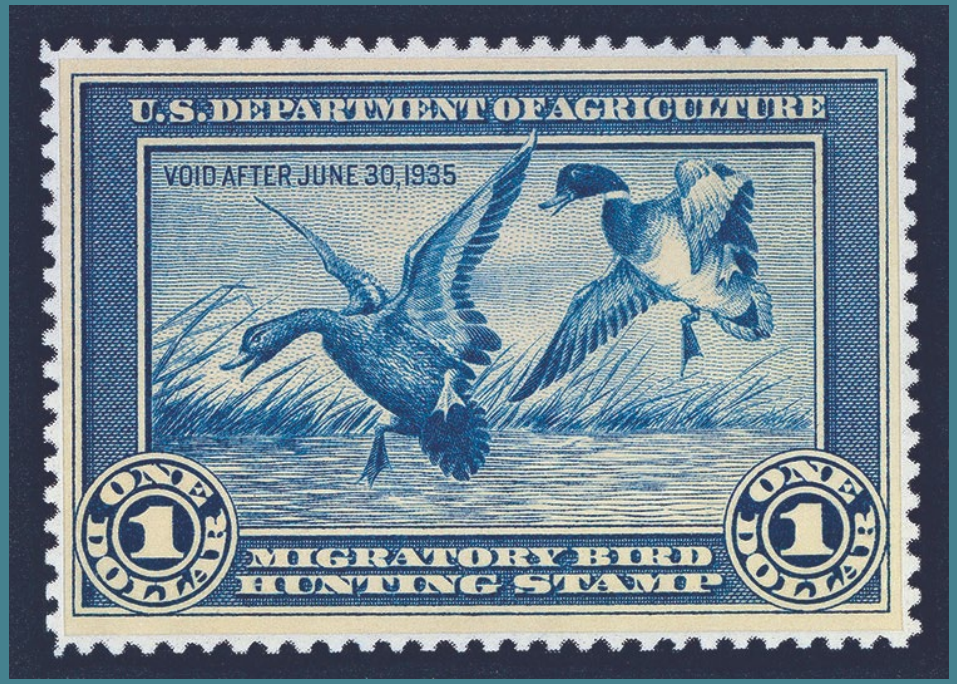
- Why did people abandon their farms in New England?
- What happened to the forest because there were fewer farms?

1918



- What was the Migratory Bird Treaty Act?
- How did this help America’s birds?

1934



- What was the Duck Stamp Act?
- How does this help waterfowl species?

1935

- What do game wardens and environmental police officers do to help wildlife?

1937

WILDLIFE & SPORT FISH RESTORATION

- What was the Pittman-Robertson Act?
- Who signed it?

1956

- What is hunter safety education?
- Why is it important that hunters take these classes?

1960

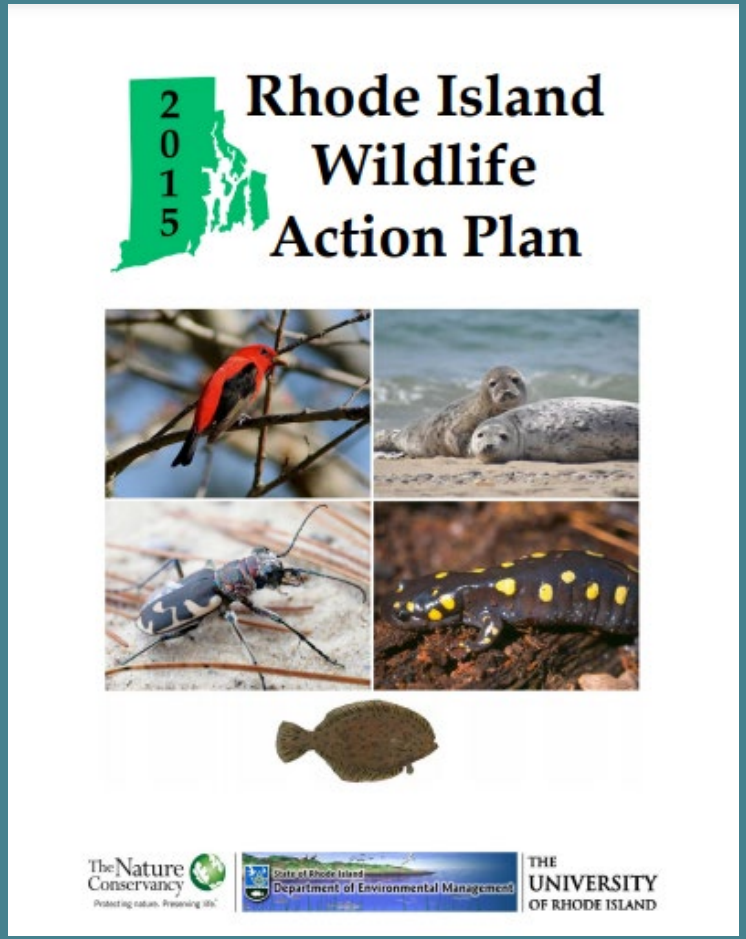
- Have coyotes always been in Rhode Island?
- How did they get here?

1973

- What is the Endangered Species Act?

1976

2000


2015
Rhode Island
Wildlife
Action Plan
The Nature Conservancy
Protecting nature. Preserving life.
State of Rhode Island
Department of Environmental Management
THE
UNIVERSITY
OF RHODE ISLAND

Present Day


USFWS

Tragedy of the Commons

Materials

- Bowls
- Tokens, beads, or beans (something small to represent fish)
- Data chart that can be used to record information (attached)

Prep

This activity can be used as a pre-lesson activity to get students thinking about the ways people consume resources. The goal of the activity is to teach students what can happen when renewable resources are depleted. Following the activity, Lesson 1 will develop on the idea of how human activities can significantly impact wildlife. The activity can be repeated post-lesson to see if students approach it any differently and if their perspectives on resource use have changed.

How to

- Divide the students into groups of four. Each group will receive a bowl which represents a lake with 16 fish (beans, beads, tokens, etc.) in the lake.

- Explain that each student will represent the head of a household who is fishing at the shared local lake to provide food for their family.

- Students will then take turns fishing in the lake. Each round 0-4 fish may be taken.
  - ➢ Rotate which student starts each round so that everyone has an opportunity to go first.
  - ➢ Make sure each student is aware of the following rules:
    - There should be no communication with one another as you fish.
    - If zero or one fish is taken, your family will be hungry.
    - If two fish are taken, your family will have just enough to eat.
    - If more than two fish are taken, they can be sold to earn money.
  - ➢ Data can be recorded in a table that has been included in the materials section, but this is optional.

- At the end of each round, the fish reproduce. Each fish can produce one more fish. Therefore, the number of fish in the bowl will double. Walk around to each group and make sure they have the correct number of fish before beginning each round. When there are no fish left in the lake, the activity is over.

- The activity can be completed several times. Allow students to communicate during one round to see if that has any effect on the outcome.

- Once each group has had a chance to go through the activity several times, including at least once with communication, pause to discuss the activity as a whole class. Ask students about their strategies for maintaining the population of fish in the lake.

- Prompt the students to consider if the activity is similar to how humans interact with the environment. Discuss what the ideas of sustainability and renewable resources mean.

- Reflect on the following items as a class:
  - Are there any parallels between natural resource use and sustainability in this activity?
  - What resources other than fish can be used up in this way?
  - Create a class list of natural resources that humans utilize in daily life.
    - Divide the list into renewable resources and nonrenewable resources.
    - Renewable resources are resources that can replace themselves within a human lifespan (animals, trees, water, etc.). Nonrenewable resources are resources that can't be readily replaced by natural means on a level equal to their consumption.

- Ask students if they think this activity was a true representation of how some people or communities overuse resources.
  - Ask students to list examples of resource overuse in the real world.
  - What consequences will there be if people do not include sustainable practices in their lifestyle?
  - How will communities be affected by this as a whole in the future?
  - Do you believe that the behaviors and lifestyles of people 100 years ago were more sustainable or less sustainable than today?
  - What are potential solutions or alternatives to this simulation? How can we change our actions to become more sustainable as a community?

Tragedy of the Commons Data Sheet

Round	Number of fish at the start of the round	Number of fish you caught	Number of people with not enough to eat	Number of people with just enough to eat	Number of people with a profit
1					
2					
3					
4					
5					
Total					

Lesson 2: The Population Puzzle

Theme

All living things interact in the environment, and the population size of one species can affect that of another. Wildlife biologists work to keep the populations of many different species stable for different reasons (popular game species, non-game species on the decline, etc.). Keeping track of populations and making sure there are enough resources to go around can get tricky!

Learning Objectives

Students will learn about interactions in nature and how populations of animals are affected by resource availability (carrying capacity). Concepts will be illustrated with real-life conservation stories from Rhode Island.

Corresponding Activities for this Lesson

- Oh Deer!
- Terrific Turkeys
- Food Web Interactions

Materials

- Lesson 2 PowerPoint
- Terrific Turkeys playing cards
- Blank paper
- Markers, crayons, colored pencils, pencils or pens
- Basket, hat or bag
- Ball of yarn or string
- Laminated habitat/animal cards
- White-tailed deer antler, skull, pelt
- Wild turkey feather and skull

Lesson *(Can be split into shorter lessons):*

1. **Explain to students that today we will be exploring how animals interact with each other and the different components of their habitat.**

2. **Place laminated habitat and animal cards into a basket, hat, or bag. Ask students to take a card from the basket and form a circle. Ask students to hold up their cards so that everyone else can see the picture. Explain to the students that the circle represents the ecosystem, and that all of the animals and habitat components on the cards can be found in Rhode Island.**
   - Start with one student holding an animal card and ask them what they think their animal would eat. For example, the white-tailed deer would eat acorns.
   - When the student makes the connection between the animal on their card and the food item, run a line of yarn between the students and ask them to hold the ends. Explain that a connection has been made between these two living things. If the second student is holding an animal card, ask them what they think their animal might eat. If they are holding a habitat card, ask them if there are any other connections they can make with others in the circle.
   - Continue creating connections between students until a web of yarn crisscrosses the circle. Explain that they have created a food web.

3. **Ask students how many strings they are holding. Are there some animals with more connections than others?**
   - Ask the students what they think would happen to the food web if some animals disappeared from the ecosystem.
   - Ask one of the students holding multiple strings to let go. What happens to the food web? Ask a couple more students to let go of their strings. How does the food web look now?
   - Explain that for an ecosystem to function properly, each species matters.

4. **Show students the slide of the puzzle with missing pieces.Explain that an ecosystem with missing species is like the puzzle; the picture is incomplete.**
   - Explain to students that when wildlife biologists think about the ecosystem, they aren't just thinking of individual animals, like the one deer or the one hawk that we saw in our food web. They are thinking about populations of wild animals. Ask students if anyone has heard the word population, or knows the definition.

5. **Explain that a population is a group of individuals of the same species living and interbreeding within a given area. For example, in Rhode Island, we have a large population of white-tailed deer, but a very small population of black bears. Ask students if they think populations can interact like we saw in the food web activity.**
   - Yes, they can! If a population of a particular animal drops too low or disappears, that impacts the environment and other species that interact with it. Ask students if they can think of some examples of how the growth or decline of a population of a particular species might positively or negatively impact the ecosystem or other species.
   - We know that if a population shrinks too much, that animal may be considered endangered, which is not good. But what happens when a population grows too much?

6. **Explain to students that they will be answering this question by playing a game of "Oh Deer!" or "Terrific Turkeys." Both games involve similar themes, and can be modified to play with any age group.**
    - Before playing the game(s), show students the deer or turkey slides to give a little background information about the species. This is a great time to pass around the natural artifacts included in the kit! The notes section of the PowerPoint contains details about the information in the slides.

7. **After playing either/both games, recap with students:**
    - Were all of the deer or turkeys able to find all of the resources they needed to survive in each round? A few individuals not making it from season to season is normal in nature.
    - What happened when the population grew too high? This natural population crash is called carrying capacity. This means that there weren't enough resources for the population to keep growing, so some animals were not able to survive.
    - Did introducing hunters (with rules) cause the populations to crash? Regulated hunting helps to keep populations at a healthy level without reaching carrying capacity, which actually helps to save animals from struggling to survive or starving.

8. **After debriefing, show students deer or turkey conservation slides to explore how biologists in Rhode Island are working to keep an eye on these populations and ensure their well-being for the future. Explain that populations of lots of different animals are monitored in Rhode Island, not just deer and turkeys.**

9. **To reinforce the concepts learned in this lesson, follow up with the Food Web Interactions activity.**


Dean Birch

Oh Deer! (Modified from Project WILD)

Prep

Review the essential components of habitat that all wildlife species need to survive: food, water, shelter, and space. Ask students if they think that all of these things are readily available at all times. What are some examples of an increase or decrease to any one of these components? Examples include drought, habitat fragmentation, invasive species, or disease. Explain to students that they will be playing a game that illustrates how wildlife populations change over time in relation to the availability of food, water, shelter, and space.

How to

- Ask students to count off in fours. Ones will stand on one side of the playing field, and will be deer. Twos, threes, and fours will be habitat components, and will scatter on the other side of the field. Have the deer stand with their backs to the habitat.

- Explain that deer must pick a habitat component to search for – food, water, shelter, or space. Once you pick what you are looking for, you have to stick with your choice, and can't change it in the middle of the round!

- Explain that the students representing the habitat also have to pick one component to represent. Again, you can't change your habitat component once you have picked it, but you can change it in the next round if you like.

- Habitat components can be represented with the following motions.
  - Food – Pretend to eat with your hands.
  - Water – Move your arms like flowing water.
  - Shelter – Make a roof over your head with your hands.
  - Space – Spread your arms out wide.

- The goal for the deer is to make the motion of the habitat component they pick, turn around, and find someone on the habitat side making the same motion. Once they find a partner, the deer will tag them, and walk back to the deer starting area. It can be understood that the deer survived the winter and reproduced in the spring. Their habitat partner has now become a deer.

- If a deer does not find a match, they "die" and become a part of the habitat.

- Record the number of deer at the beginning of the activity and at the end of each round to create a line graph depicting the deer population. Continue the activity for 15 rounds (or as time allows).

- To make things interesting, add in some challenges:
  - Have one student act as a hunter. They can only take 2 deer per season (per round).
  - Introduce Chronic Wasting Disease (CWD) – Give a few students out in the habitat a token to represent CWD. Do not tell anyone what the tokens represent yet. If a deer partners with an infected habitat component, they also contract CWD. At the end of that round, all of the deer with CWD die and become habitat. The infection persists in the habitat, and will further infect deer in subsequent rounds. Before moving on to subsequent rounds, ask students to make a prediction about what might happen to the population as CWD continues to be present in the environment.
  - Have one deer act as a doe with twin fawns. They have to find three of their chosen habitat component to be able to support themselves and their fawns
  - Have one deer pretend they have an injury (blindfold, hop on one leg, etc.) and try to find their habitat component.

- At the end of the game, work together to draw the graph on the board, and ask students to explain what they notice about it. Why did the deer population rise and fall? Can they figure out when CWD was introduced? Did the hunter have a huge effect on the deer population? Explain to the students that the highest peak on the graph is the population's carrying capacity, and that it is our job to balance wildlife populations so that they don't rise and crash too dramatically. Balance is key!


C. Longo

Terrific Turkeys (Modified from Growing Up WILD)

Prep

Review the essential components of habitat that all wildlife species need to survive: food, water, shelter, and space. Ask students if they think that all of these things are readily available at all times. What are some examples of an increase or decrease to any one of these components? Examples include drought, habitat fragmentation, invasive species, or disease. Explain to students that they will be playing a game that illustrates how wildlife populations change over time in relation to the availability of food, water, shelter, and space.

Materials

- Food and water cards
- Turkey and turkey predator cards
- Hula hoops, floor spots, cones, blankets, jump ropes or other markers for the playing field
- Ping pong balls, plastic Easter eggs or another token to represent turkey eggs

How to

- Set up the playing field outside, or in a large indoor space. On one end of the field, set up hula hoops or other markers to represent nests and roosts. Nests and roosts should be able to be distinguished from each other. For example, use cones to denote nests and hula hoops for roosts.

- On the other end of the playing field, set up a blue hula hoop as the water source (place water cards inside) and a green hula hoop as the food source (place food cards inside). On one side of the field, designate an area to represent the predator den.

- Assign roles to each student by handing out turkey/predator cards. Some students will be toms, and will find a roost to stand in. More than one tom can occupy a roost because turkeys often communally roost together in trees. Some students will be hens and will find a nest to occupy. There will be ping pong balls in each nest to represent eggs.

- Some students will be turkey predators (bobcat, great horned owl, coyote, etc), while others will be egg predators (raccoon, skunk, rat snake). All predators will go stand in the predator den. Lastly, one student will be a turkey hunter. The turkey hunter will stand off to the side until hunting season starts.

- Explain to the students that the turkeys have to find one food card and one water card each day, and then have to return to their roost or nest before the sun goes down. Predators and hunters will be introduced to the forest gradually. Turkey predators will chase the turkeys and tag them on the shoulder to catch them; they then have to bring them back to the den before going out to hunt again. Nest predators will try to get to the hens' nests while the hens are out foraging. They have to take one egg at a time to the predator den. If a hen is on a nest, or a tom is in a roost, they are safe. The hunter can only hunt during turkey season, and has to remain stationary (they can pick where they would like to set up their turkey blind). Hunters can only take one turkey per season. Once they catch one, they're not allowed to take any more.

- To start and end each round, call "Sun up" or "Sun down!"

- After each round, tally the number of turkeys that survived (did not get eaten by a predator and also picked up one food and water card). Did any turkey nests fail (all of the eggs were eaten)? Was there enough food and water to go around? Were any turkeys hungry or thirsty at the end of the day? As more predators entered the forest, was it harder to avoid being caught?

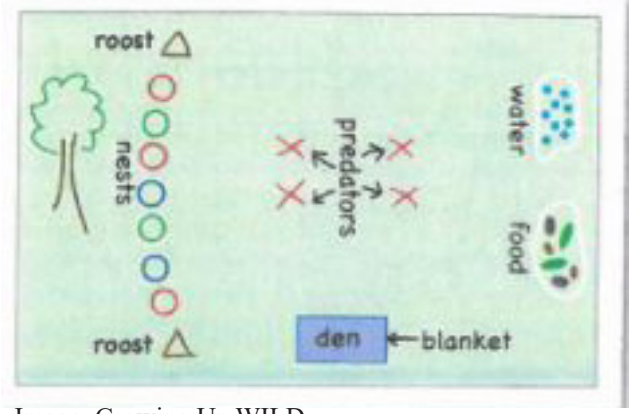


Image: Growing Up WILD

About Project WILD/Growing Up 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.

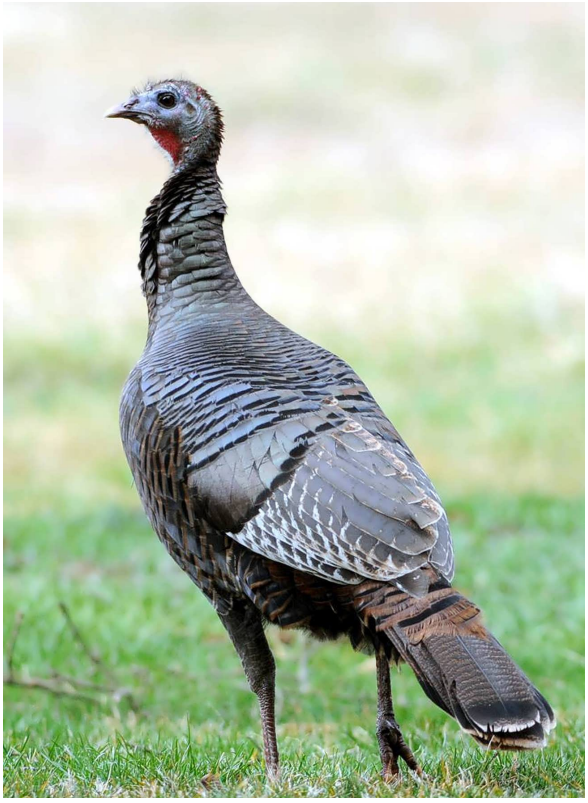
To attend a FREE training workshop, email kimberly.sullivan@dem.ri.gov.

Tom

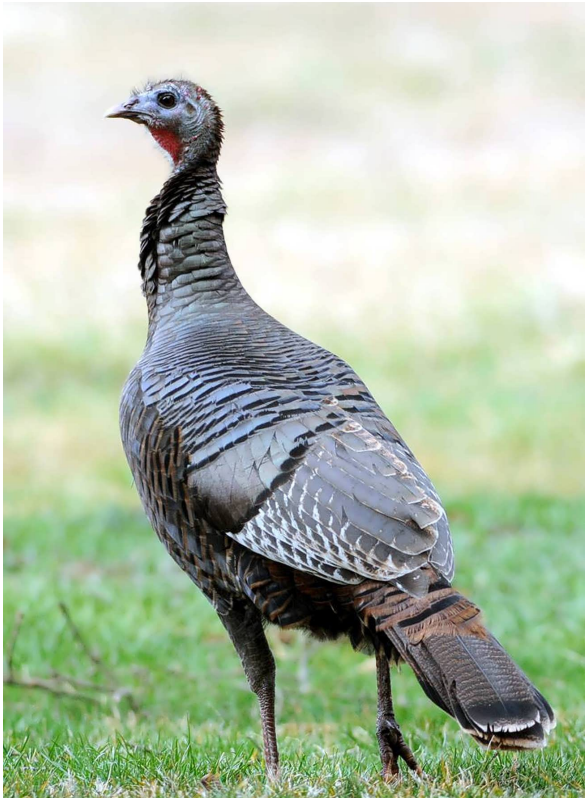
Tom

Tom

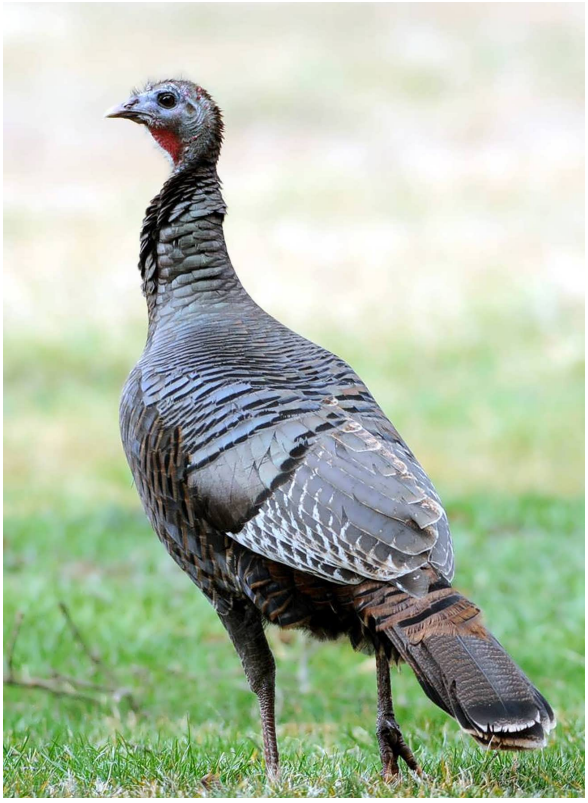
Tom



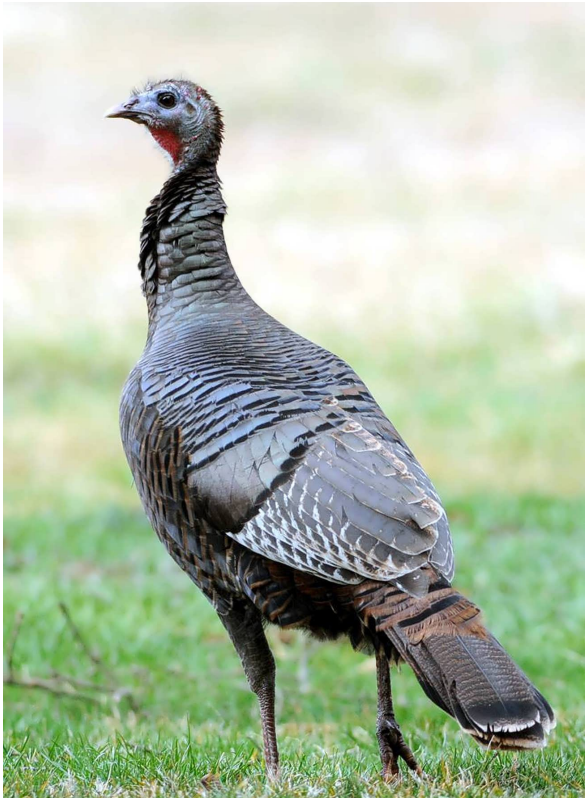
Hen



Hen



Hen



Hen

Coyote

Great Horned Owl

Bobcat

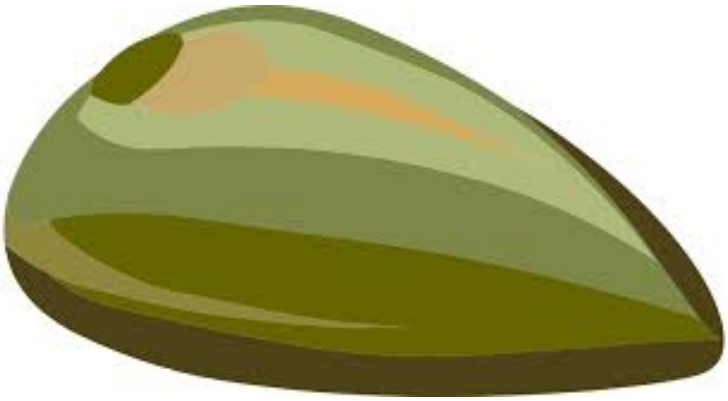
Raccoon

Striped Skunk

Black Rat Snake

Turkey Hunter

Snail

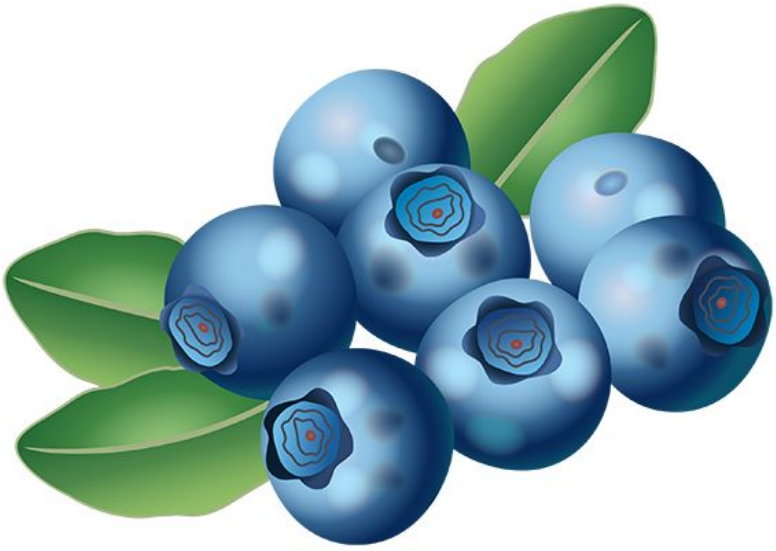


Seed

Acorn

Seed

Salamander

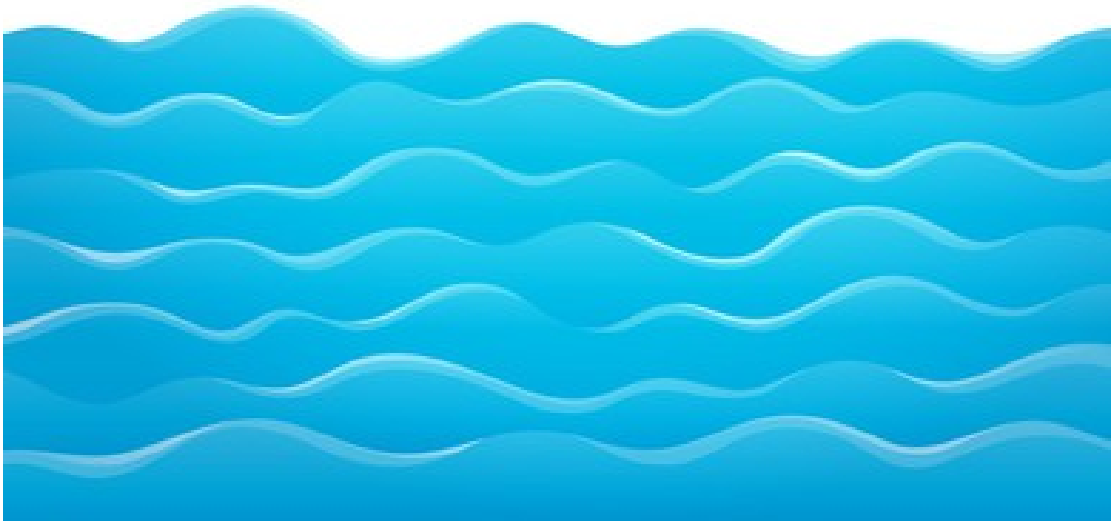


Berries

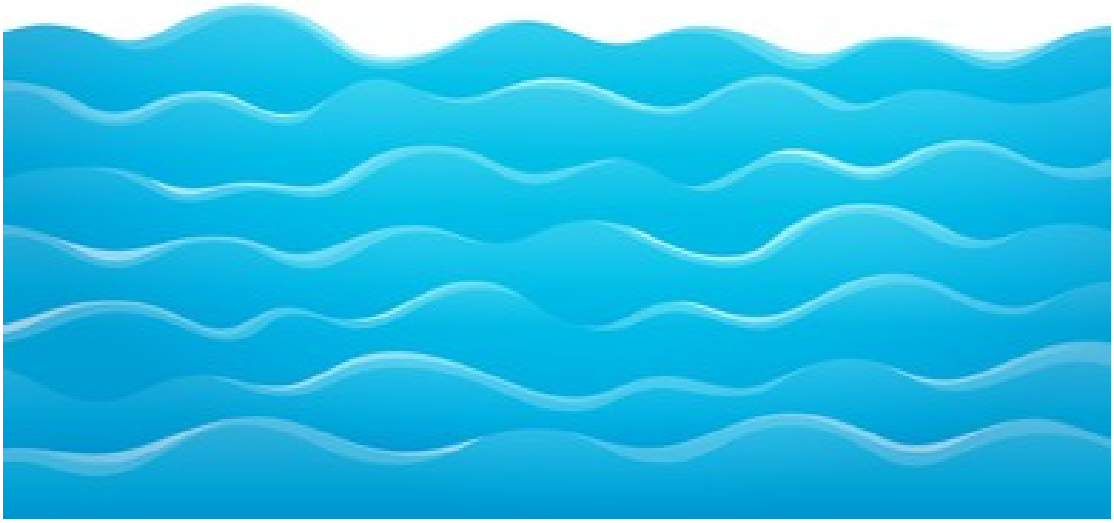
Beech Nuts

Beetle

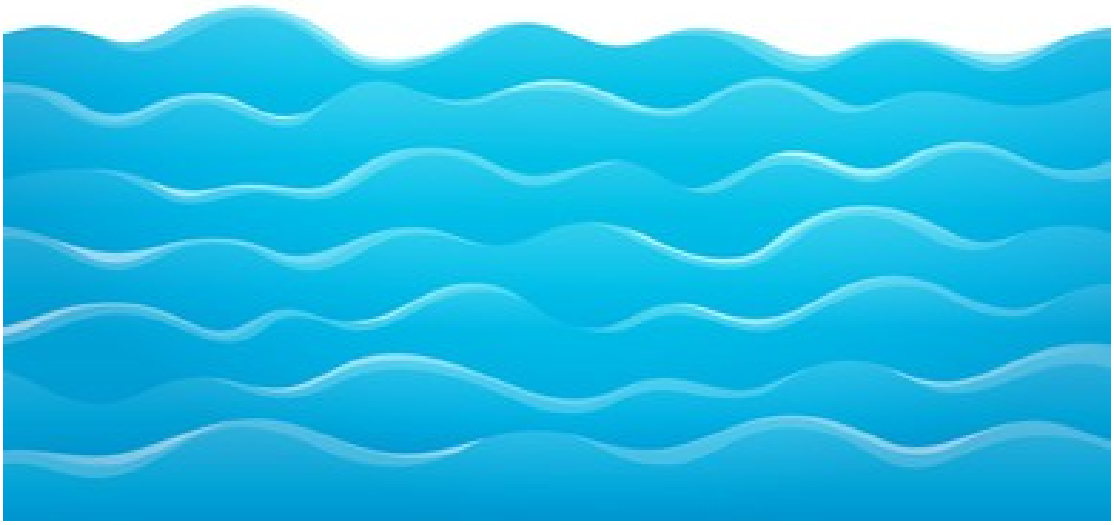
Water



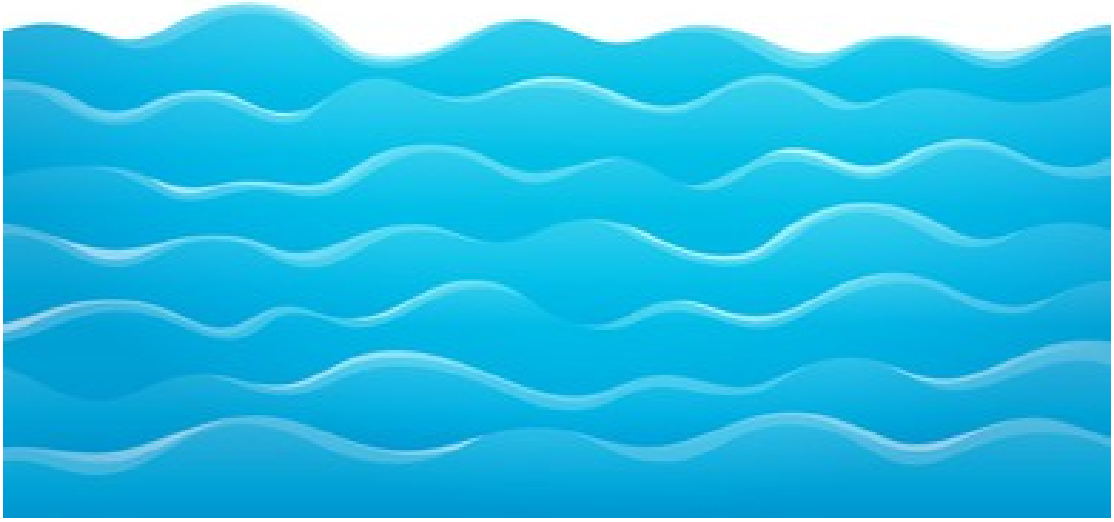
Water



Water



Water




Peter J. Ryan

Food Web Interactions

Prep

This activity can be used as a follow up to Lesson 2: The Population Puzzle. In this lesson students learn how different populations of species interact with each other to create complex ecological systems. This activity will give students the opportunity to put that knowledge to use and create their own food webs that will adapt to various real world scenarios. Before the activity begins prepare a bag with cut up pieces of paper that include the scenarios listed below. Feel free to include other potential interactions that you come up with.

Materials

- Laminated animal/habitat cards
- Blank paper
- Markers, crayons, colored pencils, pencils or pens
- Basket, hat or bag

How to

- Provide students with markers and paper and instruct them to create their own food web using the species that have been introduced in the lesson and are common to Rhode Island. You can post the cards up on the board or spread them throughout the room for students to reference.
  - Make sure students include at least two species at each level of the food web (two predators, two primary herbivores, etc.).
  - Students can get creative with the species they use and it is ok for food webs to look different from one another.
  - Have the students draw arrows between the animals in the food web to show the direction that the energy is being transferred.

- After students have completed drawing their food webs, pull out the bag you prepared with different food web events.

- Population events that can be included as scenarios:
  - Drought reduces the abundance of one of your plant species
  - Hunting season begins and there is a decrease in the amount of deer (or other primary consumer)
  - Trapping regulations help improve the predator population in the area
  - A new predator is introduced to your community and acts as competition for the other predators
  - Deforestation causes one of your herbivores to go extinct in the area
  - An invasive plant species colonizes the area and causes one of your native plant species to become reduced in abundance
  - One species of predator is removed from the area and there is no longer competition for the other predator species

- Other events can be brainstormed or included. Each event should have an effect on the abundance of one of the organisms in the food web.

- Have each student draw an event out of the bag and ask them to reflect on how it would impact their food web
  - Make sure they consider each organism in the food web and how its population may be effected in response to the scenario

- Divide students into groups or come back together as a whole class and have them present their scenarios to one another.

- Have the students describe the interactions in the food web both before and after the event took place. To extend the activity students can write out the story of the event they choose.

White-tailed Deer

Acorn

Osprey

River Herring

Coyote

Gray Squirrel

Raccoon

Spotted Salamander

Earthworm

Centipede

Eastern Mole

Bobcat

Cottontail Rabbit

Black Bear

Blueberries

Red-tailed Hawk

Woodchuck

Black Rat Snake

White-footed Mouse

Box Turtle

Slug

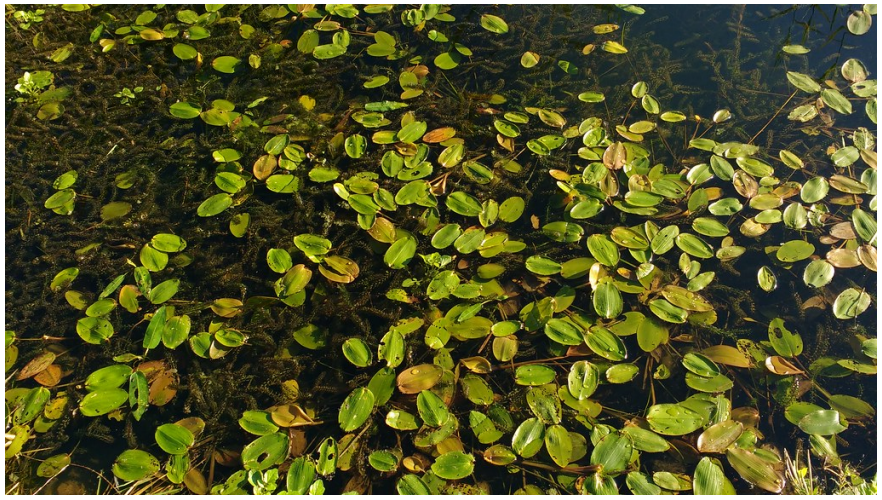
Grass

Barred Owl

Maple Tree

Beaver

Mallard



Pondweed

Caterpillar

Yellow Warbler

Fisher

Lesson 3: The Balancing Act

Theme
It's tricky to balance the needs of wildlife populations, but it's even trickier when you take into account the needs of people too!

Learning Objectives
Students will learn about the role of regulated hunting and trapping in managing wildlife populations, as well as coexistence strategies for living alongside wildlife. The concepts of cultural carrying capacity, fragmentation, and community behavior change will be explored with special focus on the Eastern coyote.

Corresponding Activities for this Lesson
Where Do You Stand on Hunting and Trapping?

Materials
- Lesson 3 PowerPoint
- Tennis ball
- Fisher, fox, coyote, and raccoon skulls
- Coyote and raccoon pelts
- Aluminum can "coyote shaker"

Lesson
1. **Explain to students that today we will be learning about balancing the needs of wildlife and people in the ecosystem.**

2. **Start things off with a challenge! Ask students to take turns trying to balance a tennis ball on their heads. You can ask students to sit, stand, walk, jog, or hop while balancing the ball depending on the students' age or eagerness to try out their balancing skills.**
   - After having some fun with the balancing challenge, ask students if they thought it was easy or hard to keep the tennis ball on their head.
   - If you think it was easy, maybe you just have a good sense of balance, but generally, this is pretty tricky! Explain to students that balancing the needs of people and wildlife can be very tricky as well.

3. **Ask students to come up with some ideas about why it might be challenging for biologists to balance these needs. Write ideas down on the board, and guide students with questions:**

4. **What do all animals (including people) need to survive?**
   - What are some things that animals might do that bother or scare people? What problems might wildlife cause for people?
   - What are some things that people might do that make it harder for wildlife to survive? What problems can people cause for wildlife?

5. **Show students the slides focused on the Eastern coyote as an example of a species that presents some conservation and management challenges.**
   - The notes section of the PowerPoint contains details about the information in the slides. This is a good time to pass around the coyote natural artifacts!

6. **Explain to students that the problems associated with coyotes could apply to any wild animal, especially other small predators like fishers, foxes, and raccoons.**
   - This is a good time to explore some of the other skulls in the kit.

7. **Ask students to brainstorm some potential solutions to the problems that these animals can cause for people.**
   - Record ideas on the board, then show students the solutions slide to confirm their ideas or add some new ones to their existing list.

8. **Show students the drawing of a backyard, and ask them to think like a wild critter. What in this picture might be considered an attractant for wildlife? What could be done to make this yard less inviting for problematic animals?**
   - After doing this exercise with the drawing, you could extend it further by walking around the school yard, neighborhood, or local park to look for examples in real life.

9. **Finish up the lesson by running through a round of "Where Do You Stand on Hunting and Trapping?" to give students the opportunity to assess their own opinions of hunting, trapping, and wildlife conservation and management based on what they have learned.**
   - Alternatively, you can start this entire unit with a round of this activity, and then repeat the activity at the end of Lesson 3. A discussion about how students' perspectives may have changed or stayed the same based on what they learned in the unit could follow.

Where Do You Stand on Hunting and Trapping?

Prep

This activity can be used any during any lesson in this kit, and can even be used as a pre- and post-activity to give students the opportunity to examine their feelings, knowledge, and perceptions regarding hunting and trapping before and after the lessons, and identify any changes in perspective based on their learning experience.

How to

Designate/label one side of the room as “Agree” and the other side of the room as “Disagree.” Tell students the middle of the room represents a neutral opinion. As each statement is read, students will move to stand on the side that aligns with their personal position on the statement.

Statements

1. All hunting/trapping should be against the law.
2. Hunting/trapping only hurts wildlife.
3. Hunting/trapping caused some wildlife populations to disappear or shrink in the past.
4. Trapping was an important part of North American history.
5. Trapping is old fashioned and doesn’t belong in our modern day lives.
6. Hunting/trapping rules help protect wildlife today.
7. It’s okay to trap individual animals that endanger people’s health or safety.
8. It’s okay to hunt/trap animals that are very common.
9. It’s ok to trap animals for fur to make clothing.
10. People should be able to get rid of animals that cause damage to crops.
11. Hunting/trapping of certain animals might help other endangered species.
12. Modern day hunting/trapping with rules has never caused a species to become endangered.
13. Hunter education programs are important.
14. People should not be able to hunt/trap any animals that they want at any time.
15. Trapping helps control the spread of wildlife disease.
16. No one should wear fur.
17. The biggest threat to wildlife is the loss of habitat.

RHODY CRITTER KITS

DEM RHODE ISLAND

RHODE ISLAND FISH & WILDLIFE

Additional Resources & Activities

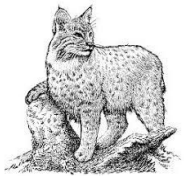
Match the tracks with the critter!

Coyote

Fisher

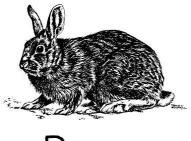
Wild Turkey

Raccoon



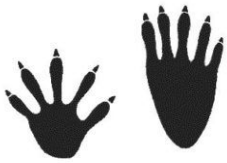
Bobcat

Beaver



Rabbit

A.



B.

C.

D.

E.

F.

G.

Match the tracks with the critter!

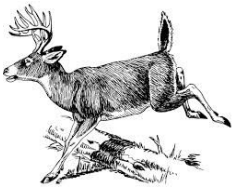
Squirrel

Virginia Opossum

Mink

Black Bear

River Otter



White-Tailed Deer

Striped Skunk

H.

I.

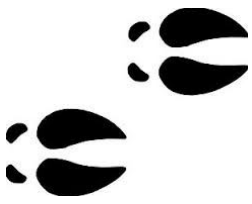
J.

K.

L.

M.

N.



Match the tracks with the critter!

Answer key

A. Raccoon
B. Coyote
C. Beaver
D. Bobcat
E. Wild Turkey
F. Cottontail Rabbit
G. Fisher
H. Mink
I. Black Bear
J. River Otter
K. Squirrel
L. Striped Skunk
M. Virginia opossum
N. White-tailed deer

Which Furbearer Am I?

Prep

This activity can be used any during any lesson in this kit as a fun way to learn Rhode Island's furbearer species. Laminated furbearer cards are included in the kit, and copies can also be made from the cards included in the educator packet. Before starting the activity, ask students to name any furbearers they know, and reinforce the definition of furbearer if needed.

How to

- Ask one student to volunteer as the "furbearer."
- Attach one of the laminated furbearer cards to their back with masking tape. Have the student stand at the front of the classroom and turn around so the whole class can see the photo on their back. You could also have the student sit on a chair facing the class, and stand behind them holding the photo so they can't see it, but the class can.
- The furbearer then asks the class questions to discover their identity. For example, a student could ask:
  - Do I have a furry tail?
  - Can I swim?
  - Am I a carnivore?
- Students should not ask: Am I a coyote?
- After the student figures out their furbearer identity, another student can volunteer as the next furbearer.
- To help students, put a list of furbearers on the board for reference.

Red Fox

Gray Fox

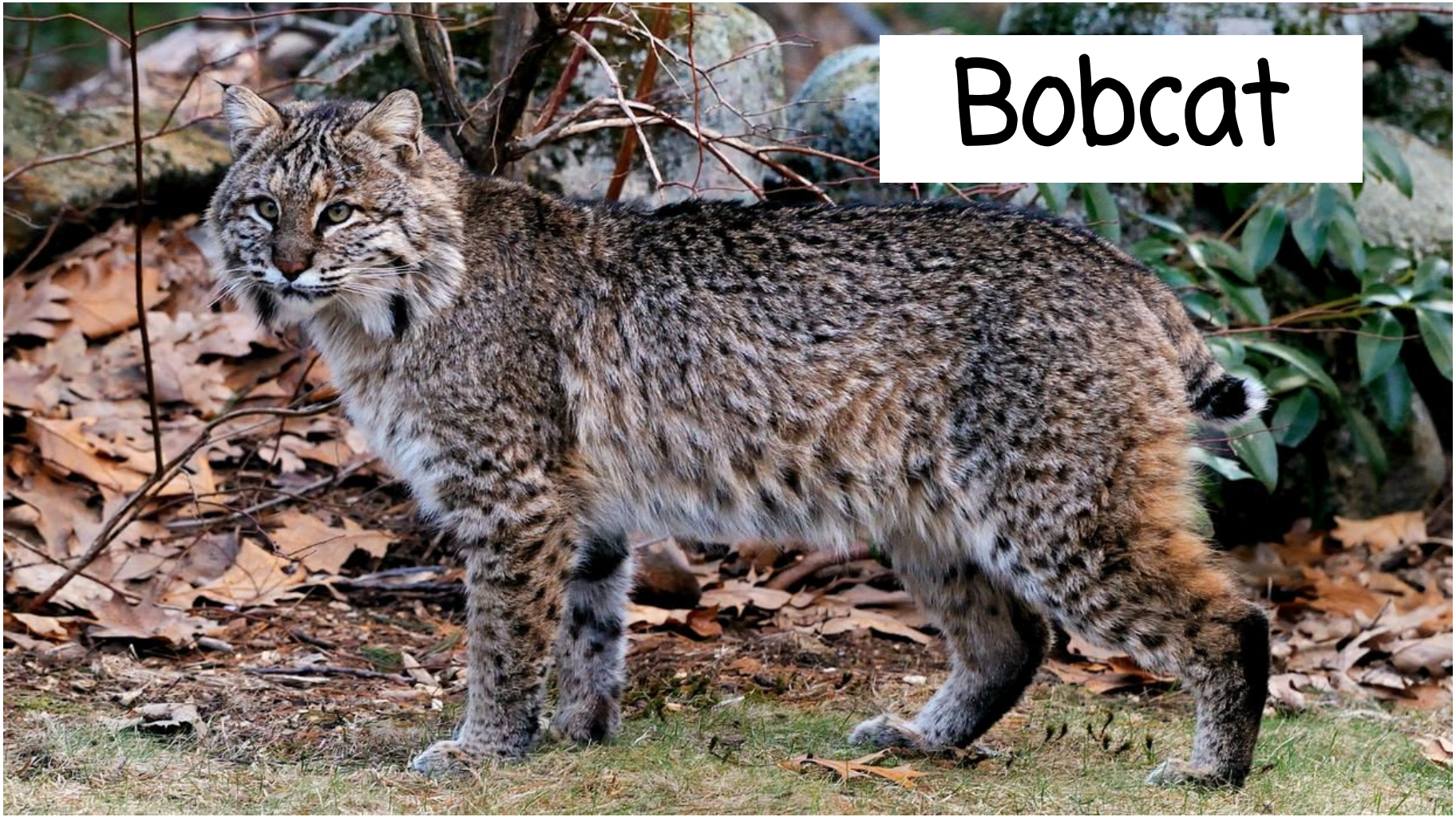
Beaver

Muskrat

Mink


Weasel


River
Otter


Bobcat


Rabbit


Coyote

Fisher


Raccoon


Opossum


Skunk