

Envirothon New Brunswick

Aquatics Learning Objectives

Key Point 1—Abiotic factors

Learning Objectives:

1. Know the processes and phases for each part of the water cycle and understand the water cycle's role in soil nutrient erosion, salinization of agricultural lands, and climatic influences.
 - The Water Cycle
 - The Hydrologic Cycle
2. Understand the concept and components of a watershed and be able to identify stream orders and watershed boundaries. Know the features of a healthy watershed and an unhealthy watershed.
 - Watersheds - Basic Concepts
3. Know how to perform and interpret chemical water quality tests and understand why aquatic organisms and water quality is affected by the physical, chemical and biological conditions of the water.
 - Water Quality Parameters
 - Working around wetlands
 - pH and the Environment
 - Water Quality Testing

Key Point 2—Biotic factors

Learning Objectives:

1. Understand the dependence of all organisms on one another and how energy and matter flow within an aquatic ecosystem.
 - Energy Flow and Ecosystem Function
2. Understand the concept of carrying capacity for a given aquatic ecosystem, and be able to discuss how competing water usage may affect the ability of the system to sustain wildlife, forestry and anthropogenic needs.
 - Water use
 - Introduction to Water Use
 - Water Issues and Energy
3. Identify common, rare, threatened and endangered aquatic species as well as Aquatic Nuisance Species (ANS) through the use of a key.
 - Aquatic Species
 - Dichotomous key to stream macroinvertebrates
 - ANS
4. Know how to perform biological water quality monitoring tests and understand why these tests are used to assess and manage aquatic environments.
 - Biological indicators
 - Bio indicator
 - Biological treatment of surface water

Key Point 3—Aquatic Environments

Learning Objectives:

1. Identify aquatic and wetland environments based on their physical, chemical and biological characteristics.
 - Classification of Wetlands
 - Types of Wetlands
2. Know characteristics of different types of aquifers, and understand historical trends and threats to groundwater quantity and quality.
 - Ground Water
 - Ground Water Storage
3. Understand societal benefits and ecological functions of wetlands.
 - Functions and Values of Wetlands
4. Understand the functions and values of riparian zones and be able to identify riparian zone areas.
 - Riparian Zones
 - Riparian Area Management

Key Point 4—Water Protection and Conservation

Learning Objectives:

1. Understand how education programs and enforcement agencies are working together to protect aquatic habitats and preventing those who use our waterways from inadvertently transporting Aquatic Nuisance Species ANS from one river to another.
 - ANS Task Force
 - Fisheries and ocean Canada – Aquatic Animal Health
 - Ocean Programs
2. Interpret major provincial and /or federal laws and methods used to protect water quality (i.e. surface and ground water). Utilize this information to propose management decisions that would improve the quality of water in a given situation.
 - Federal Water Policy
 - Federal Policy and Legislation
3. Be familiar with the Federal, Provincial and state agencies that provide oversight of water resources, and understand that Geographic Information Systems (GIS) is a useful and important tool in the management of water resources.
 - Canada Water Legislation FAQs
 - Integrated Watershed Management
 - Federal Policy and Legislation
 - GIS and hydrology
4. Identify global and local sources of point and non-point source pollution and be able to discuss methods to reduce point and non-point source pollution.
 - Groundwater Contamination - Point and Nonpoint

5. Understand the interaction of competing uses of water for water supply, hydropower, navigation, wildlife, recreation, waste assimilation, irrigation, and industry.
 - Water use
 - Water Issues and Energy
 - Interaction of competing uses of water

6. Know the meaning of water conservation, and understand why it is important every time you turn on a faucet.
 - Canada's Water Crisis
 - Wise Water Use

Other Resources:

Watersheds

Pollution Sources: Point and Nonpoint

Water Availability Indicator

The Flow of Energy

Groundwater

New Brunswick Protection

Wetlands Policy

<http://www.nbeia.nb.ca/pdf/Wetlands%20Classification,%20Identification%20&%20Regulatory%20Context.pdf>

<http://www.dnr.state.md.us/education/envirothon/aquatics.html>

<http://www.ec.gc.ca/eau-water/default.asp?lang=En&n=27147C37-1>

<http://www.nbeia.nb.ca/pdf/Wetland%20Legislation%20in%20New%20Brunswick.pdf>