T7.2 COASTAL ENVIRONMENTS

Like terrestrial and freshwater environments, the coastal environment may be subdivided using biophysical classifications that provide a hierarchical categorization. Coastal landforms (see T7.3) are the smallest of these divisions and have not been systematically identified in Nova Scotia. Regional divisions are distinct and widely recognized as follows:

1. Atlantic Coast: exposed, high wave energy
2. Bay of Fundy: large tidal range, semi-enclosed, more sheltered to wave exposure
3. Southern Gulf of St. Lawrence: micro-tidal, seasonally wave dominated, winter sea ice
4. Sable Island: open shelf environments, exposed high wave energy

Coastal environments have been further subdivided by Owens and Bowen.[1] The following subdivisions are made on the basis of geomorphic and process characteristics :

1. Atlantic Coast
- Northeast Cape Breton Island (Districts 550 and 210)
- East Cape Breton Island (District 530)
- Southeast Cape Breton Island (District 870)
- North Chedabucto Bay (District 860)
- South Chedabucto Bay (District 850 in part)
- Eastern Shore (Districts 830, 840 and 850 in part)
- Western Shore (District 820)

2. Bay of Fundy
- South Shore (District 720)
- Head of the Bay (District 710 in part)
- Minas Basin (District 620)
- Chignecto Bay (Units 532 and 523)

3. Southern Gulf of St. Lawrence
- Northumberland Strait (District 520 in part)
- Antigonish-West Cape Breton Island (Districts 550, 220, 310 and 580)
- St. Georges Bay (District 520 in part)

4. Sable Island (District 890)

Tables T7.2.1–T7.2.3 identify the main characteristics of the first three subdivisions. This approach most closely approximates the land-district level of biophysical classification, characterised by a "distinctive pattern of relief in geology, geomorphology and associated regional vegetation".[1]

SUBDIVISION	GEOLOGICAL CHARACTER	BACKSHORE RELIEF	BEACH CHARACTER	FETCH AND WAVE EXPOSURE	MEAN TIDAL RANGE	SEDIMENT AVAILABILITY
Northeastern Cape Breton Island	Resistant metamorphic and igneous rocks; thin till cover	Upland cliffed coast (5–100 m)	Absent or narrow; coarse sediments	Exposed open ocean coast; ice-free 8 to 9 months	1 m	Very scarce
Eastern Cape Breton Island	Carboniferous sandstone or shale; thin till cover	Rocky cliffs (5–20 m)	Occasional spits and barriers	Exposed ›500 km; ice-free 8 to 9 months	1 m	Scarce
Southeastern Cape Breton Island	Carboniferous sedimentary and metasedimentary rocks; thick till and drumlins	Low rock and till cliffs (10–20 m)	Barrier beaches	Exposed open ocean coast; ice in sheltered areas up to 3 months	1 m	Scarce, but locally abundant
Northern Chedabucto Bay	Carboniferous sedimentary rocks, some resistant volcanics, abundant till	Low rock and till cliffs up 20 m	Spits and barrier; coarse sediments	Exposed in northeast; elsewhere sheltered (›50 km) ice-free 8 to 9 months	1.5 m	Abundant
Southern Chedabucto Bay	Resistant metasedimentary and igneous rocks; fault-line coast; very thin till	Rocky cliffs (3–10 m)	Absent or narrow; coarse sediments	Sheltered (50 km) ice-free 8 to 9 months	1.5 m	Very scarce
Eastern Shore	Resistant metasedimentary and granitic rocks; variable-thickness tills and drumlins	Indented low rocky coast, some eroded drumlins (30 m)	Absent or barriers or pocket beaches in re-entrants; coarse	Exposed open ocean coast, embayments sheltered; ice in sheltered areas 2 to 3 months	1 to 2 m	Very scarce
Western Shore	Resistant sedimentary and metamorphic rocks; thin till deposits	Till or rock cliffs (3–30 m)	Narrow or coarse-sediment barriers	Variable locally very exposed; local ice up to 2 months	4 m	Scarce, but locally abundant

Table T7.2.1: Coastal environments of the Atlantic Coast of Nova Scotia.

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SUBDIVISION	GEOLOGICAL CHARACTER	BACKSHORE RELIEF	BEACH CHARACTER	FETCH AND WAVE EXPOSURE	MEAN TIDAL RANGE	SEDIMENT AVAILABILITY
South Shore	Resistant Triassic basalt dyke; parallels coast	Low rocky coast or cliffs, up to 30 m	Absent or narrow cobble beach at high-water mark, with wide intertidal platform	Sheltered (50 km)	6 to 10 m	Very scarce
Head of the Bay	Resistant conglomerates, basalts or granites	Cliffed coast, up to 200 m	Absent or large pocket beaches, pebble/cobble on beachface and mud overlying coarse sediment in intertidal zone	Exposed (50-100 km)	10 m	Scarce, but locally abundant
Minas Basin	Triassic sandstone and shales, or unconsolidated glacial deposits	Cliffs, up to 30 m	Wide, intertidal mud or sand flats on rock platform, pebble-cobble beach at high-water mark, marshes in sheltered areas	Very sheltered (‹50 km)	›10 m	Abundant
Chignecto Bay	Permo-Carboniferous sandstone and shale	Cliffs, up to 20 m	Wide, intertidal mud flats on rock platform, pebble/cobble beach at high-water mark, extensive marshes in sheltered areas	Very sheltered (‹50 km)	›10 m	Abundant

Table T7.2.2: Coastal environments of the Bay of Fundy, Nova Scotia.

SUBDIVISION	GEOLOGICAL CHARACTER	BACKSHORE RELIEF	BEACH CHARACTER	FETCH AND WAVE EXPOSURE	MEAN TIDAL RANGE	SEDIMENT AVAILABILITY
Northumberland Strait	Sandstone and shale	Unresistant low relief; till, rock cliffs (3–10 m)	Barriers, spits and intertidal bars; mixed or fine-grained sediments	Very sheltered (<50 km) ice-free 7 to 8 months	1 to 2 m	Scarce
Antigonish	Deformed sedimentary, metasedimentary and igneous rocks	Resistant rocky upland cliffed coast (5–100 m)	Absent, or narrow gravel-boulder beaches	Very exposed (>300 km) ice-free 7 to 8 months	‹1 m	Very scarce
St. Georges Bay	Metasedimentary and sedimentary rocks	Low relief; till, rock cliffs (2–10 m)	Narrow, or spits and barriers; mixed sand-gravel beaches	Sheltered (50 km) ice-free 7 to 8 months	1 m	Scarce, but locally abundant

Table T7.2.3: Coastal environments of the Southern Gulf of St. Lawrence, Nova Scotia.

The Atlantic Coast of mainland Nova Scotia has been further subdivided by Munroe.[2] He identified twelve morpho-dynamic units. One distinctive unit included the large salt marshes of Lobster Bay, Little River and Cheboque harbours along southwest Nova Scotia (in Unit 831). In these long, shallow estuaries, large tides penetrate the gently sloping valleys of rivers such as the Tusket, Annis, Chebogue and Argyle. Drowned drumlins and rock outcrops dot the outer parts of these bays. Another distinctive area is the Baymouth barrier-beach system east of Halifax Harbour to Owl's Head (west of Ship Harbour, Unit 833). Drumlins in this area provide an important anchor for the barriers, as well as an important source of sediment for beach formation.

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Associated Topics

T2 Geology, T6.2 Oceanic Environments, T6.3 Coastal Aquatic Environments, T6.4 Estuaries, T7.1 Modifying Forces, T7.3 Coastal Landforms

References

1 Owens, E.H., and A.J. Bowen (1977) "Coastal environments of the Maritime Provinces." *Maritime Sediments* 13.

2 Munroe, H.D. (1982) Regional Variability, Physical Shoreline Types and Morphodynamic Units of the Atlantic Coast of Mainland Nova Scotia, edited by R.B. Taylor, D.J.W. Piper and C.F.M. Lewis. Geological Survey of Canada. (*Open File* 725).

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