

T12.6 THE OCEAN AND RESOURCES

Nova Scotia's marine waters play a major role in the province's economy and lifestyle. Our interaction with coastal and offshore waters and the resources they support has shaped many aspects of Nova Scotia's landscape and human-settlement patterns, while providing food, tidal energy and recreation.

HISTORICAL CONTEXT

Pre-European Settlement

Prior to European colonization of Nova Scotia, coastal and offshore waters provided transportation routes and abundant food sources for the Mi'kmaq. Camps were often located in coastal areas where the Mi'kmaq subsisted on various types of marine life, including cod.

According to one account, written in 1863, traveling long distances on open waters in their canoes was never without worry for the Mi'kmaq, as a type of large fish (killer whale) sometimes attacked their boats. The Mi'kmaq adopted the preventive practice of placing tree boughs at the stern; these smelled of the land and drove the fish away.¹

Coastal waters provided resources for most of their needs and also brought the Mi'kmaq into contact with European fishermen in the 1500s. Exploratory voyages by sea in the late 1400s had spread word of the resources available in the New World. For more than a century, the prospect of a sea route to Asia and the potentials of the New World encouraged most exploration. The fishery drew thousands of men and hundreds of boats across the Atlantic each year (see T12.11). Knowledge of the configuration and resources of northeastern North America was spread across Europe, and the fishermen's accounts often surpassed the detail of the official exploration records.²

The practice of sending ships to fish offshore banks (Region 900), salting the cod in their holds and returning to Europe without landing is thought to have been developed by 1550.² In spring and summer, offshore currents brought floe ice (see T6.1) and icebergs offshore. The European fishermen were not

In the early 1600s, the Governor of Acadia remarked that the sea was "paved with salmon" and other species. At times, fish were so plentiful that they impeded the passage of ships; according to John Cabot, cod could be captured by simply lowering wicker baskets over the side of a boat.³

used to these conditions, and they found shelter in the numerous harbours.

The first fishermen did not establish permanent settlements. As the industry grew more competitive and disputes over land between the French and English developed, more permanent bases were established to support the fishing industry and to stake claim on territory. Many semipermanent settlements developed along the Atlantic coast and offshore islands as overwintering stations with make-shift dwellings. These lengthened the period of residence but did not change the migratory character of the fishing community.

Louisbourg, and then Halifax, developed from military strategies during the conflicts between the French and the English. As territorial disputes were settled, many of the coastal communities were linked by sea, with boat services providing transportation and trading routes.

1800s

In the early to mid-1800s, boat services existed between Halifax and Arichat, Lunenburg, Shelburne, Liverpool and Yarmouth, as well as to New England and Great Britain. In addition, Pictou was connected by boat to Prince Edward Island, and Fundy coastal communities were connected to New Brunswick, while Sydney had an established link with St. John's, Newfoundland.

Transatlantic migrations were also occurring at this time, requiring the transport of people and goods. This was tied in with the shipbuilding industry in Nova Scotia (see T12.10). The sailing-ship industry flourished between 1820 and 1880. At first, North American timber was sought to build ships and masts; gradually, however, vessels built in Nova Scotia were used in the international trade. Schooner captains generally waited for the outgoing tidal currents to

carry them from port. Several hundred kilometres from shore, mariners encounter the Gulf Stream, a river of water flowing up to 25 m/s and used for centuries to assist ships travelling to Europe from Nova Scotia. Trade increased with steam power in the late 1880s, when Nova Scotia was trading with Great Britain, New England and the West Indies.⁴

1900s

The sea continued to provide a livelihood for many people into the twentieth century.⁵ However, by the 1920s, the Maritime region had lost control of the major industries. Halifax and Saint John remained ocean-shipping cities; however, they faced increasing competition from Montreal and the eastern seaboard. Halifax retained its focus as a centre for Nova Scotia fishing trade but had limited success in developing a winter port-to-rail trade. “Despite its magnificent natural harbour, Halifax was not well sited to become a major port.”⁵

The railway changed the trading patterns, and as central Canada opened up in the 1900s and new technology changed the fishing industry, the Maritimes’ position in the world market diminished. By 1925, ten steam trawlers were operating in Nova Scotia waters, effectively reducing the numbers of small boats and local industry. During the World Wars, Halifax was revitalized as a central port and harbour. Its position as a military base continues today.

Coastal waters have long affected human-habitation patterns. Most of Nova Scotia’s population lives within 20 km of the coast, reflecting both the marine heritage of the province and the desirability of the coastal zone as a place in which to live and work, with the fishery often serving as the predominant resource.

THE OCEAN AND RESOURCES TODAY

The Offshore Fishery

Many of Nova Scotia’s productive fishing grounds exist owing to the presence of nutrient-rich water and associated phytoplankton blooms, produced by an oceanographic phenomenon known as “upwelling” (see T6.1), which brings cold nutrient-rich waters upwards to replace warmer surface water. Most upwellings are wind generated, but in the Bay of Fundy (Units 912, 913) they are caused by the tides. The conditions in this area sustain a breeding ground for whales and the most affluent commercial fishery on the country’s east coast.⁶ While the fishery is an economic mainstay in Nova Scotia, it also exerts the single largest human pres-

sure on the Canadian marine ecosystem (see T12.11).

Harbours

Deepwater harbours are also an important resource, as Halifax (Unit 833) and Port Hawkesbury (District 860) attest; these are among the largest deepwater ice-free ports in the world. The viability of several of Nova Scotia’s resource industries (pulp and paper products, gypsum, aggregates) is closely tied to the accessibility of marine transportation. Today, as in the past, the shipping industry and transport by water are very important to the economy of the province. Bilge and oil discharge related to marine transportation is considered a threat to marine animals (see T12.11).

Discharge

Human impact on coastal waters in Nova Scotia has been significant. Both coastal waters and marine life are influenced by industrial discharge, oil spills, municipal sewage and storm-water runoff, runoff from agricultural and urban areas, ocean dumping, long-range atmospheric transport, and persistent litter and debris. Some of these contaminants can degrade coastal waters; their impact is commonly measured in terms of biochemical oxygen demand (BOD) and total suspended solids (TSS). BOD results from the decomposition of organic waste and can affect aquatic life by reducing the oxygen content of the water. TSS, which includes sand, grit and other nonbiodegradable materials and human fecal matter, can alter benthic habitat and, in the latter case, cause fecal coliform contamination. These types of stresses in marine ecosystems have resulted in shellfish closures. In 1970, 104 areas were closed to shellfish harvesting; in the early 1990s, 236 were closed.⁷ Poor water quality has also limited the expansion of aquaculture operations at various coastal sites.⁸

In March 1995, the media reported that surveys of Britain’s shorelines revealed increasing amounts of plastic bottles and other debris derived from eastern North America. A detailed product analysis showed that about one-third of this debris originated in Atlantic Canada, drawing attention to the fact that the way we abuse our own marine waters is part of a global problem.

The effect of industrial discharge on Nova Scotia's ocean waters is most evident in several areas. Cape Breton's coal mines discharge their wastewater and runoff directly into the ocean.⁹ The high sulphur content of the coal results in highly acidic wastewater and higher solubility of metals, which in turn can lead to bioaccumulation of metals in benthic fauna.¹⁰ The waters of the Northumberland Strait receive the effluent of Boat Harbour, once a Pictou Landing tidal lagoon that now serves as a reservoir for pulp mill wastes, which have been responsible for fish kills and impacts on the estuary.

Despite human impact on coastal and offshore waters, nature is resilient, and most ecosystems will recover over time, given the right conditions. This is exemplified by one of Canada's early major oil spills, which occurred in 1970, when the tanker *Arrow* ran aground in Chedabucto Bay, resulting in a spill of 15,000 t in Nova Scotian waters. Shoreline analysis at one particular site, twenty years later, reveals that oil can still be found in sediments and may persist for another decade.^{10,11} However, the coastal waters and marine life recovered quite rapidly, according to studies undertaken by the Bedford Institute of Oceanography. Much of the oil in the bay disappeared quickly after the disaster, and, although thousands of clams and seabirds died, fish and lobster did not, and the clams made a quick comeback.

Estuaries

Estuaries, as sheltered and productive coastal areas, have for centuries been preferred sites for human settlement and development. They tend to be used for disposal of wastes, are freely modified for shipping or agricultural purposes and have generally been neglected both from conservational and scientific points of view. Some of the capability of estuarine ecosystems to handle detritus has enabled them to cope with the human wastes that have been deposited as a consequence of this activity. However, as human populations have grown, the quantity of waste has reached the point where even these environments are unable to sustain the input.

Organic wastes, such as untreated sewage, consume the oxygen essential for animal life, and when tidal mixing is small, anaerobic conditions may persist for long periods. In estuaries that are mixed more thoroughly by tides, the capacity to handle extra organic matter is much greater. The wastes from our society also contain a variety of toxic metals, manufactured organic compounds, oils, radionuclides, etc., that are harmful in high concentrations to living things. Because estuaries tend to act as traps, these toxic materials can accumu-

late, often in association with the fine grades of sediment deposited on tidal flats. These may remain within the system for long periods and represent a major threat to water quality.

Nova Scotia's abundant bays and estuaries have become the focus for a burgeoning aquaculture industry involving salmon, mussels, clams, oysters and scallops. The naturally high productivity, coupled with good tidal flushing and protection from heavy seas, makes many estuaries ideal locations for aquaculture. For this industry to persist (and particularly if filter-feeding species are to be grown), high water quality must be maintained. More than any other factor, the potential of aquaculture has focused attention on the state of Nova Scotia's estuaries. The aquaculture industry needs clean waters in which to operate, and this industry has been the most prominent factor in focusing attention on the state of Nova Scotia's estuaries and on the need to protect, and in many cases rehabilitate, estuarine environments.

Causeways and Bridges

Physical restructuring of coastal environments through the construction of causeways and bridges has also put pressure on marine environments, altering the flow of waters and sediments and interrupting migration, spawning runs and larval transport of fish and invertebrates (see T12.7). In Nova Scotia, construction of the Canso Causeway changed the numbers and types of bottom-dwelling species in the Strait of Canso. A smaller causeway at Barrington Passage cut off the summer mackerel migration and affected lobster habitat.⁹ The construction of the Annapolis Tidal Power Station on the Annapolis River, which generates 20 MW of electricity for 12,500 homes, has changed current patterns and caused river erosion upstream. Human, fish and bird populations, dependent on the river and associated coastal ecosystems, have been affected by this development.

Recreation and Tourism

The ocean and coastline of Nova Scotia provide a number of important resources for recreation, including general beach recreation, coastal cruising, deep-sea fishing, scuba diving and bird-watching. More recently, other activities such as whale watching, sea kayaking, surfboarding and windsurfing have shown significant development, particularly in specific areas of Nova Scotia where the best opportunities occur. Examples include Humpback and other whale watching at Brier Island, Digby County (District 810, Unit 912), and surfing at Lawrencetown

Beach, Halifax County (Units 833, 911). Halifax is the finishing point of the biennial Marblehead-to-Halifax yacht race.

Many of these activities form the basic components of new ventures in ecotourism or adventure tourism. They provide new economic opportunities for coastal communities directly and indirectly through the provision of accommodations, specialized outfitting and other services.

OFFSHORE PROTECTED AREAS

The current plight of many economically important fish species and vulnerable pelagic mammals, birds and turtles has drawn attention to the need for protected areas offshore. International initiatives and coordinated activity are required to care for species that do not recognize national boundaries and that generally undertake long seasonal migrations. However, the ineffectiveness of international agreements makes active protection in national jurisdictions essential. For example, the Leatherback Turtle, which migrates to feed as far north as the Cabot Strait in Canadian waters, lays its eggs on sand beaches of Florida and the Gulf of Mexico. Pelagic or oceanic seabirds, such as the Greater Shearwater, commonly feed in Nova Scotia's offshore waters in the summer, as they range far from where they breed. These species are vulnerable to marine pollution (see T12.3) when in Nova Scotia's waters, but the main concern is for the protection of their distant breeding areas.

In Nova Scotia waters, there is a general need for the conservation of pelagic and benthic habitats in areas that support populations of vulnerable species, e.g., the Right Whale. Although species may be protected individually, protection of the habitat on which they depend is the best approach to conservation. The Gulf of Maine Action Plan provides opportunities for this approach.¹² The Action Plan evolved from an international agreement to conserve for sustainable resource use the marine environment of the Gulf of Maine—the water between Cape Cod and Cape Sable Island—and the abutting terrestrial watersheds that drain into the Bay of Fundy and the Gulf of Maine. The agreement was drawn up in 1989 by the bordering states and provinces. The population of Bottlenose Whales that inhabits The Gully, northeast of Sable Island (Districts 930 and 940), requires conservation of its habitat as the best approach to protection. The establishment of a protected area for this purpose has been proposed.¹³ Establishing protected areas offshore can be an essential tool in the conservation of economically important fish spe-

cies through habitat management. The application of the *Natural History of Nova Scotia* theme-regions approach may prove to be useful in the establishment of offshore marine protected areas.¹⁴



Associated Topics

T6 The Ocean, T11.7 Seabirds and Birds of Marine Habitats, T11.12 Marine Mammals, T11.14 Marine Fishes, T11.15 Amphibians and Reptiles, T12.3 Geology and Resources, T12.7 The Coast and Resources, T12.10 Plants and Resources, T12.11 Animals and Resources

Associated Habitats

H1.1 Open Water, H1.2 Benthic, H2.4 Mud Flat, H2.5 Tidal Marsh

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