

H5.3 CLIFF AND BANK

Cliff and bank habitats are very steep to vertical faces of bedrock outcroppings and occur inland, as well as along the coast.

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Plate H5.3.1: Basalt cliffs at Cape Split, Kings County (District 720). Headland vegetation includes a coastal spruce forest (H6.2), and the cliff itself is habitat to arctic-alpine species, such as *Sedum rosea*, and to several species of lichen. Photo: A. Wilson.

FORMATION

Cliff and bank habitats have three probable origins: geological faulting and folding, rejuvenation of rivers associated with earlier lower sea levels and coastal erosion associated with modern rising sea level. The result is an elevated bare precipitous mass of rock outcropping.

PHYSICAL ASPECTS

1. *Bedrock*: variable.
2. *Soils*: bedrock outcrops with crevices filled with soil.
3. *Relief*: steep hilly or mountainous topography.
4. *Drainage*: north-facing cliff generally moist to dripping wet, while south-facing cliff tends to be dry. Conditions occurring on east- and west-facing cliffs dependent on local climatic conditions.
5. *Salt spray*: on sea cliffs in exposed situations.

ECOSYSTEM

This bare habitat is probably one of the most severe types to be colonized by plants. For a long time, only crustose lichens will persist, with herbs and very few tree species eventually colonizing the crevices. Generally speaking, these cliffs are too rocky and steep to support a forest stand.

SUCCESSIONAL SEQUENCE

As best as can be determined, the lichen-bryophyte-fern community constitutes the climax vegetation on the cliff habitat. The nature of the habitat would have to be radically altered through geological processes in order to produce a more elaborate successional sequence than the present plant community.

PLANTS

There are varying gradations between hydric (wet) and xeric (dry) cliffs, and a typical assemblage of plants associated with both extremes. This common community is comprised of the bryophytes and lichens, which thrive in crevices and frequently blanket even precipitous rock surfaces. The crustose lichens include *Lecanora* spp., *Lecidia* spp., *Buellia* spp. and *Rhizocarpon* spp.

Foliose lichens, such as *Parmelia* spp. and *Gyrophora* spp., and fruticose lichens, such as *Cladonia* spp. and *Stereocaulon* spp., are usually

present. Many mosses and liverworts are frequent in this habitat; for example, *Bartramia pomiformis*, *Hedwigia ciliata*, *Radula complanata*, *Porella platyphylloides*, *Plagiochila asplenioides* and *Plagiopus oederiana*. Certain ferns are also characteristic: Rock Polypody, Common Bladder Fern and Rusty Woodsia. Fir Clubmoss is also typical of this habitat. Hair-grass and Harebell are frequent herbaceous species. This habitat may also harbour many of the rarer arctic-alpine plants.

ANIMALS

The lack of soil in rock crevices tends to limit and specialize the invertebrate fauna. The following may be found: Collembola (springtails), Bagworm Moths whose larvae feed on lichens, and predatory beetles which eat small insects. Some hardy species, such as the slug *Deroceras laeve*, may occur as incidentals.

The most conspicuous species on sea cliffs are seabirds, and this habitat is important for nesting of gulls, alcids and cormorants. Bank Swallows nest in cliffs of unconsolidated material.

SPECIAL FEATURES

- Lichens and bryophytes have several significant ecological adaptations which permit them to be the first colonizers of rock surfaces. Not only can these nonvascular plants exist without soil as a growing medium but they can also tolerate desiccation for an extended period to the point of becoming brittle.
- Lichens have the unique distinction of being able to disintegrate rock surfaces chemically by secreting corrosive carbonic acid.
- Arctic-alpine vegetation.
- A special kind of cliff in Nova Scotia is the unconsolidated bank found on seaward-facing, eroding drumlins. Bank Swallows and Kingfishers favour this habitat for nesting. This habitat is common along the coast of the Minas Basin (Region 700).
- Quarry sites have cliffs which, given the right conditions (e.g., the right substrate and available species), can function as a natural cliff ecosystem. A gypsum quarry could regenerate naturally, developing the same type of vegetation as a gypsum cliff. A quartzite quarry could be colonized in the same manner as any other bare rock with lichens. Artificial cliffs do not usually have crevices where humus can accumulate, and regeneration is

very slow. Another difference is that quarry sites are generally associated with ponds, while natural cliff habitats are associated with flowing fresh or salt water.

DISTRIBUTION IN NOVA SCOTIA

Coastal cliffs are found in sections of the Cobequid Mountains, Pictou–Antigonish highlands and Mabou highlands (District 310); the cliffs, often in basalt, of Region 700; the old hard rocks of District 210; and the soft sandstones of Regions 500 and 600. Inland cliffs are found in ravines, often on fault lines and near waterfalls, especially in District 220, and in Regions 300 and 700.



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Associated Topics

T2 Geology, T4.2 Post-glacial Colonization by Plants, T7.3 Coastal Landforms, T8.1 Freshwater Hydrology, T8.2 Freshwater Environments, T8.3 Freshwater Wetlands, T10.7 Pteridophytes (Ferns and their Allies), T10.8 Bryophytes (Mosses, Liverworts and Hornworts), T10.11 Lichens, T10.12 Rare and Endangered Plants, T11.7 Seabirds and Other Birds of Coastal Wetlands, T12.3 Geology and Resources

Associated Habitats

H1.1 Open Water, H3.1 Open-water Lotic (Rivers and Streams), H3.5 Water's Edge Lotic (Rivers and Streams), H3.6 Water's Edge Lentic (Lakes and Ponds), H5.4 Talus Slope, H5.5 Cave

Additional Reading

- Conrad, H.S. (1979) *How to Know the Mosses and Liverworts*. (Revised by P.L. Redfearn, Jr.). William C. Brown Co., Dubuque, Iowa.
- Daubenmire, R. (1968) *Plant Communities: A Textbook of Plant Synecology*. Harper and Row, New York.
- Hale, M.A. (1979) *How to Know the Lichens*. William C. Brown Co., Dubuque, Iowa.
- Nichols, G.E. (1918) Vegetation of northern Cape Breton. *Trans. Conn. Acad. of Arts Sci.* 22.
- Roland, A.E. and E.C. Smith (1969) "The Flora of Nova Scotia". *Proc. N. S. Inst. Sci.* 26.