# T12.7 THE COAST AND RESOURCES

Nova Scotia's coastlines are constantly shifting in a dynamic process of erosion and deposition called shoreline migration (see T7.1). The rates of change vary considerably, depending on exposure to wind and wave action, the presence of glacial deposits, the types of substrate and exposed bedrock, vegetation cover and the flow of water through the landscape on a seasonal basis. In addition to these natural processes, people have created their own dynamics and rates of change to coastal environments (see T7.2) and habitats (see H2).

Historical and cultural development in Nova Scotia is dominated by links to the sea, causing the majority of the population to be concentrated along the coastlines.[1] In addition, the coastlines offer a wide variety of natural and scenic resources. Exploitation of these resources can be in conflict with natural coastal processes and put pressure on these ecosystems. Most negative impacts result from a lack of understanding of coastal processes and the delicate balance of coastal ecosystems due to the effects of extreme climatic conditions.

## HISTORICAL CONTEXT

### *Pre-European Contact*

Sea-level fluctuations (see T3.3) and eroding coastlines have obscured most archaeological evidence that people inhabited Nova Scotia's coastlines prior to 3,000 years ago. Post-glacial climate changes (see T4.1) suggest that resources were different from those here today. Large middens dating between 2,000 and 3,000 years ago suggest that people during this period lived along the coast where shellfish could be exploited.

Early Mi'kmaq people chose campsites along the coast, based on the availability of fresh spring water and firewood and a place to beach canoes. They chose places with escape routes in case of attack, such as peninsulas or islands, and high ground, where they could keep a lookout for enemies and for food species, such as porpoise. Clear coastal water was preferred to the turbulence and mud of the inner Bay of Fundy, and streams running into the ocean needed to be small enough to accommodate a fishing weir.

**Plate T12.7.1:** Dykeland at Grand Pré, Kings Co. (District 610), formed by the dyking and draining of tidal marsh. An upland field in the foreground leads to Grand Pré National Historic Site, commemorating Acadian heritage. Minas Basin and Blomidon (Unit 720) are seen in the distance. Photo: A. Wilson.

In the summer, they chose areas with a stiff breeze, to keep blackflies away. During the rest of the year, shelter from the wind was important. In winter, hibernating eels were fished under the ice in estuaries.

***European Settlement***

The first Europeans to settle permanently in Nova Scotia dyked the extensive tidal marshes along the Bay of Fundy coastline. The Acadians created the first dykelands at Port Royal (Unit 610) in the 1630s. They dyked the upper marsh (see H2.5) first, developing a few hectares at a time and gradually extending the agricultural land toward the outer edge of the marsh.[2] When all available marsh had been dyked along the Annapolis estuary, settlement spread around the Bay of Fundy to areas where dykeland production could occur. The Acadians did not generally clear upland areas along the coast, as their basic needs were met through dyking the tidal marshes.

Dyking modified the natural marsh production and converted the tidal marshes to agricultural land. Dykelands were created by the construction of banks to keep the flood water from a low-lying area that would normally be inundated. Fresh water drained from the marshes at low tide through a culvert, referred to as an *aboiteau*, and natural vegetation was removed. Figure T12.10.1 illustrates species composition and landscape features of a tidal marsh before and after dyking.

The dykelands required maintenance to prevent them from returning to the natural successional tendencies of tidal-marsh vegetation (see H2.5). New Englanders who settled the vacant lands after the expulsion of the Acadians (see T12.1) found the marshes flooded with salt water by a severe storm that had damaged the dykes and aboiteaux.[2]

New Englanders cleared the coastal uplands for farming, but they continued to use dykelands for hay and pasture, and marsh mud was dug for fertilizer for their upland farms. Immigrants also cleared much of the coastal forests and drumlin headlands along the Atlantic Coast (Region 800), exposing the unconsolidated materials to increased erosion. By the early 1800s, immigrants to Nova Scotia had recovered most of the original Acadian dykelands as well as reclaimed new areas of tidal marsh.

Sediment from logging and farming provided marsh grass with a foothold to develop some of the extensive tidal marshes found on the Nova Scotia eastern shore: e.g., Chezzetcook, Petpeswick, Three Fathom Harbour (Unit 833).

By the mid-nineteenth century, settlements were scattered around the coast and along the main river valleys stretching inland. The interior of Cape Breton was as frequently settled as the coastline, owing to the ease of access afforded by Bras d'Or Lake. Islands were often used as summer fishing stations and processing plants. In coastal areas too rugged for agriculture, fishermen supplemented their income with sheep farming. Sheep often lived in a semiwild state, feeding on kelp and seaweed. In 1907, 400–500 sheep were reported to be living on Tusket Island, Yarmouth County (Unit 831), and in Guysborough County, 1,000 sheep grazed the 65 km of coast between Ecum Secum (Unit 834) and Port Bickerton (Unit 842).[3]

During the nineteenth century, hay was an important crop needed to maintain the horse-powered logging and mining industry. By the early 1900s, large tracts of coastal marshes, such as at Tantramar and Minudie in Cumberland County (Units 523 and 532), were devoted to the production of hay.

By the late 1930s, the hay market had all but ceased as a result of fossil-fuel technology. The dykes fell into disrepair, and much of the land was reclaimed by the sea. In 1948, the Marshland Rehabilitation Act was enacted to promote the creation and maintenance of dykelands. Over twenty years, using modern technology, 18,000 ha of tidal farmland were protected in Nova Scotia.[2] Tidal dams were constructed on the Avon, Annapolis and Tantramar rivers.

Chezzetcook Inlet, Halifax County, experienced a second era of siltation and marsh development in the 1940s and 1950s, when construction of a railway and causeway led to siltation and build-up of mud deposits. Except for marshes in the Bay of Fundy, where high tides contribute the sediment needed to start marsh development, many of Nova Scotia's tidal marshes have probably arisen since the first European settlement.

## THE COAST AND RESOURCES TODAY

***Agriculture***

Agriculture along the Atlantic Coast (Region 800) occurs mostly on drumlins and drumlin islands cleared during the 1800s and 1900s (see T12.4).

Sheep farming still occurs on some islands and along the Atlantic coastline.

Along the Northumberland (Unit 521) and Bay of Fundy Coasts (Regions 600 and 700), dykelands are still maintained for the production of hay, forage, pasture and some grain and vegetables.[2] Water from the uplands collects in low-lying areas, creating a band of freshwater wetlands and shallow lakes, often surrounded by bog. These areas provide habitats

for a variety of wild animals and plants. The largest expanse of maintained dykeland is found in the Tantramar Marshes (Unit 523). Without maintenance, these dykelands and others in Nova Scotia would revert to tidal marsh.[4]

***Dredging***

The maintenance of fishing harbours is an ongoing task, particularly along the west coast of Cape Breton, where the dynamics of the exposed shoreline create constant deposition in the channels: e.g., Inverness (sub-Unit 551a) and Judique (Unit 522). Dredging can accelerate the erosion of beaches and cliffs by reducing the littoral-sediment supply. Munroes Island, Pictou County, at the entrance to Caribou Harbour (sub-Unit 521a), has been reduced considerably by dredging. Dredging also increases sedimentation in tidal lagoons and inlets, increasing turbidity in the waters. Materials dredged from the channels are deposited in designated offshore dumping areas. The levels of toxins in these dredged materials and their possible ecological effects are often undetermined.

***Coast-protection Structures and Harbour Defences***

Jetties and breakwaters built on beaches and in estuaries may affect the development of coastal systems. Local beaches have built throughout the province by accumulation of sand behind wharves and jetties. For example, a jetty at the mouth of a river near Rissers Beach, Lunenburg County, (Unit 832), has caused the build-up of a beach-and-dune system, which now depends on the maintenance of the jetty. A similar situation is occurring at Mabou Harbour, Inverness County, (sub-Unit 551a), where the beach is enlarging, owing to the interception of northward-moving sand by a breakwater. The opposite occurs at Inverness Beach, where jetties trap southward-moving sand and direct it into a lagoon, which has to be dredged periodically.[1]

***Causeway Construction***

Causeways intercept wave dynamics, causing bank erosion downstream and excessive deposition upstream. Causeways can also alter current flows and interrupt fish- and invertebrate-breeding cycles. The construction of the Canso Causeway changed the numbers and types of benthic species in the Strait of Canso (sub-Unit 583a and Unit 860).[5] The Windsor Causeway, built across the Avon River in the late 1960s, has arrested the macrotidal movement of sediments in the Bay of Fundy (Unit 511). The increased sedimentation has caused an extensive mudflat development, which is being colonized by salt-marsh grass. A causeway to Caribou Island (sub-Unit 521a), built in 1922, increased the progradation process at Waterside Beach in Pictou, allowing subtidal deposits to build a series of beach ridges.[6] Causeway construction at Barrington (Unit 841) has dramatically increased sand accumulation on the opposite side of Barrington Bay. The causeway has cut off the summer mackerel migration and has also affected lobster habitat.[7]

***Beach Quarrying***

Beach quarrying (see T12.4) is tied to the accessibility of material and has historically occurred where roads and rail lines cross beaches and sand dunes.

Transportation routes along dunes and across beaches can affect dune stability, and succession and can block drainage channels. Culverts under the roads are constantly subject to blocking by sand and gravel, which results in flooding upstream and in the backwaters, affecting water quality of the backwater and increasing erosion along the stream banks.

***Coastal Development***

There is increasing pressure for shorefront development in Nova Scotia, particularly for seasonal dwellings and tourism facilities. The population density on the Atlantic coast of Canada increased about ten per cent between 1971 and 1986.[5] This type of population growth can increase stress on marine and coastal ecosystems.

On-site waste-disposal systems require minimum lot sizes and soil depth for approval. Soil-deprived coastal barrens are often subject to blasting and infill, drastically altering ecological communities. Constructing foundations in dunes undermines the system's stability.

***Recreation***

Recreation is a year-round activity along the coasts of Nova Scotia, and some activities—for example, use of all-terrain vehicles (ATVs), horseback riding and camping—can be destructive to coastal habitats, mostly owing to soil erosion along trails. Management depends on active participation from special user groups. For example, at Conrad's Beach Provincial Park, Halifax County, (Unit 833), local bird-watchers help protect Piping Plover breeding areas, and horseback riders and hikers are directed away from from the nesting areas by boardwalks and interpretive signs.

### *Conservation*

Comprehensive programs have been developed in response to dune erosion and beach-habitat degradation. Various conservation methods employ flexible devices, such as snow fencing and revegetation. These methods are used in conjunction with limiting human access to sensitive areas. This includes restricting vehicle access, building boardwalks and providing public education, such as the Piping Plover program (see T12.11). Boardwalks, such as at Clam Harbour Beach Provincial Park (Unit 833), allow access while maintaining the ecological integrity of the dunes and coastal barrens.

The international importance of coastal wetlands to migrating waterfowl populations has resulted in the creation of conservation programs to protect wildlife wetland habitats at various sites throughout the province, including Minas Basin, Chignecto and the outer estuary of Musquodoboit Harbour. Some of the dykeland in the Bay of Fundy has been reflooded under programs designed to create habitat for wetland wildlife. Marsh-reclamation projects are found in the Amherst area (Unit 523) and in the Belleisle Marsh in the Annapolis Valley (District 610).

To date (1993), approaches to managing coastal pressures have been largely uncoordinated, as a result of fragmented jurisdictional responsibilities for marine and coastal resources. Coastal-zone management is of prime concern, however, and programs are emerging to encourage economic development that includes environmental protection and conservation. Management concerns in Nova Scotia are reflected in *Coastal 2000* .[8] The consultation paper offers a framework for strategic planning at the community level in Nova Scotia.

### *Associated Topics*

T3.3 Glaciation, Deglaciation and Sea-level Changes, T4.1 Post-glacial Climatic Change, T7.1 Modifying Forces, T7.2 Coastal Environments, T12.1 Colonization by People, T12.4 Glacial Deposits and Resources, T12.9 Soil and Resources, T12.10 Plants and Resources, T12.11 Animals and Resources

● ● ● ● ● ● ● ●

### *Associated Habitats*

H2 Coastal

### *References*

1 Ricketts, P.J. (1988) "Shoreline changes and associated coastal management issues in the Maritime Provinces." In D. Day et. al. (eds.), *Geographical Perspectives on the Maritime Provinces*. Saint Mary's University, Halifax.
2 Nova Scotia Dept. of Agriculture and Marketing (1987) *Maritime Dykelands: The 350 Year Struggle*. Province of Nova Scotia, Halifax.
3 Goudey, S.P. (1908) *1907—Sheep on the Sea Islands Off the Coast of Southwestern Nova Scotia*. Annual Report of the Secretary for Agriculture for the Year 1907. Province of Nova Scotia, Halifax. pp. 127–128.
4 Howell, G., D. Wilson, M. Sheeran and J.A. Burnett (1991) "Upper Bay of Fundy dykelands: Changing the tides." In *The State of Canada's Environment*. Fisheries and Oceans Canada, Environment Canada, Ottawa.
5 Fisheries and Oceans Canada, Environment Canada (1991) "Oceans: Charting a course." In *The State of Canada's Environment*. Fisheries and Oceans Canada, Environment Canada, Ottawa.
6 Taylor, R.B, S.L. Whitman, M.J. Milne and S.M. Kober (1985) Beach Morphology and Coastal Changes at Selected Sites along Mainland Nova Scotia. Geological Survey of Canada, Ottawa. (*Paper* 85–12).
7 Eaton, P.B., L.P. Hilderbrand and A.A. d'Entremont (1986) *Environmental Quality in the Atlantic Region 1985*. Environment Canada, Environmental Protection Service, Atlantic Region, Dartmouth.
8 Nova Scotia Dept. of the Environment, Dept. of Fisheries (1994) *Coastal 2000: A Consultation Paper*. Province of Nova Scotia, Halifax.

### *Additional Reading*

• Environment Canada (1987) *A Profile of Important Estuaries in Atlantic Canada*. Government of Canada, Atlantic Region, Dartmouth.
• Lewis, C.F.M and M.J. Keen, eds. (1990) "Constraints to development." In *Geology of the Continental Margin of Eastern Canada: Geology of Canada No. 2*. Geological Survey of Canada, Ottawa. pp. 743–823.
• Nova Scotia Dept. of Lands and Forests, Parks and Recreation Division (1986) *Results of the Nova Scotia Beach Protection Study*. Province of Nova Scotia, Belmont.
• Wood, K.S. (1990) *Shoreline Development in Nova Scotia: Planning and Policy Issues*. Oceans Institute of Canada.