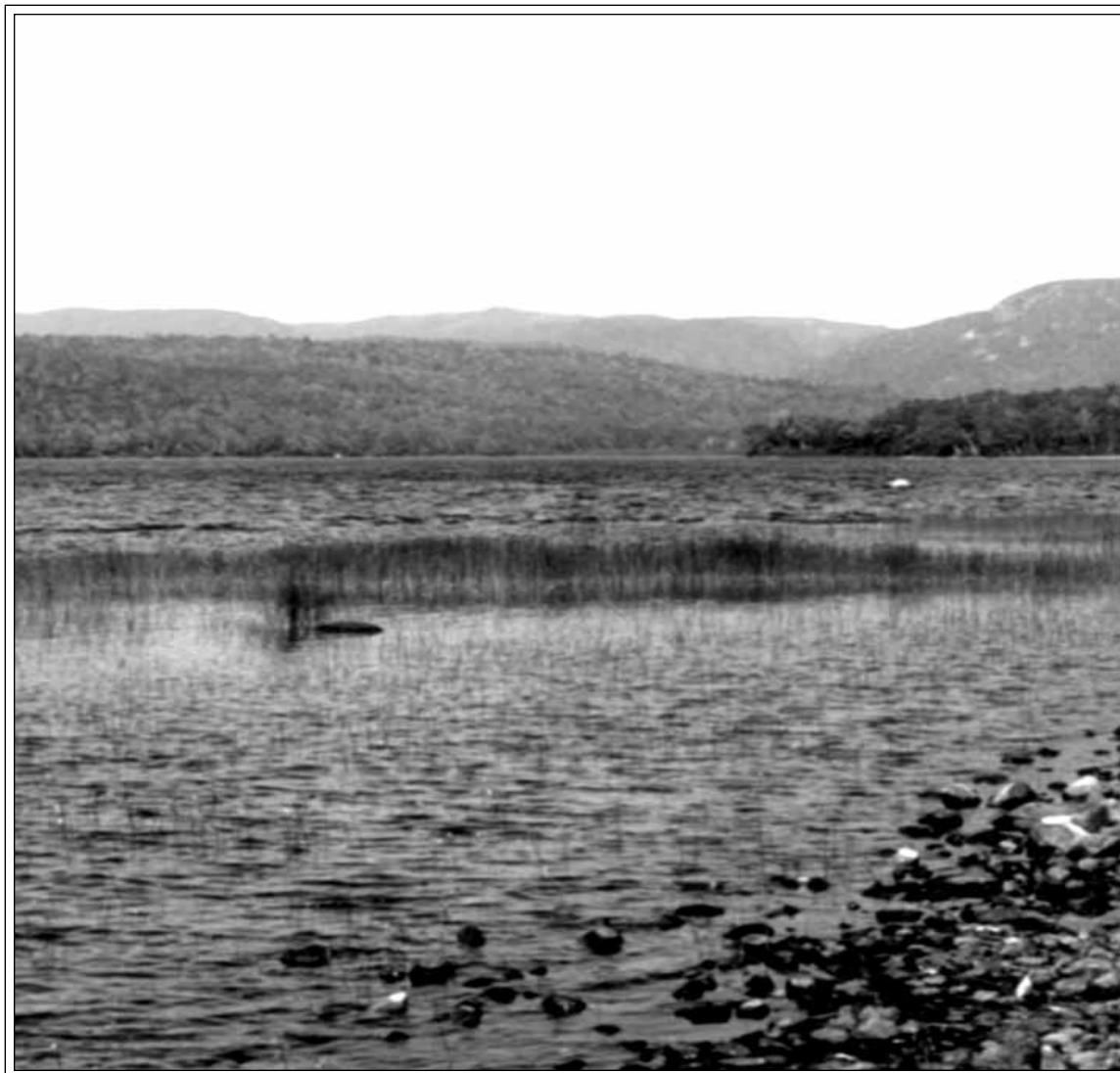


H3.4 BOTTOM LENTIC (LAKES AND PONDS)

The bottom habitat of lentic environments (lakes and ponds) is the depositional environment in the benthic zone (see Figure T7.2.2). The benthic zone is the area where decomposition takes place. It is associated with abundant biological activity and very little oxygen.

The dominant organisms are anaerobic bacteria.

Closely associated with the benthic zone is the profundal zone, which lies directly above the benthic zone but beneath the depth of light penetration (see H3.3).



H3.4
Bottom Lentic
(Lakes and
Ponds)

Plate H3.4.1: Warren Lake in Victoria County, Cape Breton County (sub-Unit 552b). The steep-sided lake levels off at 31m and provides a high proportion of bottom habitat compared to edge habitat. Photo: D. Davis

FORMATION

The formation of the bottom habitat in lentic environments is closely associated with the origin of the lake or pond (see H3.2). Most lakes and pond bottoms in Nova Scotia are covered with "lake-bottom muck" (i.e., silt, clay or organic matter).

PHYSICAL ASPECTS

1. *Bedrock*: may occur in all bedrock types, as well as in alluvial or glacial deposits.
2. *Soil*: deposition of silt, clay, etc.
3. *Relief*: depressional topography
4. *Drainage*: ponds and shallow lakes exhibit seasonal fluctuation of water levels.

ECOSYSTEM

Although the abundance of life in the lentic bottom zone is not great, it is still significant. Organisms living there have adapted to the conditions of soft mud and low oxygen levels. During the summer, a thermocline often develops in eutrophic lakes, causing the bottom waters to become anerobic. However, in deep oligotrophic lakes, where productivity is low, the supply of oxygen is not depleted by decomposers. Under these conditions, the profundal zone can support life, particularly fish, some plankton and certain cladocerans, which live in the bottom ooze.¹

SUCCESSIONAL SEQUENCE

Succession relates to the deposition of sediments and organic material. As the deposits accumulate, the water level becomes more shallow and the zone of light penetration (limnetic) increases. The nutrient supply in the bottom becomes available for primary production, and plants begin to take root. The benthic zone is thus replaced by an extension of the littoral zone. The character of the water column also changes.

PLANTS

No vegetation is associated with this habitat, since it lies beyond the depth of light penetration.

ANIMALS

The benthic community of this habitat, including the microscopic or meiofauna, have become adapted to conditions of soft mud and low oxygen.

The primary constituents are in three groups:

1. bloodworms, including chironomid larvae (midges) and annelids (worms)
2. small clams of the family Sphaeriidae
3. *Chaoborus* or "phantom midges"

Many species of crustaceans, rotifers, nematodes, beetle larvae and protozoans may also be present. These organisms are significant, as they consume organic matter and provide food for other bottom-dwelling animals (see Topic T11.16). Fish species, such as Lake Whitefish and Brown Bullheads, are found in oligotrophic lakes with sufficient oxygen. The bottoms of ponds are important habitats for the larvae of amphibians such as salamanders and frogs (tadpoles).

SPECIAL FEATURES

- Chironomid larvae (midges) have adapted to many benthic habitats that have low concentrations of oxygen. The bright-red-coloured larvae have a pigment which binds to oxygen and enables the storage of oxygen in this type of habitat. Their abundance may be an indicator of poor water quality.

DISTRIBUTION

Deep-water lakes are found throughout Nova Scotia; however, they are more abundant on the hard, igneous and metamorphic bedrocks of the Atlantic Interior (Region 400).



Associated Topics

T8.1 Freshwater Hydrology, T8.2 Freshwater Environments, T9.1 Soil-forming Factors, T11.13 Freshwater Fishes, T11.16 Land and Freshwater Invertebrates

Associated Habitats

H3.2 Open-water Lentic (Lakes and Ponds), H3.6 Water's Edge Lentic (Lakes and Ponds)

References

- 1 Smith, R.H. (1990) *Ecology and Field Biology*. Harper and Row, New York.