

H5.5 CAVE

Caves are openings in bedrock caused by solution or erosion by percolating water, flowing water, or wave action. To some extent, abandoned mine shafts and tunnels also function as cave habitat.

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Plate H5.5.1: Hayes Cave, South Maitland, Hants County (sub-Unit 511a). The water levels in the pools vary with rainfall. Photo: R. Merrick

FORMATION

Carbonic acid in solution in rainwater dissolves calcareous rocks, and over long periods of time, percolating water will cause the formation of cavities along paths of weakness in the rock. As these cavities increase in size, the erosional effect of flowing water becomes more important, and eventually a cave will be formed. Sinkholes at the surface above the cave are part of the system and, with streams, are the main routes by which water, soil and organic material enter the cave (Figure H5.5.1).¹

Shallow caves in sea cliffs, caused by marine erosion alone, are never deep enough in Nova Scotia to provide a true cave habitat.

PHYSICAL ASPECTS

1. *Bedrock*: usually a calcareous sedimentary rock, particularly gypsum or limestone.
2. *Soils*: mixed clay and rubble, with variable amounts of humus, stratified when deposited by water.
3. *Relief*: variable; rough due to roof falls.
4. *Drainage*: water percolating through the cave roof, often accumulating in pools during wet seasons.
5. *Environmental conditions*: water has high pH (7.8 at Hayes Cave in Unit 511); air has 100 per cent relative humidity and usually constant temperature, 5°C to 9°C.

ECOSYSTEM

Because little or no light enters, there is no primary production in the cave habitat. The consumer organisms that are found depend upon organic material flushed in by water or brought in by mammals such as bats and porcupines.

SUCCESSIONAL SEQUENCE

Small cavities that develop into passages and caves eventually open up to the land surface. This allows for entry of soil, organic material and animals. With further solution and erosion, the cave system will eventually collapse, and the habitat will be destroyed.

PLANTS

The lack of light prohibits the growth of green plants. Fungi are usually present on the soil and on decaying organic material (e.g., animal droppings).

ANIMALS

Soil animals enter the cave accidentally and may establish populations similar to those that exist outside of the cave system. So far, no distinct cave soil fauna has been detected in Nova Scotia. Beetles and springtails are common. Dragonfly nymphs have been observed in cave pools.

Fish are occasionally seen in pools. At Hayes Cave, the Threespine Stickleback and an unidentified species of dace (*Chrosomus* spp.) have been recorded. The dace are slightly different from those seen in other habitats and are presumed to be an accidental occurrence. They have lost their pigmentation, due to low light levels and water temperatures.

Mammals recorded include bats and porcupines. The porcupines may be common at times, and their droppings contribute organic matter to the ecosystem. Bats use caves for hibernation during the winter, taking advantage of the constant temperature and humidity conditions. At Hayes Cave, the Little Brown Bat is the most common, but Keen's Bat and Eastern Pipistrelle also occur. The bats are in the cave from

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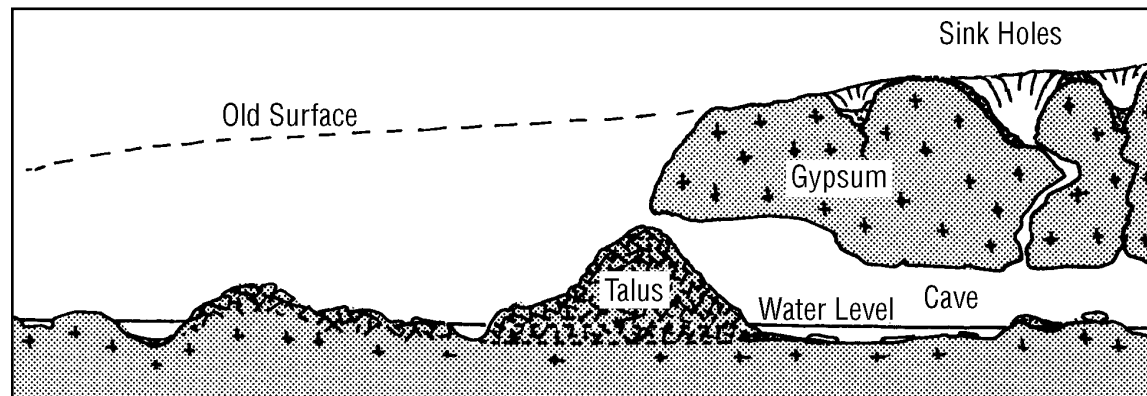


Figure H5.5.1: The main features of a cave system and karst topography in gypsum. Based upon information from South Maitland, Hants County (sub-Unit 511a). Not drawn to scale.

early September until the following June. Winter counts have indicated up to 6000 present throughout the winter.

SPECIAL FEATURES

- The karst topography of sinkholes and cliffs in gypsum areas that indicates the presence of caves (see Figure H5.5.2).
- The special environmental conditions: low light, alkaline water, high humidity and constant temperature.
- Hibernating bat populations. Survival of the bats depends upon maintenance of the correct environmental conditions and prevention of disturbance.

DISTRIBUTION IN NOVA SCOTIA

Caves may occur in any limestone or gypsum area. The best-known examples are in the gypsum formations of Hants County and Victoria County (Districts 510, 520, 540 and 560). It is believed that there are many other small cave systems, particularly in Cape Breton Island. Abandoned mine workings in Cape Breton (Districts 540 and 550) and in the gold districts of the Meguma Group (Districts 410, 420 and 430) can also provide cave habitats, especially for hibernating bats.

Associated Topics

T2.4 The Carboniferous Basin, T3.1 Development of the Ancient Landscape, T3.2 Ancient Drainage Patterns, T3.3 Glaciation, Deglaciation and Sea-level Changes, T3.4 Terrestrial Glacial Deposits and Landscape Features, T10.10 Fungi, T11.8 Land Mammals, T11.11 Small Mammals, T12.3 Geology and Resources

Associated Habitats

H3.6 Water's Edge Lentic (Lakes and Ponds), H5.3 Cliff and Bank

Reference

- 1 Morris L., ed. (1985) *The Hayes Cave Site*, South Maitland, Nova Scotia. Nova Scotia Museum, Halifax. (*Curatorial Report*, No. 50).

Additional Reading

- Gilhen, J. and F. Scott (1981) *Distributions, Habitats and Vulnerability of Amphibians, Reptiles, and Small Native Mammals in Nova Scotia*. Nova Scotia Museum, Halifax. (*Curatorial Report*, No. 45).
- Scott, F. (1979) *Preliminary Investigations at Hayes Cave, Hants Co., Nova Scotia in 1978*. Nova Scotia Museum, Halifax. (*Curatorial Report*, No. 38).

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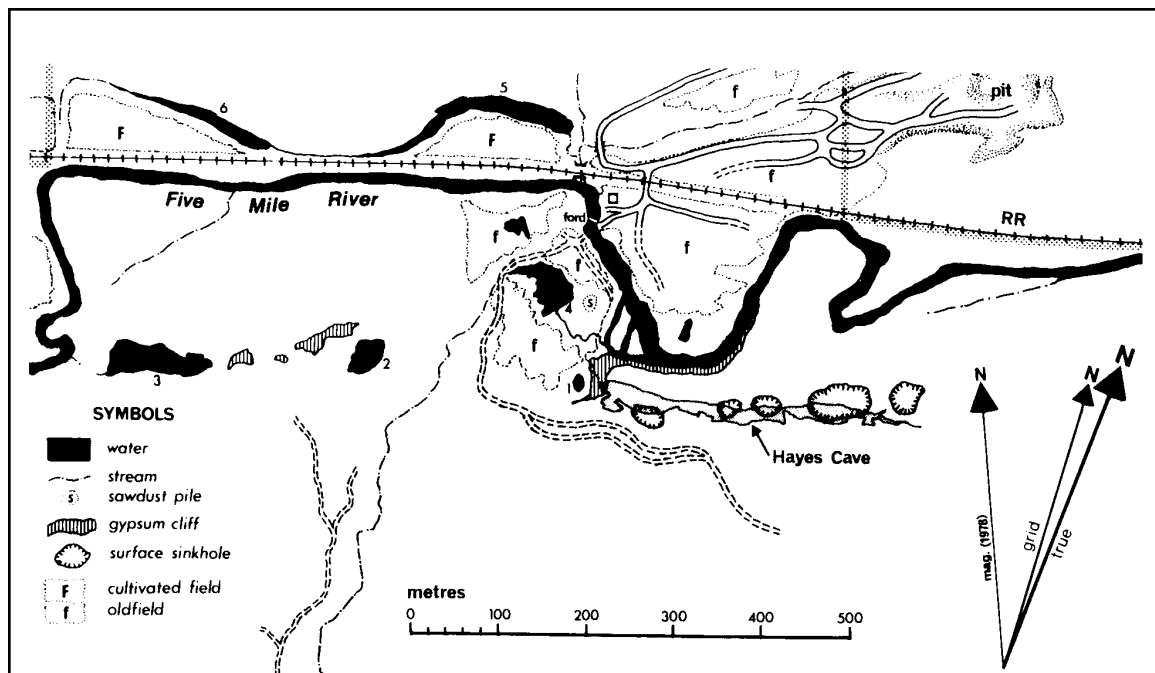


Figure H5.5.2: The location of the cave system at South Maitland, showing the relationship between the cave and karst topography.