

2023 Envirothon – Wildlife Section

Wildlife Learning Objectives for the NCF-Envirothon

Wildlife may be the first topic that comes to mind when you think of conservation: the panda, the elephant, the snow leopard, the grey wolf, the bald eagle, or any other well-known current or former endangered animal. These charismatic species are easy to rally behind, but the wildlife in your backyard or local park need the same basic resources as a rhinoceros: food, water, shelter, and space. Conservation for local wildlife is just as important as conservation for big-name species in exotic locales. Through understanding wildlife biology, ecology, and conservation, humans can reduce our negative impacts to wildlife and implement management strategies to help species thrive, both locally and globally.

Just like the ecosystems we study, human society and culture are incredibly diverse. In the same way that biodiversity makes ecosystems more resilient, these differences in human perspective and experience make us stronger as a global community. Every person's story and relationship with the environment is important, and we must work together to ensure that everyone's stories are heard, including the historically marginalized and economically disadvantaged. We invite you to seek out stories from your own communities – to discover the unsung conservation heroes, to learn the histories that aren't typically taught in classrooms, to highlight local environmental issues, and to explore what types of natural resource conservation are occurring in your local community, state/province, and nation.

Students should be able to:

- Provide an informed opinion about current issues in wildlife conservation.
- Think critically about solutions to current wildlife conservation issues.
- Work collaboratively in a team to synthesize and apply knowledge.
- Make connections between concepts in Wildlife and the subjects of Soils and Land Use, Forestry, Aquatic Ecology, and the Current Issue.

Wildlife Learning Objectives:

Students will be able to:

Wildlife Biology

- Distinguish between major taxonomic classifications of wildlife, their typical roles in ecosystems, and their habitat requirements (including mammals, birds, fish, reptiles, amphibians, and insects).
- Explain the processes of natural selection and evolution and relate these processes to the variety of life we see on Earth today.
- Provide examples of physical and behavioral adaptations (such as mimicry, camouflage, freeze response, hibernation, special organs, et cetera) and how these adaptations benefit wildlife.
- Describe the significance of migration in the life cycle of certain wildlife species.
- Describe the roles that circadian and seasonal rhythms play in the life cycles of different wildlife species.
- Explain the difference between generalist and specialist species and provide examples of each.

Wildlife Ecology

- Identify the essential components of a habitat and recommend suitable habitat for local wildlife species.
- Identify biotic and abiotic factors in ecosystems and how they are related to wildlife habitat requirements, ecosystem variation, and wildlife conservation.
- Describe the roles of producers, consumers, and decomposers in various ecosystems and identify their trophic levels.
- Diagram a food web and describe the flow of energy within it.
- Relate the energy pyramid to different trophic levels and the total amount of energy available to consumers.
- Identify the effects of various environmental impacts on the energetic relationships in food chains and webs.
- Identify common wildlife diseases, their causes, and their effects.
- Apply concepts of landscape ecology as they relate to wildlife conservation, including:
 - a) Patterns in landscape and habitat type, and how this affects the distribution of wildlife species
 - b) Use and proximity of different habitat types over the course of a species' life (migration, species that undergo metamorphosis, et cetera)
 - c) Effects of disturbance on an ecosystem and its impacts to wildlife
 - d) Habitat connectivity and importance of wildlife corridors
 - e) Genetic diversity in species across landscapes and the importance of this genetic diversity to healthy species populations
- Describe wildlife adaptations to unique ecosystems (such as high elevations, deserts, fire-dependent ecosystems, et cetera).
- Define resilience and describe what it means for ecosystems and wildlife species.

Wildlife, Conservation, and Society

- Explain the distinctions between species designations (such as common, rare, endangered, threatened, endemic, extirpated, and extinct) and provide examples of each type.
- Recognize important issues facing wildlife on a local, state/provincial, national and international scale, propose solutions to current problems, and evaluate viability of solutions.
- Define keystone, umbrella, game, non-game, and indicator species and describe their roles and functions within ecosystems.
- Describe the impact of changes in climate on wildlife and their habitats.
- Explain the roles of local, state/provincial, national, and international agencies in wildlife protection and management.
- Identify the costs and benefits of various wildlife management strategies (for example, a farmer sacrifices tillable acreage to maintain a wildlife buffer, losing potential crop revenue, but gaining better water quality for the farm, reducing erosion, and fostering habitat area for pollinators, quail, and other wildlife).

Field Skills

- Identify common local wildlife species from preserved specimens, skulls, skeletons, pelts, tracks, scat, and other animal signs without the use of a key.
- Explain an animal's habitat, dietary requirements, and life cycle based on animal signs.
- Recommend wildlife management practices for a variety of uses (including conservation, connectivity, and hunting) for a variety of landscapes (including grasslands, forests, croplands, wetlands, and urban settings).

Wildlife Identification List:

Below are the lists of fish and wildlife species students should know. Without the use of a key, be able to identify the following fish and wildlife of New Hampshire from pictures, drawings, mounts, pelts, and tracks/scat combinations. In addition, it is important to be familiar with their habitat requirements and natural histories. (*Note: Students are not expected to know scientific names.*)

Fish:

Brook trout, *Salvelinus fontinalis*
Rainbow trout, *Oncorhynchus mykiss*
Slimy sculpin, *Cottus cognatus*
Tessellated darter, *Etheostoma olmstedii*

Salamanders:

Eastern newt, *Notophthalmus viridescens*
Northern two-lined salamander, *Eurycea bislineata*
Spotted salamander, *Ambystoma maculatum*
Spring salamander, *Gyrinophilus porphyriticus*

Turtles:

Eastern box turtle, *Terrapene carolina Carolina*
Eastern painted turtle, *Chrysemys picta*
Snapping turtle, *Chelydra serpentina*
Wood turtle, *Glyptemys insculpta*

Frogs:

Bullfrog, *Lithobates catesbeiana*
Green frog, *Lithobates clamitans melanota*
Spring peeper, *Pseudacris crucifer*
Wood frog, *Lithobates sylvaticus*

Snakes:

Black racer, *Coluber constrictor*
Eastern hognose snake, *Heterodon platirhinos*
Garter snake, *Thamnophis sirtali*
Smooth green snake, *Opheodrys vernalis*

Invertebrates:

Karner blue butterfly, *Lycaeides Melissa samuelis*
Monarch butterfly, *Danaus plexippus*
Viceroy butterfly, *Limenitis archippus*
White mountain fritillary, *Boloria chariclea montinus*

Birds:

American bittern, *Botaurus lentiginosus*
American robin, *Turdus migratorius*
American woodcock, *Scolopax minor*
Bald eagle, *Haliaeetus leucocephalus*
Chestnut-sided warbler, *Setophaga pensylvanica*
Dark-eyed junco, *Junco hyemalis*
Eastern phoebe, *Sayornis phoebe*
Great blue heron, *Ardea herodias*
Hermit thrush, *Catharus guttatus*
Mallard, *Anas platyrhynchos*
Peregrine falcon, *Falco peregrinus*
Piping plover, *Charadrius melodus*
Red-tailed hawk, *Buteo jamaicensis*
Wild turkey, *Meleagris gallopavo*
Wood duck, *Aix sponsa*

Mammals:

American marten, *Martes americana*
Eastern cottontail, *Sylvilagus floridanus*
Eastern coyote, *Canis latrans*
Fisher, *Martes pennant*
Gray fox, *Urocyon cinereoargenteus*
Little brown bat, *Myotis lucifugus*
Moose, *Alces alces*
New England cottontail, *Sylvilagus transitionalis*
Northern long-eared bat, *Myotis septentrionalis*
Raccoon, *Procyon lotor*
Red fox, *Vulpes vulpes*
Short-tailed weasel (ermine), *Mustela erminea*
Snowshoe hare, *Lepus americanus*
Virginia opossum, *Didelphis virginiana*
White-tailed deer, *Odocoileus virginianus*