

## Chapter 2

# Defining Coastal and Marine Waters

### Highlights

- ❑ In March 1983, the United States declared its 200-mile exclusive economic zone by presidential proclamation, thereby asserting sovereign rights over the resources in the 200 miles extending beyond its coastline, including fishing and mineral resources, and jurisdiction to protect the marine environment.
- ❑ On 29 July 1994, the United States provisionally accepted UNCLOS.
- ❑ The United Nations Convention on the Law of the Sea (UNCLOS) entered into force on 16 November 1994.
- ❑ The convention provides for five basic maritime zones: the territorial sea, the contiguous zone, the exclusive economic zone, the continental shelf, and the high seas.
- ❑ Thirty-six U.S. states and territories have a total of more than 95,000 miles of coastline bordering the Pacific and Atlantic Oceans, the Gulf of Mexico, the Gulf of Alaska, the Bering Sea, the Arctic Ocean, and the Great Lakes (which have 5,000 miles of coastline).

Scientific findings, economic values, and political considerations all influence how the definitions and terminology of the coastal environment are developed. The language used to describe the coastal environment can be a mix of words that conjure up romantic images of nature or words that sound like the stuff only geologists or lawyers could love. Sandy beaches and saltwater marshes sit side by side with continental shelves and exclusive economic zones.

## Internationally Declared Zones

The language that defines the marine environment from “the coast” to the “open ocean” reflects centuries of international conflict and compromise over jurisdiction. Typically, coastal countries have attempted to set limits on other nations’ access. These coastal countries wanted to protect what they perceived as their own economic and military interests. This approach usually meant that coastal countries declared waters within a certain distance from their coasts as territorial waters. Other nations would be allowed to pass through these waters, but would be prohibited from fishing or engaging in other economic or military activities.

By the early 1900s, the world was a crazy quilt of irregular territorial zones. Some countries claimed their zones extended three miles from their shoreline out to sea; others claimed six miles or more. In 1945, President Truman proclaimed the United States had exclusive control over its continental shelf, the underwater extension of the North American continent that stretches more than 200 miles beyond the U.S. shoreline. This proclamation followed the discovery of rich stores of oil and mineral resources on the continental shelf.

Luc Cuyers, in *Ocean Uses and Their Regulation*, wrote that with Truman’s proclamation, “the United States called the world’s attention to the notion that there was something of great value besides fish in the sea, and nothing in international law prevented a coastal state from claiming it.”

Other countries followed the U.S. lead and declared control over broader ocean territories. The crazy quilt of zones became even more irregular. The United Nations responded by recommending that its member nations confer. In 1958, the first United Nations Convention on the Law of the Sea (UNCLOS), held in Geneva, Switzerland, attracted representatives of 86 countries. At the convention, delegates hammered out four agreements, or conventions, that began to define sea rights and responsibilities. A second meeting in 1960 expanded on the earlier agreements.

Finally, a third conference was convened in 1973. This conference (UNCLOS III) proved to be the most difficult, complicated, and comprehensive. It began with more than 400 draft articles. Conference delegates spent nearly 10 years whittling these articles down to about 320 articles and 9 annexes, forming a manageable convention that defines ocean boundaries and the rights and responsibilities of the world community in using the oceans.

This convention, more than any of its predecessors, specifically addressed ocean pollution, making it each country's duty to protect the ocean environment and conserve living resources. It mandated cooperation among neighboring coastal states to control ocean pollution from all sources.

During the previous two decades, the ocean's great mineral wealth beyond oil had come to light. Capturing that sea-bottom wealth, which included fields of manganese nodules, would be technologically challenging and expensive. But industrialized countries, such as the United States, anticipated that as technology improved, those fields could be mined economically in the near future. The UNCLOS convention placed deepwater seabeds outside the jurisdiction of any individual country and within the jurisdiction of a new institution, the International Seabed Authority.

In 1982, the United States voted against the convention, primarily because of concerns that provisions regarding deep seabed mining would restrict U.S. access to valuable seabed minerals. Despite U.S. opposition, in 1982 the majority of the conference delegates voted to adopt UNCLOS. The Deep Seabed Mining Implementing Agreement of July 1994 addressed U.S. concerns about potential mining restrictions. As a result, on 29 July 1994 the United States signed UNCLOS. Although the United

For more information on the United Nations Convention on the Law of the Sea, see the U.N. Web site at <http://www.un.org/depts/los>

States upholds all the provisions of the convention, the United States remains a provisional member. U.S. ratification will be possible once the U.S. Senate has provided its advice and consent.

At the time the United States signed the convention, it was still not in force. Sixty eligible nations had to ratify UNCLOS before the convention could enter into force. That goal was not achieved until 16 November 1994. By January 1998, the convention had been adopted by 123 parties.

UNCLOS establishes five ocean zones: territorial sea, contiguous zone, exclusive economic zone, continental shelf, and high seas.

### **Territorial Sea**

This zone may extend out to 12 nautical miles (1 nautical mile equals 1,852 meters, or 6,076 feet), measured from a baseline on a country's coast. The territorial sea is considered part of a country's sovereign territory, although ships may pass through as long as passage is innocent (i.e., not done to harass, attack, or exploit the host country or its resources).

### **Contiguous Zone**

This zone extends an additional 12 nautical miles from the territorial sea. A host country has rights to control immigration, customs, sanitary, and pollution regulations in its contiguous zone.

### **Exclusive Economic Zone**

A country may declare an exclusive economic zone (EEZ) extending from the outer boundary of the territorial sea to 200 nautical miles from the coast baseline (i.e., the maximum EEZ width would be 188 nautical miles from the coast where the territorial sea is 12 nautical miles). Within this zone, the coastal country does not have complete sovereignty. Other countries may fly over it, navigate through it, or lay pipes or cables. However, the coastal host country has all rights to control the resources in these waters, including fisheries and mineral resources. It also may assert jurisdiction (which the United States has not) over scientific research conducted in these waters. In March 1983, the United States declared its own 200-mile EEZ through presidential proclamation.

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### **Continental Shelf**

UNCLOS provides a complex definition of the continental shelf. This zone extends a minimum of 200 nautical miles from the coastal baseline and may extend up to 350 nautical miles in special circumstances. The coastal country has exclusive jurisdiction over the mineral resources of its shelf, including oil. Up to 7 percent of the profits from mineral development beyond the 200-mile line from shore must be shared with the international community. The coastal country is obligated to protect the continental shelf's marine environment from negative consequences of oil development.

### **High Seas**

This maritime zone extends beyond areas of national jurisdiction and is generally open and freely available for use by all. No country may interfere with the justified and equal rights of other countries on the high seas. The seabed under the high seas, home to certain mineral beds, is the common heritage of humankind, according to part of the convention. Mineral resources of the seabed are under the jurisdiction of the United Nations International Seabed Authority.

## **Nationally Recognized Definitions**

In addition to accepting many of the provisions of UNCLOS, the United States also recognizes state jurisdiction over coastal waters (approximately three miles for most states, nine nautical miles for Texas and the west coast of Florida). States have significant coastal resources management authority in these waters.

Thirty-six U.S. states and territories have a total of 95,429 miles of coastline bordering the Pacific and Atlantic Oceans, the Gulf of Mexico, the Gulf of Alaska, the Bering Sea, the Arctic Ocean, and the Great Lakes (which have 5,000 miles of coastline). The area where water meets land—the beaches, bays, and wetlands—is the coastal zone. In addition to these areas, estuaries

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(where saltwater and freshwater mix) and watersheds (drainage basins) are integral parts of the coastal zone.

The coastal zone is formally defined in section 304 of the Coastal Zone Management Act as follows:

the coastal waters (including the lands therein and thereunder) and the adjacent shorelands (including the waters therein and thereunder), strongly influenced by each other and in proximity to the shorelines of the several coastal states, and includes islands, transitional and intertidal areas, salt marshes, wetlands, and beaches.

Among the many commercially valuable fish and shellfish that depend on coastal waters, particularly the bays and estuaries, are striped bass, shad, salmon, sturgeon, shrimp, clams, crabs, oysters, lobsters, mussels, abalone, and bay scallops. The National Marine Fisheries Service estimated that U.S. consumers spent \$41.2 billion for fishery products in 1996. These waters also serve as habitat and breeding areas for hundreds of varieties of birds and other animals, including marine mammals, such as seals, manatees, sea lions, and otters. Coastal waters also provide important recreational, aesthetic, and cultural value.

### **Rocky Shores, Sandy Beaches, Wetlands**

The natural shoreline geography and geology of coastal waters are diverse. The three basic types of shoreline are rocky shores, sandy beaches, and wetlands. Within these types are various subtypes.

Rocky shores and sandy beaches are defined in the U.S. Geological Survey's 1991 report, *Coasts in Crisis*:

**Rocky shores** form on high-energy coasts where mountains meet the sea at the base of sea cliffs.  
Active tectonic environments, such as in California,

produce rocky coasts as a result of mountain-building processes, faulting, and earthquakes. Rocky coasts also form where ice and strong waves have effectively removed fine-grained sediment. In Maine and parts of Alaska, glaciers have scoured most of the sediment cover from the shore. In the Arctic, ice gouging and rafting have removed sand-sized particles from some beaches, leaving cobbles and boulders.

The U.S. Geological Survey categorizes *sandy beaches* into three subtypes: mainland, pocket, and barrier beaches.

*Mainland beaches* stretch unbroken for many miles along the edges of major land masses. Some are low standing and prone to flooding; others are backed by steep headlands. They receive sediment from nearby rivers and eroding bluffs. Examples of mainland beaches include the coasts of ... northern New Jersey and southern California.

*Pocket beaches* form in small bays surrounded by rocky cliffs or headlands. The headlands protect the sandy alcoves from erosion by winter storms and strong currents. Pocket beaches are common in Maine and the Pacific Northwest.

*Barrier beaches* are found along the Gulf of Mexico, Cape Cod, the Hatteras National Sea Shore, and much of Alaska. They are part of complex integrated systems of beaches, dunes, marshes, bays, tidal flats, and inlets. The barrier islands and beaches are constantly migrating, eroding and building in response to natural processes and human activities.

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*Wetlands* are semiaquatic lands that are either inundated or saturated by water for varying periods during the growing season. In all wetlands, the presence of water creates conditions that favor the growth of specially adapted plants (hydrophytes) and promotes the development of characteristic hydric (wet or moist) soil properties. The two subtypes of wetlands are inland and coastal.

*Inland wetlands* include marshes and wet meadows dominated by grasses and herbs, shrub swamps, and wooded swamps dominated by trees and woody vegetation.

*Coastal wetlands*, as their name suggests, are found along the Atlantic, Pacific, Alaska, Great Lakes, and Gulf of Mexico coasts and are closely linked to the nation's estuaries. For instance, saltwater and fluctuating water levels (due to tidal action) combine to create a rather difficult environment for most plants. Consequently, many shallow coastal areas are mud flats or sand flats lacking vegetation. Certain grasses and grass-like, salt-tolerant (halophytic) plants form extensive colonies called coastal marshes. These marshes are particularly abundant along the South Atlantic and Gulf of Mexico coasts. Mangrove swamps, dominated by halophytic shrubs or trees, are common in Hawaii and in southern Florida. (See chapter 3 for a discussion of wetland functions and chapter 4 for a discussion of wetland delineation.)

## Estuaries

Coastal wetlands are integral parts of estuaries, water bodies where freshwater empties into and mixes with saltwater. Estuaries are different from oceans and rivers—chemically, biologically, and hydraulically—and are highly productive. Recognition of the distinctive nature and importance of estuaries has increasingly led to the development of separate regulations and strategies to address them. About 75 percent of commercially important fish and shellfish in the United States are estuarine-dependent (i.e., they rely on estuaries and upper reaches of tidal rivers for early life stages, food, migration, or spawning).

Under the Clean Water Act (CWA), the estuary has its own legal definition and protection. An estuary, according to the act, is “all or part of the mouth of a river or stream or other body of water having unimpaired natural connection with the open sea and within which seawater is measurably diluted with freshwater derived from land drainage.” Examples of estuaries are the San Francisco Bay, Chesapeake Bay, Long Island Sound, and Mobile Bay (Alabama).

The definition of estuary under the CWA also takes upstream waters into account: “associated aquatic ecosystems and those portions of tributaries draining into the estuary up to the historic height of migration of anadromous fish or the historic head of tidal influence, whichever is higher.” Anadromous fish are fish that live in the sea but spawn in freshwater, such as salmon and herring. The reference to the “historic height of migration” is often cited as justification for maintaining that an estuarine zone extends beyond just a narrow tidal region. By this approach, for instance, part of New York State is included in the Delaware Bay Estuary Program (see National Estuary Program, chapter 5), and some argue the same logic should lead to considering New York as part of the Chesapeake Bay Program.

### **Watersheds**

A watershed, also known as a drainage basin, is defined by the U.S. Environmental Protection Agency (EPA) as a geographic area in which water, sediments, and dissolved materials drain to a common outlet—a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean.

The effect of streams and rivers on the ocean environment can begin well upstream, miles from the coast and well above the spawning grounds of anadromous fish. Here, the rivers and streams begin to gather the silt and sand that is carried downstream to build beaches. Any change in the course of the river, through dams, diversions, or draining, can cause fluctuations in sand and

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water delivery to the ocean. Here, also, the quality of water that later feeds coastal wetlands can begin to deteriorate from pollutants.

A large river's watershed may cover thousands of square miles. Watersheds are increasingly the basis for public/private water quality protection efforts. The Chesapeake Bay watershed extends from Central New York State to Central Virginia, and the Gulf of Mexico drainage area covers more than 40 percent of the land area of the continental United States—from the Appalachians to the Rockies and parts of Canada.

### **The Great Lakes**

For millions of Americans, the term “coast” conjures up images of the five Great Lakes—Superior, Huron, Michigan, Erie, and Ontario. Shared with Canada, the complex Great Lakes ecosystem supports a wide variety of freshwater flora and fauna.

*The Great Lakes: An Environmental Atlas and Resource Book* published in 1995 by Environment Canada and EPA, points out that “the magnitude of the Great Lakes water system is difficult to appreciate, even for those who live within the basin.” The *Atlas* offers these facts about the significance of the Great Lakes:

- ❑ One-tenth of the U.S. population and one-fourth of Canada's population live in the Great Lakes basin.
- ❑ The Great Lakes span more than 750 miles (1,200 kilometers) from east to west. The five lakes contain the largest system of fresh surface water in the world and about 18 percent of the world's freshwater (only the polar ice caps contain more).
- ❑ Nearly one-fourth of Canadian agricultural production and 7 percent of U.S. agricultural production are located in the Great Lakes basin.
- ❑ The eight Great Lakes states have more than 5,000 miles of shoreline.

Outflows from the Great Lakes are small—less than 1 percent—relative to the total volume of water (23,000 cubic kilometers, or 5,500 cubic miles). As a result, pollutants entering the lakes stay in the system and become more concentrated with time.

The economic contributions from the Great Lakes region are also noteworthy. According to a 1995 background paper by the Great Lakes Commission and the Federal Reserve Bank of Chicago, the eight Great Lakes states contain 30 percent of U.S. manufacturing, and the province of Ontario contains 50 percent of Canada's manufacturing. The Great Lakes states account for 40 percent of U.S. industrial water use and 70 percent of U.S. steel production.

*The Great Lakes: An Environmental Atlas and Resource Book* is available online at <http://www.cciw.ca/glimr/great-lakes-atlas/intro.html>.