WOODLOT MANAGEMENT HOME STUDY

- a Brief Introduction to -
WOODLOT ECOLOGY

Ecology

The word ecology comes from a Greek word meaning a house or place to live. Today it means the study of living things and their relationship to each other and their environment, home, or community.

Ecologically speaking, your woodlot is a complex association of plants and animals known as an ecosystem. An ecosystem is a community of plants and animals which interact through a series of cycles and processes on a particular site. Non-living factors such as the air and soil are also an important part of any ecosystem.

Why is it important to understand Ecology?

It's important to understand woodlot ecology because our actions influence the way a forest ecosystem works and changes. If we understand natural systems, we can act in ways which will help our woodlots stay healthy.

Above all, it is important to understand that people are a part of the forest ecosystem and depend on it for survival.

The Nova Scotia Woodlot: Climate, Soil, and History

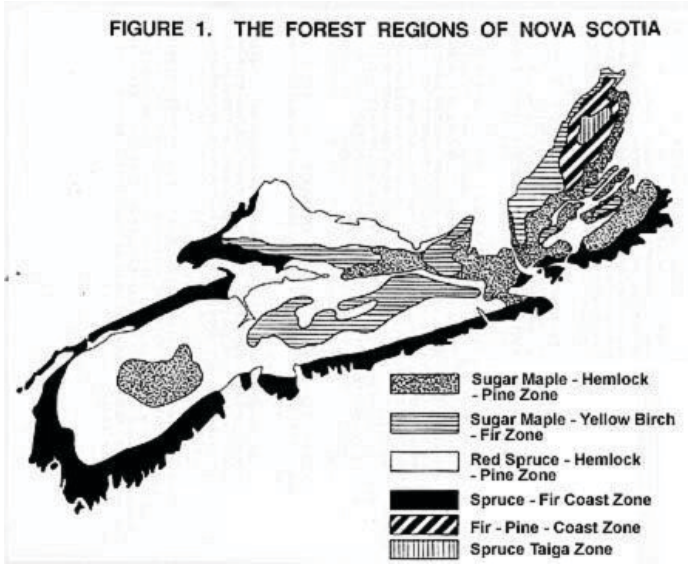
The Acadian Forest

The Acadian Forest covers about 80 percent of the land area in Nova Scotia. This forest is a transition zone between the northern coniferous forest that contains softwoods such as fir, hemlock, spruce, and pine, and the southern deciduous forest that contains hardwoods such as maple, oak, popular, and birch.

Much of the forested land in Nova Scotia is mixed, containing both hardwood and softwood. However, there are many areas that are purely softwood and hardwood.

It is difficult to characterize a "typical" woodlot in Nova Scotia since the province has six distinct forest regions. These regions range from the *red spruce-hemlock-pine zone* of the Annapolis Valley to the *sugar maple-yellow birch-fir areas* of Cape Breton.

FIGURE 1. THE FOREST REGIONS OF NOVA SCOTIA



Climate

Generally, our climate has ample precipitation, a wide but not extreme temperature range, and a late and short summer. Our varied climate can change dramatically from day to day and from one place to another. Anyone who has traveled across the province knows how diverse our climate is.

How close your land lies to the coast affects the humidity and temperature of your woodlot. Climate also changes with elevation. Within your own woodlot there may be land forms and weather patterns that create climatic differences.

Climate is responsible for the following essentials of life on your woodlot:

- Light and gases in the air needed to produce green plants.
- Heat to warm the soil and air so plants can grow.
- Air movement to create wind to spread pollen and seed.
- Precipitation to supply water.

Light

Energy in the form of sunlight is required by all living things. Solar energy from the sun is the main fuel of the woodland community.

Without solar energy, plants could not manufacture food. The amount of energy produced is impressive. Just 2.5 hectares (1 acre) of beech maple forest can use as much solar energy in one year as the amount of electricity needed to supply an average home for 50 years. Therefore, one of the most important aspects of a climate is the amount of light, or solar radiation received by the woodlot.

Light also acts as a signal to inhabitants of the woodlot. The shortening days of summer trigger a chemical reaction in the trees that slows down the growing process. In the same way, the lessening of light in the fall will signal birds to migrate south or snowshoe hare (rabbits) to turn white.

Temperature

Forests are important moderators of temperature. The earth absorbs heat during the day. Although the sun is the source of the heat, heat reflection and radiation play an important role in how cold or hot the temperature is.

During the day, the sun shines on the forest. The canopy acts as an umbrella and much of the heat is reflected off its top. Although some light filters down, the forest floor stays cooler than its top. During the night the forest floor slowly releases and radiates the stored heat. The canopy now acts as an insulator to keep in this radiating heat. If forests are not present, more heat stays on the ground, creating higher temperatures. The temperature range found in your woodlot determines what kinds of plants and animals live there.

Wind

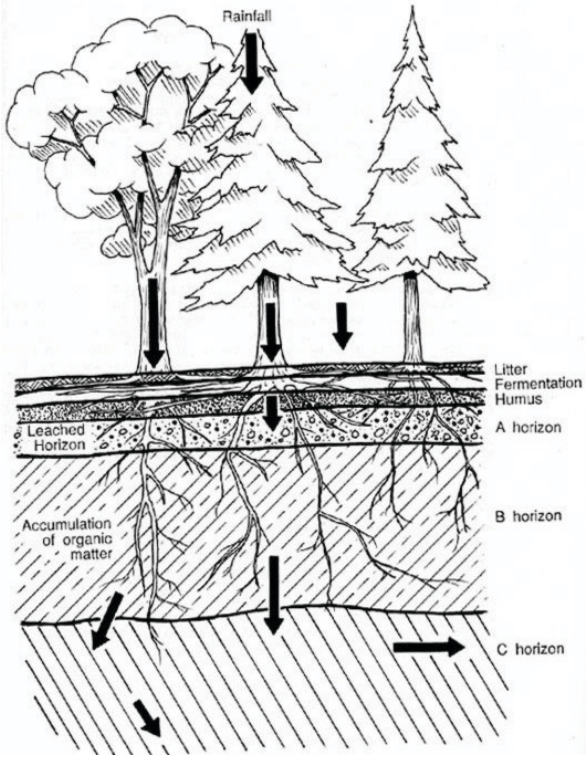
Wind or air movement plays a key role in the natural cycles in a woodlot. The following are some important functions of wind:

- It is a necessary component of the water cycle. It controls how much moisture evaporates from plants, transports water vapour from lakes and oceans to land, and moves around rain and snow.
- It moves atmospheric gases like carbon dioxide which makes the production of green plants possible; circulates hot and cold air which create weather patterns; and disperses pollutants in the air.
- It is a transportation system for pollen and seeds, as well as small animals like insects and spiders.
- It influences the size and shape of trees by constantly blowing from one direction, causing sways or leans.

Soil

Soil is an essential part of the earth's surface because it stores the nutrients, minerals, and water necessary for plant and animal survival.

FIGURE 2. SOIL LAYERS



History of Nova Scotia Woodlots

Forests in Nova Scotia have been changing since they began. Some of these are natural changes caused by wind, insects, diseases, fire, and lightning. Other changes were caused by people as they cleared land for agriculture and harvested trees for various other purposes.

Briefly

The influence of climate, water, and soil interact to determine what plants and animals will survive on a specific forest site. Each forest site is also a product of its past history and use. These elements shape the development of your woodlot and the distribution of what lives there. When analyzing a woodlot ecosystem, all these factors must be considered.

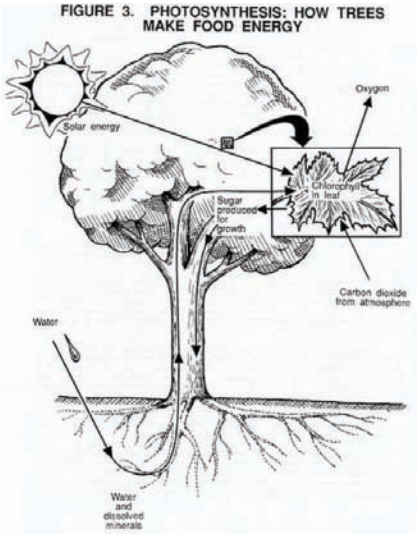
Energy Flow

Photosynthesis

Solar energy in the form of sunlight is constantly bombarding the earth. Through a chemical process called photosynthesis. Plants are able to use this energy to produce food, water, and oxygen. The food formed in this process provides the basis for all life on earth.

Photosynthesis is one of the most basic chemical reactions and also one of the most important to understand.

FIGURE 3. PHOTOSYNTHESIS: HOW TREES MAKE FOOD ENERGY



The Food Web and Important Cycles

The energy produced in photosynthesis flows through the woodlot in the food web. Food and water are constantly moving through your woodlot system to keep it functioning.

There are various cycles including water, nutrient, carbon and nitrogen cycles and, each cycle can be highly dependent on another cycle in order to work. The water cycle and the carbon cycle, for example, make photosynthesis possible which provides energy to the entire woodlot system as indicated above.

Understanding the fundamental functions of your woodlot not only helps you appreciate the interconnections in the woodlot community, it also illustrates the basic ingredients which are required for life and growth. These cycles keep the woodlot community growing.

It is of paramount importance to understand that both plant and animal life are influenced by climate, soil fertility, and the history of disturbance in your woodlot. In turn, the structure and population of species on your woodlot is determined by the dominant plants that grow there.

The interactions of any community are linked primarily by food and losing even one link in the food chain can upset the entire order of an ecosystem.

Glossary

Carbon Cycle - One of the essential nutrient cycles. Carbon dioxide is taken from the atmosphere to make food energy and then stored in trees or decayed plant and animal tissue.

Climate - Light, temperature, wind, lightning, carbon dioxide, and precipitation combined.

Ecology - The study of living things and their relationship to their environment, home, or community.

Ecosystem - A dynamic set of living organisms (plants, animals and micro-organisms) all

interacting among themselves and with the environment in which they live (soil, climate, water, and light).

Nitrogen Cycle - The movement of one of the necessary nutrients in the forest ecosystem. Nitrogen mainly comes from the atmosphere and is “fixed” into a usable form by plants, fungi, and bacteria.

Photosynthesis - The process by which the sun’s energy is used by plants to create sugar, oxygen, and water.

Water Cycle - The way water is moved through the ecosystem.

For More Information

Please refer to the full length version of, **Home Study Module 7: Woodlot Ecology.** This module, along with others in the Home Study series, are available free from:

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