

# Introduction to Biodiversity in Nova Scotia

## What is biodiversity?

Biological diversity, or biodiversity, refers to the variety of life found on earth in the form of different ecosystems, species, and genes, and the systems and processes that link them together.

## Why is biodiversity important?

Biodiversity is essential to all life on earth. For humans, biodiversity provides the wealth of natural capital necessary to our survival and well-being, for example,

- healthy aquatic systems provide fish for food and water for drinking
- intact, healthy forests regulate climate, filter air, and reduce the severity of floods and soil erosion
- wetlands effectively capture and act as a reservoir of fresh water
- plants like the Canada yew (*Taxus canadensis*) provide medicine for cancer treatment
- bees pollinate crops that we harvest for food
- bats consume many agricultural pests



**Ecosystems**



**Species**



**Goods and Services**

A healthy linking of biodiverse ecosystems, species, and goods and services are essential for our continued survival and well-being.



The **short-tailed shrew** (*Blarina brevicauda*), common throughout Nova Scotia and much of northeastern North America, is a rare example of a venomous mammal. In a New Brunswick lab, scientists are investigating the chemical properties of this shrew's venom as a potential cancer treatment, with promising results.

## Importance of natural capital

A solid foundation for prosperity is built on a balance of healthy natural capital, along with economic and social capital. Natural capital is bound up in healthy, functioning ecosystems and often referred to as ecosystem goods and services.

Four categories of **ecosystem goods and services**:

**Provisioning services:** food, clean water, medicine, fibre for clothes and shelter, other material goods

**Regulating services:** filtration of water and air; mitigation of floods and extreme weather events

**Cultural services:** recreational fishing, camping, hiking, biking, canoeing, cross-country skiing, and snow-shoeing; traditional foods; materials for traditional crafts

**Supporting services:** ecosystem processes like nutrient cycling and pollination that support provisioning, regulating, and cultural services

### Measuring our natural capital

Few studies have measured the dollar value of the natural capital found in Nova Scotia.

Global Forest Watch recently estimated that Nova Scotia's protected areas, which now account for more than 12 per cent of Nova Scotia's land mass, provide \$1.3 to \$4.2 billion worth of ecosystem goods and services annually.

In 2012, the federal, provincial, and territorial governments released the results of the Canadian Nature Survey. The survey estimated that Nova Scotians spent approximately \$973 million on nature-related activities and services in the previous 12 months.

In 2011, *A Survey of the Sportfishing Industry in Nova Scotia* reports that anglers spent \$85.6 million in Nova Scotia on sportfishing activities.

These attempts to measure natural capital demonstrate that biodiversity is an important economic asset to be highly valued.

# Threats to biodiversity

Over the last few hundred years, humans have had a substantial impact on biodiversity and have disrupted many natural processes, including those that regulate climate, water, and air quality.

Sometimes the results of our impact are immediately evident: for instance, poorly managed forest harvest practices can impact habitat for resident plants, lichens, fungi, and birds and other animals. Sometimes the results of our impact are not seen until many years later. For example, forested lands provide many other ecosystem services, including helping to

prevent floods; but permanent deforestation impairs the land's ability to absorb water from heavy rainfall or from an unusually large spring river-flow. On the other hand, ecologically based forest practices can help conserve and restore healthy forest ecosystems that maintain biodiversity while providing the goods and services we need.

## Five key threats to biodiversity

- habitat fragmentation and loss
- invasive species
- climate change
- pollution
- unsustainable consumption of natural resources

## Mitigating factors

Resource-use practices, such as forestry, agriculture, aquaculture, fishing, hunting, and trapping, may negatively impact biodiversity, but when practiced sustainably these activities can help prevent biodiversity loss.

While Nova Scotia faces many of the same challenges as other parts of the world, many positive initiatives are working to address these issues:

- Forest practices are increasingly ecosystem based and incorporating biodiversity into planning.
- Farmers are using information on biodiversity to help conserve species and ecosystems on the farm.
- Hunters and trappers routinely fund projects that conserve habitat and fund wildlife research.
- Protected spaces: Nova Scotia protects 13 per cent of its land to conserve biodiversity.



**The Minas Basin** is a significant stopover and refueling area for many migrating shorebirds, such as sandpipers that feed on the mud shrimp (*Corophium volutator*). Although the birds stay only about two weeks to feed, they are able to double their weight before they embark upon the next leg of their journey. Contaminants from human and industrial waste, or run-off from agricultural and urbanized lands, could profoundly affect this and other aquatic ecosystems.

# Conserving biodiversity

Better awareness of biodiversity is a first step in meeting the challenge of addressing what threatens it. Conserving biodiversity for its own sake is important, but ultimately threats to biodiversity can profoundly affect our own well-being. Conservation of biodiversity is not just about protecting interesting or unique species and ecosystems; it is also about protecting the needs of humans now and in the future.

Nova Scotia offers many ways to learn about biodiversity. It can be as simple as taking a walk in a natural setting and observing what you see. You can also contact your local naturalist club, a nearby university, or the Museum of Natural History. Many great resources for learning about biodiversity are available online.

## Definitions

**Ecosystem:** a biological community consisting of plants, animals, and microorganisms interacting with each other and the non-living components of their environment.

**Species:** a grouping of organisms that can interbreed and produce viable offspring also capable of reproducing.

**Genes:** the functional units of heredity contained in each species. Genetic diversity allows species and systems to adapt to environmental changes over time and ultimately is the basis for the biodiversity seen at the species and ecosystem levels.

## Global Statistics

- **Wetlands** are among the most productive ecosystems in the world. Wetlands are being lost and degraded more quickly than any other ecosystem type: over half of wetlands have disappeared from the earth since 1900.
- **Currently, 37 per cent of freshwater fish species are facing the possibility of extinction.**
- **An estimated 60 per cent of ecosystem goods and services are being used unsustainably.**
- **About 17,000 species are being threatened with extinction worldwide.** This number is rising and currently includes one in three amphibians, one in four mammals, and one in eight birds. The earth has lost more than 150 bird species in the last 500 years.