Study Guide

2021-2022

NOVA SCOTIA

Nova Scotia Envirothon

Last Revised January 2022

LEARNING OUTCOMES: AQUATIC ECOLOGY

Abiotic

Identify the processes and phases of the water cycle.

Understand the concept of watersheds. Know the features of a healthy and unhealthy watershed.

Biotic

Identify aquatic species common to Nova Scotia and understand their dependence on one another. Know which aquatic species are considered 'at risk' and what their status is. Know how to use a dichotomous key to identify micro- and macro-invertebrates. Habitat: Understand habitat needs of aquatic species.

Understand the concept of migratory fish and give local examples.

Understand the impact invasive and introduced species can have on an ecosystem and give local examples.

Aquatic Environments

Know what classifies a wetland from other ecosystems. Understand the functions and values of wetlands.

Watercourse Protection & Conservation

Understand ways the Province manages, conserves and protects aquatic resources. Give examples of local regulations which are in place to protect aquatic resources. How can you protect aquatic resources?

Know various methods of conserving water and why they are important. How can you conserve water?

Understand water quality testing and monitoring and why these tests are used to assess and manage aquatic environments. Understand point and non-point source pollution and ways to reduce them. Explain how water quality can be improved.

LEARNING OUTCOMES: FORESTRY (1/2)

Tree Physiology & Identification

Identify common tree species without a key, know how to use a key for unusual & less common species in the Acadian Forest Region.

Know the characteristics (shade tolerance, longevity, site, common uses) of the tree species native to Nova Scotia.

Know the parts and tissues of a tree and be able to explain the growth processes as they relate to the life cycle, including photosynthesis and respiration.

Forest Ecology

Understand the structure of a forest (canopy, understory, ground layer and crown classes).

Understand forest ecology concepts and abiotic and biotic factors affecting them including the relationship between soil and forest types, tree communities, forest succession and biodiversity.

Sustainably Managed Forests

Understand what silviculture is and the various treatments used, both in even-aged and uneven-aged management (thinning, clear cutting, shelter wood, selection cutting, pre-commercial thinning, site preparation and planting).

Know how to use forestry tools and equipment in order to measure tree diameter, height and basal area. Be able to examine growth rings to determine tree age and tree history (periods of drought, growth, scarring from fire).

Be able to interpret macro-features from an aerial photograph.

Understand how social, economic and environmental factors influence forest management decisions and be able to address current forestry issues from different perspectives (ie. Clear cutting vs old growth, prescribed burns in protected areas), and know the provincial regulations pertaining to wildlife habitat and watercourse protection.

Value of the Forests

Understand the importance and value of trees in an urban and community setting and what factors affect their health and survival.

Understand the economic value of forests and their importance to society including biodiversity, biomass, carbon sequestration, economic benefits, non-timber forests products, and why trees and forests are important to human health, recreation, wildlife and watershed quality.

Understand the economic importance of the forest industry to the provincial, national and international economies, and identify the main types of forest Products produced in the Maritimes.

LEARNING OUTCOMES: SOILS AND LAND USE

Soil Conservation and Land Use Management

Understand why soils are a vital (and essentially non-renewable) natural resource that must be managed properly in order to sustain human society.

Compare different land uses and conservation practices and their impacts on soils, with particular emphasis on agriculture and food production.

Understand how soil management is integral to maintaining clean water and a healthy aquatic environment.

Chemical Properties of Soil and Soil Fertility

Understand how soil fertility reflects the overall chemical, physical, and biological conditions within a given soil.

Understand the concept of micronutrients and macronutrients as they relate to soils and plant nutrition.

Identify roles and benefits of organic matter in soils.

Physical Properties of Soil and Soil Formation

Understand basic soil forming processes and the factors affecting them.

Understand the concept of soil parent material and how different parent materials can affect soil properties.

Be able to identify common soil horizons and soil features and use this information to interpret soil properties and limitations for land use (e.g., texture, structure, colour, organic matter content, stoniness, drainage class).

Be able to use soil survey maps and related information to make interpretations about soil limitations, opportunities, and appropriate land use.

LEARNING OUTCOMES: WILDLIFE (1/2)

Birds, Mammals, Amphibians and Reptiles

Identify wildlife species common to Nova Scotia and the Maritimes using field guides, mounted specimens, skins/pelts, skulls, silhouettes, decoys, wings, scats, tracks, sounds or other common signs.

Define habitat and know the habitat requirements for wildlife and the factors that affect wildlife sustainability. Explain major causes of habitat loss in Nova Scotia.

Wildlife Ecology

Identify basic needs required by common wildlife species.

Describe wildlife adaptations and their significance (hibernation, migration, colouration, etc.). Identify general food habits (herbivore, omnivore, carnivore), habitats (terrestrial, aquatic) and habits (diurnal, nocturnal) using skull morphology and/or teeth. Identify and explain the advantages of physiological and/or behavioural adaptation of wildlife to their environment.

Know the difference between an ecosystem, community and population. Understand population dynamics such as birth, mortality, age-structure, sex ratio and mating systems. Understand the impact of limiting and decimating factors of common wildlife species on wildlife management. Understand the relationship between predator and prey.

Define succession and explain how a change in climate, topography or land use might modify the process of succession.

Define biodiversity and terminology (limited factor, territory, home range, forest fragmentation, etc.). Explain why biodiversity is important to people and wildlife. Understand the importance of the three levels of biodiversity (genetic, species and ecosystem/community) and the implications of loss at each level. Explain the major causes of biodiversity loss in NS.

Describe food chains, food webs and trophic levels with examples from NS.

Conservation and Wildlife Management

Understand the concept of carrying capacity and why it is the main factor affecting population size. Relate the concept of carrying capacity to a wildlife species native to NS. Understand the difference between biological carrying capacity and cultural carrying capacity.

Explain common wildlife management practices and methods that are being used to manage and improve wildlife habitat in NS. Understand the role hunters and trappers play in wildlife management. How can you help in the protection, conservation, management and enhancing of NS wildlife populations?

Issues Involving Wildlife and Society

Understand how non-native, invasive species threaten our environment and the biodiversity of many wildlife species. Understand the impact that non-native, invasive plants can have on wildlife habitat and native wildlife species. Be familiar with species that are non-native and/or invasive species to Nova Scotia.

Understand the impact that land-use decisions can have on wildlife populations. Understand that wildlife resources are under constant pressure caused by human population growth, environmental degradation and habitat reduction.

Understand the various status of 'at risk' species (vulnerable, threatened, endangered, extirpated, extinct) and the factors that are affecting these species. Understand species reintroduction. Explain common causes that lead to depleted populations and describe measures being taken to help their recovery. Know the organization and agencies responsible for listing species as 'at risk' on global, national and provincial levels.

Understand the impacts, both positive and negative, of people on biodiversity. Negative impacts could be fragmentation of habitat due to development (roads, buildings, etc.), disturbance of wildlife nesting seasons, destruction of habitat due to vehicles, motor vehicle collisions, trash interfering with wildlife health (food intake), pesticides in the environment. Positive impacts could be enhancement of wildlife habitat in order to attract wildlife viewing, increased knowledge through visiting wildlife and natural areas, funding for wildlife management.

Describe white nose syndrome and how is it affecting bats. What measures are being taken to discover outbreaks and prevent spread? Describe brainworm and how is it affecting the mainland moose population.

LEARNING OUTCOMES: WASTE TO RESOURCES

1. Landfills and Hazardous Materials

    - Describe different types of landfills and explain how they are regulated.

    - Identify examples of hazardous materials and toxic substances and describe their proper disposal and handling.

2. Reuse, recycling and waste diversion

    - Explain how the practices of reusing or recycling products conserves natural resources.

    - Describe how recycled materials can be repurposed and further diverted from landfills.

    - Explain how waste can be repurposed

    - Composting and Food Waste

    - Describe composting processes and identify how composting supports waste diversion efforts.

    - Explain how composting improves soil health and provide evidence for how composting supports water conservation efforts.

    - Describe the problem of food waste and explain how it impacts the sustainability of the global food supply.

3. Combustion with Energy Recovery (Waste to Energy)

    - Identify examples of closed loop energy systems and facilities.

    - Compare methods of carbon sequestration and describe their potential as an energy source.

4. Human and Animal Waste Treatment

    - Evaluate the differences between municipal waste treatment and home sewage treatment systems.

    - Compare and contrast the methods of waste treatment for human waste versus animal waste.

    - Describe the impacts to ground and surface waters when fecal waste is not effectively managed.

    - Identify innovative methods for managing fecal waste to lessen the impact to natural resources.

5. Brownfields and the Restoration of Degraded Lands

    - Define a brownfield and identify the impacts of brownfield materials on soil and water quality.

    - Explain methods for removing brownfield toxins and the role of federal and state entities in restoration.

    - Compare "green" approaches to re-using degraded lands and identify the benefits these methods provide to local communities.