

Chapter 2

Definitions and Fundamental Concepts

*Men do not think they know a thing till they have grasped the
“why” of it. . .*

– Aristotle’s *Physica*, Book II

Abstract In the form of four W’s: Why? Where? When? and Who?, this chapter describes some of the institutional issues related to ocean and coastal planning. It covers why special or unique approaches are needed, what areas (locations) are included in the coastal zone and make up the different maritime zones. A brief history of how coastal and ocean planning and management has developed is presented, and lastly, the chapter gives examples of international, national and sub-federal entities involved in planning for oceans and coasts. With these emphases, the chapter provides a foundation for further study of environmental planning for oceans and coasts.

Keywords Arbitrary boundaries • Intertidal zones • Maritime zones • Private tidelands • Sovereign jurisdiction • Subtidal • Supratidal • UNCLOS

Rachel Carson, author of the best-selling book *Silent Spring* (1962) and considered by some to be the founder of the modern environmental movement, wrote extensively about the sea and the shore. Before delving into the perils of pesticide use, which made her world-famous and forever changed environmental regulation, she wrote three bestsellers: *Under the Sea-Wind* (1941),¹ *The Sea Around Us* (1951), and *The Edge of the Sea* (1955).

In a seminal article published in the *Atlantic Monthly* in 1937, she wrote:

The ocean is a place of paradoxes. It is the home of the great white shark, two-thousand-pound killer of the seas, and the hundred foot blue whale, the largest animal that ever lived. It is also the home of living things so small that your two hands might scoop up as many of them as there are stars in the Milky Way. And it is because of the flowering astronomical

¹ It was actually the reissued version of this book, published in 1952 after the popularity of her next book was confirmed, that achieved best-seller status.

numbers of the diminutive plants, known as diatoms, that the surface waters of the ocean are in reality boundless pastures.

Carson's writing reflected overall truths that were new ideas – basically, that all of life is a continuum and interconnected – but most of what she wrote in this passage was wrong. A very large pair of hands could probably scoop up only enough seawater to hold 100 million diatoms – a tiny fraction of the billions of stars that make up the Milky Way. Her ensuing description of diatoms was also incorrect. How could it be that such mistakes were glossed over in such a highly visible non-fiction article? How could Carson have been so off-the-mark and yet still considered an expert on the sea?

Her statements reflect the limited knowledge of her era, but in many respects, knowledge about the sea is still limited today (see Chap. 3). Most people know very little about the seas, even those involved in decision making about ocean environments and resources. Carson herself had little contact with her prime media, other than a thorough familiarity with what existed at the edge of the tide outside the seaside cottage where she lived. Upon writing her second book about the sea, she had spent what amounted to a few minutes standing at the bottom of a skiff's ladder in little over 2 m of water off the coast of Florida wearing a diving helmet (Souder 2012). Another reason that such a statement passed as truth is because it embodied another broad point reflecting common thought *at the time*: that the sea and its resources are endless – as endless as the stars.

2.1 Why? Special Challenges

Today we know that the sea's resources are unequivocally finite. Not only that, but that they exist in a delicate balance with most other aspects of the planet – climate, land, freshwater and more – and that they are in trouble (Roberts 2007; Halpern et al. 2008; Lubchenco and Sutley 2010). For this reason, it is the purview of the environmental planner working on marine and coastal environments to have in mind first and foremost the preservation and protection of these delicate balances. Doing so or not doing so will have implications far beyond the specific coastal and/or marine environment being worked on. Also, it is imperative for the environmental planner to be aware of the particular characteristics of the marine and coastal environment and that he or she understands their particular challenges.

Agardy (2000) succinctly compares characteristics of the marine environment to those of the terrestrial environment. In doing so, she helpfully raises awareness of the unique challenges of the sea; the comparison can also be helpful to planners transitioning to work on oceans and coasts from more conventional terrestrial environs. Marine systems have nebulous boundaries, large spatial scales and fine temporal scales. Consideration of the three-dimensional living space of organisms is essential, as is consideration of relatively unstructured food webs and nonlinear system dynamics. Oceans have been less studied than land. Relative to marine

systems, terrestrial systems usually have clear boundaries, small and temporally coarse spatial scales, relatively two-dimensional living space, structured food webs and linear system dynamics (Agardy 2000).

What do these characteristics mean for the marine environment? What do they mean for the coastal environment? The latter may be even more difficult to decipher. A natural tendency of books about marine planning, coastal planning or environmental planning in general is to treat each ecosystem type or seascape/landscape unit separately. In many ways, this contradicts principles of integration that are fundamental to the planning approaches of integrated coastal zone management and integrated marine planning, described in Chap. 4 of this book. Therefore, I try to avoid hard and fast distinctions between coastal and ocean environments.

2.2 Where? Location, Location, Location

Most of the Earth (70.8 %, or 362 million km²) is covered by oceans and major seas. Marine systems are highly dynamic and tightly connected through a network of surface and deep-water currents. The properties of the water cause stratified layers, tides and currents. Upwellings break this stratification by mixing layers and creating vertical and lateral heterogeneity within the ocean biome. Total global coastlines exceed 1.6 million kilometers in length and coastal ecosystems are found in 123 countries around the world.

Before describing man-made, or what can be considered “socially-constructed”, marine and coastal boundaries, I briefly describe coastal and seascape units. Elements of the interface between land and sea include the waterline, shoreline or coastline, and beaches. The shore refers minimally to the narrow strip of land in immediate contact with the sea, including the area between high and low water lines, aptly termed the intertidal zone. True marine areas are generally considered to be those that are subtidal or always seaward of the tides. Supra-littoral areas make up the terrestrial portion of the coastal zone or “uplands”. Despite these rather clear definitions, for management and planning purposes the coastal zone is, in fact, a vague term with many interpretations (Box 2.1).

The elements of the coastal zone should be well understood by planners because there are processes related to each that are important to consider when anticipating impacts of development. The incremental effects of global climate change also affect these areas. For example, sediment transport is an important process along the coast, dependent on long-shore and near-shore waves and tides; it relates to processes of erosion and accretion. Effects of sea level rise will be exacerbated by any type of construction that changes the natural shoreline. Physical geographers and geologists who specialize in structure formations and geomorphological processes in marine environments and in the coastal zone use these nuances of terminology to describe their areas of interest. Further explanations about these terms can be found in Chap. 3 of this book.

Box 2.1: Various Definitions of the Coastal Zone

The coastal zone has many definitions and all of them are social constructs. In other words, coastal boundaries depend on humans and man-created institutions, i.e., laws, regulations, jurisdictions and such. Various definitions are provided here.

The coastal ocean is a shallow (<200 m) area, covering approximately 7 % ($26 \times 10^6 \text{ km}^2$) of the surface of the global ocean, where land, ocean and atmosphere interact; in oceanography, this region is termed the Epipelagic Zone (*The Encyclopedia of the Earth*. <http://www.eoearth.org/view/article/151298/>).

The coastal zone includes offshore waters, the coastline, and the adjacent shores (Sorensen 1997).

A “coastal zone” consists of the coastal waters and the adjacent shorelands, as well as islands, transitional and intertidal areas, salt marshes, wetlands, and beaches (16 U.S.C. § 1453. Definitions, US Coastal Zone Management Act).

The coastal zone is any part of the land that is influenced by some marine condition, such as tides, winds, biota or salinity. The coast is global in its distribution but not in its width. In some places the coastal zone might be a few hundred meters wide, whereas in others it might be more than 200 km wide (Davis and Fitzgerald 2004).

The coastal zone is the environment resulting from the coexistence of two margins, namely, the terrestrial edge of the continent and coastal water as the littoral section of shelf seas. Its terrestrial portion is defined by an area extending 10 km landwards from the coastline. Where relevant, assessment of the basic coastal zone is enhanced by comparisons among the immediate coastal strip (up to 1 km), the coastal hinterland (the zone between 1 and 10 km line) and the non-coastal national territory, called inland (EEA 2006).

The coastal zone is a narrow band of terrestrial area dominated by the ocean influences of tides and marine aerosols; it defines a marine area where light penetrates throughout (UNEP 2006).

Boundaries of the coastal zone should correspond with the boundaries of the resources addressed in a coastal management plan. Coastal zones can be affected significantly by human and other activities that occur at a great distance from the coast itself. Where influences are generated further inland, a definition of the coastal zone should encompass the entire watershed or river basin that drains into coastal waters (Beatley et al. 2002).

In the oceans, physical boundaries are often determined by geophysical properties such as sediment thickness or depth. General delineations consist of the upland, continental shelf, continental slope and deep sea (Fig. 2.1). Areas past the jurisdictional boundaries of any one state are considered the high seas (Fig. 2.2). Although not belonging to any one jurisdictional entity and considered to be in the international domain, this delineation is clearly a social construct – meaning that it is based more on people’s decisions and institutions than conditions of the natural world. In any case, the high seas are by and large public domain and shared international resources; here, the term “freedom of the seas”, which has been in use since the age of imperialism, takes precedent.

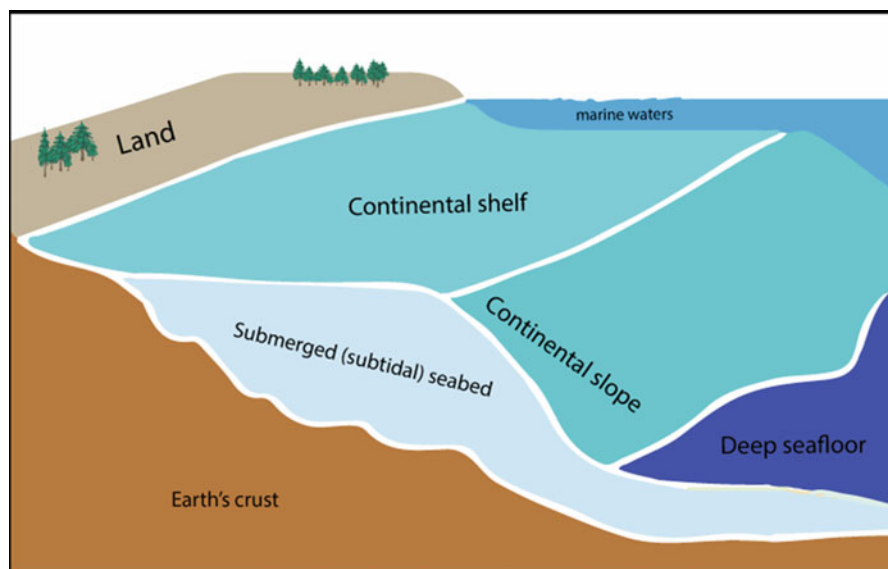


Fig. 2.1 A simplified look at the different areas of coasts and seas

Jurisdiction over an area is often related to who manages it. Once a jurisdictional authority is known or determined, planning begins with delineating the managerial boundaries to correspond with either the physical and ecological units of the coasts or oceans (Clark 1996) or to address a specific problem such as flooding or marine pollution (Brenner et al. 2006; Balaguer et al. 2008; Hering and Ingold 2012).

There are many cases where rather than encompassing physical or even administrative units, jurisdictional boundaries have been set arbitrarily. “Arbitrary”, in this case, refers to spatial demarcation that does not reflect the physical, and especially the natural, elements of the environment, but is based instead on artifacts. For example, the distance a cannonball could fly was used to set the extent of littoral state jurisdiction in the U.S. during colonial times (Sohn et al. 2010). Such boundaries may impede meaningful conservation and integration efforts (Clark 1996; Cicin-Sain and Knecht 1998). In almost all cases, coastal and marine planners’ work will be subject to combinations of physical and jurisdictional boundaries. Examples of such combinations can be found in just about every demarcation of marine and coastal boundaries.

Most maritime zones are determined according to the United Nations Convention of the Law of the Sea (UNCLOS). Sovereign rights of a coastal nation decrease as one moves further from the shore. The baseline from which most boundaries or maritime zones (Fig. 2.2) are delineated is usually dependent on the shape of the coast, and the actual waterline is determined relative to both high and low tides. The most physically-dependent element of these offshore boundaries is perhaps the continental shelf (Box 2.2).

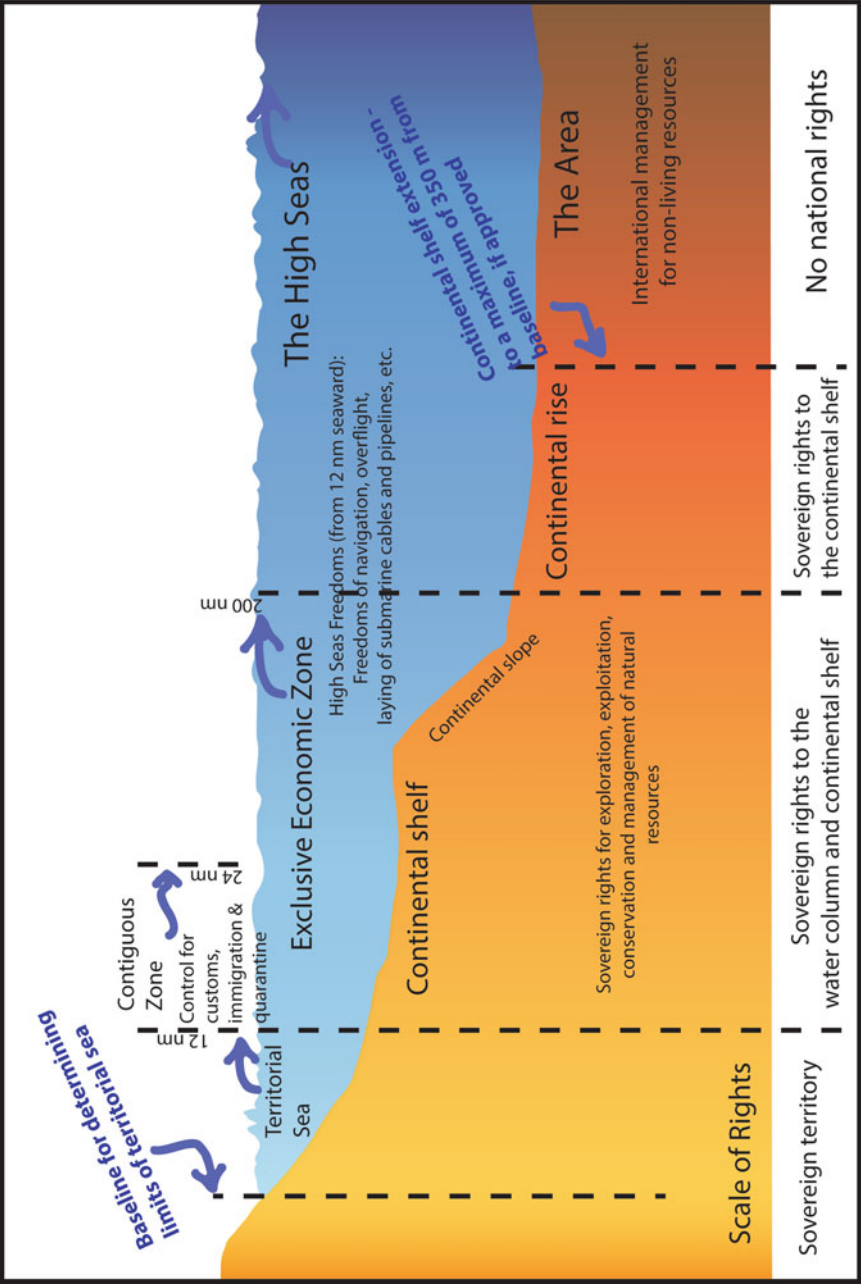


Fig. 2.2 Maritime zones under the UN Convention of the Law of the Seas (UNCLOS) of 1982 (Note: 1 nautical mile (nm) = 1852 m)

Box 2.2: Important Marine Jurisdiction Definitions (according to UNCLOS)

Internal waters are all waters landward of a coastal state's baselines. A coastal state has complete sovereignty over these waters.

The **territorial sea** extends from a coastal state's baselines to 12 nm and includes airspace. A coastal state has sovereignty over its territorial sea though foreign vessels have a right to innocent passage.

The **contiguous zone** extends from the outer limit of the territorial sea to 24 nm. A coastal state can exercise control to prevent infringement of its customs, fiscal, immigration or sanitary laws and can set regulations within its territory or territorial sea.

The **exclusive economic zone** extends from the outer limit of the territorial sea to 200 nautical miles (nm). A coastal state has sovereign rights over the natural resources of the water column and the seabed as well as jurisdiction over certain matters like marine scientific research and the protection and preservation of the marine environment. Foreign vessels may exercise their freedom of navigation in this zone.

The **high seas** are waters beyond the national jurisdiction of any state.

The **area** is seabed beyond national jurisdiction, the nonliving resources of which are administered by the International Seabed Authority, a body established by the Convention. All states party to the Convention are members of the Authority.

An interesting local example of boundary determination is the Massachusetts Waterways Regulation Program. This regulatory program administers the Massachusetts Public Waterfront Act of 1866, one of the oldest pieces of legislation pertaining to coastal development (hereafter “Chapter 91” because it is implemented through Massachusetts General Laws Chapter 91). The act's main goals are preservation of water-dependent uses of coastal properties and of public use rights in tidelands. Water-dependent uses are activities for which proximity to the water is either essential or of great advantage (Portman 2006).

In private tidelands (Fig. 2.3), which are those of the intertidal zone between low and high tide, land ownership in fee title is distinct from “use ownership”. In areas that are owned privately, the public maintains some usage rights, particularly for “fishing, fowling and navigating”. The two ownership domains are referred to as *jus privatum* and *jus publicum*. In the intertidal area within Chapter 91 jurisdiction, the state confers *jus privatum* to private owners that is subservient to the *jus publicum* (Archer et al. 1994).

A finer demarcation of marine and coastal areas, based on an “ecosystems” approach, can be found within the context of the Millennium Ecosystem Assessment of 2005 (MEA). This demarcation distinguishes between terrestrial ecosystems (e.g., sand dune systems), areas where freshwater and saltwater mix, near shore coastal areas and open ocean marine areas. In a synthesis report, based

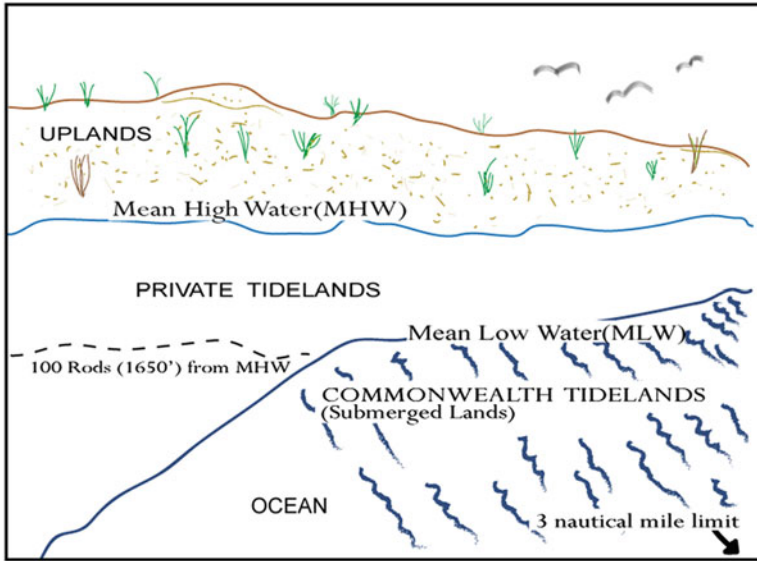


Fig. 2.3 Jurisdictional boundaries according to Chapter 91 of the Massachusetts General Laws. As for most US states, sub-federal Massachusetts state jurisdiction extends 3 nm seaward from the mean low water mark

on the findings of the MEA, the ocean and coastal realm is divided into “marine fisheries systems” and “inshore coastal systems and coastal communities”. Marine systems are defined as waters from 50 m depth to the high seas. The latter term refers to systems that extend from waters shallower than 50 m depth to the coastline and inland from there to a maximum of 100 km distance or 50 m elevation, whichever is closer to the sea (UNEP 2006) (Box 2.3).

Box 2.3: The Importance of Marine Boundaries: Iceland

After WWII, while the Soviet Union, the US and Europe dealt with matters of the Cold War, Iceland dealt with an extraordinary defense matter: that of preserving its fish stock. Iceland’s fish stocks were of utmost importance. The country had been dependent on fishing since its settlement (around 960 AD), first for subsistence, and later for commercial fishing. Following skirmishes that lasted nearly four centuries, Iceland’s territorial waters – the area from which it could exclude foreign fishing vessels – were set as extending three nautical miles from land in 1896. As commercial fishing picked up again after WWII, fish stocks throughout the Atlantic plummeted and most countries increased their territorial limits. In 1952, Iceland extended its territorial sea limit to 4 nm. Then, in 1958, Iceland declared a 12 nm limit, which Britain protested by sending in naval boats to protect British trawlers fishing in Icelandic waters. These were the first acts of the Cod Wars that flared on

(continued)

Box 2.3 (continued)

and off for the next 30 years. Iceland continued to expand its claims as fish stocks continued to dwindle. To do so, Iceland employed its coast guard to cut the cables of any foreign trawlers that were caught poaching. Matters came to a head in 1976, when Iceland declared a 200 nm limit around its shores, at which point Britain broke off diplomatic relations and ordered British Navy boats to ram Icelandic coast guard boats, which occurred on several occasions. The situation was only resolved in 1985, when international law confirmed Iceland's position by granting the 200 nm limit to all countries involved in the dispute.

Logically, different demarcations also depend on who is making the distinctions and why (see Sect. 2.4). For example, the European Environment Agency defines the marine part of a coastal zone as the zone extending 10 km offshore (i.e., as in Natura 2000 coverage analysis) or a variable zone of sea shelf, depending on the issue analyzed (EEA 2006), e.g., navigation routes, territorial waters, fisheries, coastal dynamics, etc.

No matter which geographical or ecological boundaries are adopted, as one goes farther out to sea, less regulation and fewer boundaries exist. Yet high seas areas – the deep marine areas – are important and vast. The deep ocean, defined in a report of The Economics of Ecosystems and Biodiversity (TEEB)² initiative as beyond the continental shelf where water depths vary from 200 to 11,000 m, constitutes the world's largest biome. Deep oceans cover more than 87 % of the ocean (Beaudoin and Pendleton 2012). Though sparsely documented, these areas are thought to contain huge reservoirs of biomass and the largest number of undiscovered species. Studies suggest that conservation of deep-sea biodiversity is essential for sustainable functioning of the entire ocean and, therefore, as development capabilities extend farther out to sea, more attention needs to be directed by environmental planners to these areas.

2.3 When? Historical Developments

Coastal management, and later, marine planning, have taken similar and interconnected routes of development. Experts describe coastal area management as having been stimulated by two basic needs: (a) the need to develop a response to erosion and subsequent environmental degradation, including natural disasters, and (b) the pursuit of economic development, particularly infrastructure such as seaports and recreational facilities (Vallega 1999). In recent years, concerns for

²TEEB is a global initiative supported by UNEP, focused on drawing attention to the economic benefits of biodiversity.

environmental protection and sustainable development of the oceans have brought about the advent of marine planning and management.

In 1991, Stella Vallejo articulated an international perspective of the evolution of the concepts of coastal area management (CAM) and ocean management in her book *Development of Integrated Sea Use Planning*. It included a chronology from 1966 of the increasing number of initiatives in CAM and a review of one of the first pieces of legislation on the topic – the 1972 US Coastal Zone Management Act. Known as the CZM Act, this legislation empowers the US littoral states to implement coastal area management programs. Vallejo pointed out early on that in view of the conceptual basis of CAM, its practical applications present particular challenges. Among these are that “the marine dimension has conceptually emerged as having two distinct components: the coastal area and the ocean area. In practice, planning and management efforts accentuate this dichotomy.” (Vallejo 1991). Unfortunately, this dichotomy continues today.

Probably the two most important developments since the early 1990s, when Vallejo articulated these concerns, have been the advent of *integrated* coastal zone management and the recent burgeoning popularity of marine spatial planning. It seems that ICZM, in some ways, failed to be *integrative* enough to extend to the management of far-from-shore marine areas (Klinger 2004; Portman et al. 2012). In the past decade, marine spatial planning, often with an emphasis on integrating the terrestrial coast with the near-shore marine environment, has moved in to fill the gap.

Both coastal and maritime policies have long been a part of nationally-expressed interests and the subject of many international agreements. The UNCED conference of 1992 in Rio de Janeiro, and the 1993 World Coastal Conference in Noordwijk, The Netherlands, provided kick-off points for concern about coastal zone planning and management. Related conventions and legislation of the mid-1990s set the pace for European coastal development and protection, as they did for much of the developing world.

The European Commission initiated a three-year *Demonstration Program for Integrated Coastal Zone Management* in 1996 that included sites in different member countries. Experiences drawn from this program were used to develop a European strategy for coastal development, which eventually resulted in the European Council Recommendation of May 2002 concerning the implementation of Integrated Coastal Zone Management in Europe (European Parliament 2002). Today, most countries have initiated regional or national efforts towards ICZM (Portman et al. 2012).

Marine spatial planning (MSP) got a much later start. Ehler and Douvère’s *Marine Spatial Planning: A step-by-step approach toward ecosystem-based management*, published in 2009 by UNESCO’s Intergovernmental Oceanographic Commission, is one of the first major texts on how to conduct MSP. The handbook describes MSP as a process of analysing and allocating the spatial and temporal distribution of human activities in marine areas to “achieve ecological, economic, and social objectives, usually specified through a political process” (Ehler and Douvère 2009).

The expansion of offshore activities due to improvements in extraction technologies and the push for greater exploitation of the sea as land resources dwindle has led to interest in MSP as a tool for sea use management. For example, the proactive siting of wind farms was reported as a major factor driving marine spatial plans at the US sub-federal level, such as the Massachusetts Ocean Management Plan of 2009 and the Rhode Island Ocean Special Area Management Plan adopted in 2010 (Eastern Research Group 2010). Also in Germany (Fig. 2.4), offshore wind farm siting has been a factor driving MSP in the German EEZ (Portman et al. 2009). Others have attributed the advent of MSP to the need to meet international and national commitments to biodiversity conservation (Douvere et al. 2007). Several European countries, on their own initiative or driven by European legislation and policy, have taken global leadership in implementing MSP over the last decade (see Chap. 6).

2.4 Who? Institutions and Legal Considerations

Planning, especially in the public domain, is a diverse and interdisciplinary field that continues to evolve as society changes, as democracy matures and as methods of knowledge and understanding improve. If we accept the tenet that planners cannot manage the environment, but rather human activities within it, then we realize that studying the field means understanding human constructs. Human constructs are, by and large, human institutions. In the context of this chapter, I use the term “institutions” in its broadest sense: to refer to human conventions (i.e., laws and regulations), as well as agents and organizations. With the knowledge of public sector institutions available in most modern democratic societies, we can build typologies of these agents for planning and management in particular environments.

Public conventions and institutions are just as essential for the planning of coasts and oceans as they are for terrestrial planning. On land, private institutions often have the upper hand due to the predominance of private land ownership. Due to the public nature of oceans and coasts, public institutions wield more influence than they do in the terrestrial environment. However, that having been said, private influences are now increasing in the marine and coastal environment (Portman 2009).

Although a diverse range of tools and mechanisms exists for planning and management of coastal and marine environments, a few general design principles are worthy of mention. These are foundational drivers that shape regulation and regulatory entities in nations the world over, so planners working in coastal and marine environments should understand these principles and their origins.

Spatial Plan for the German Exclusive Economic Zone of the Baltic Sea - Map -

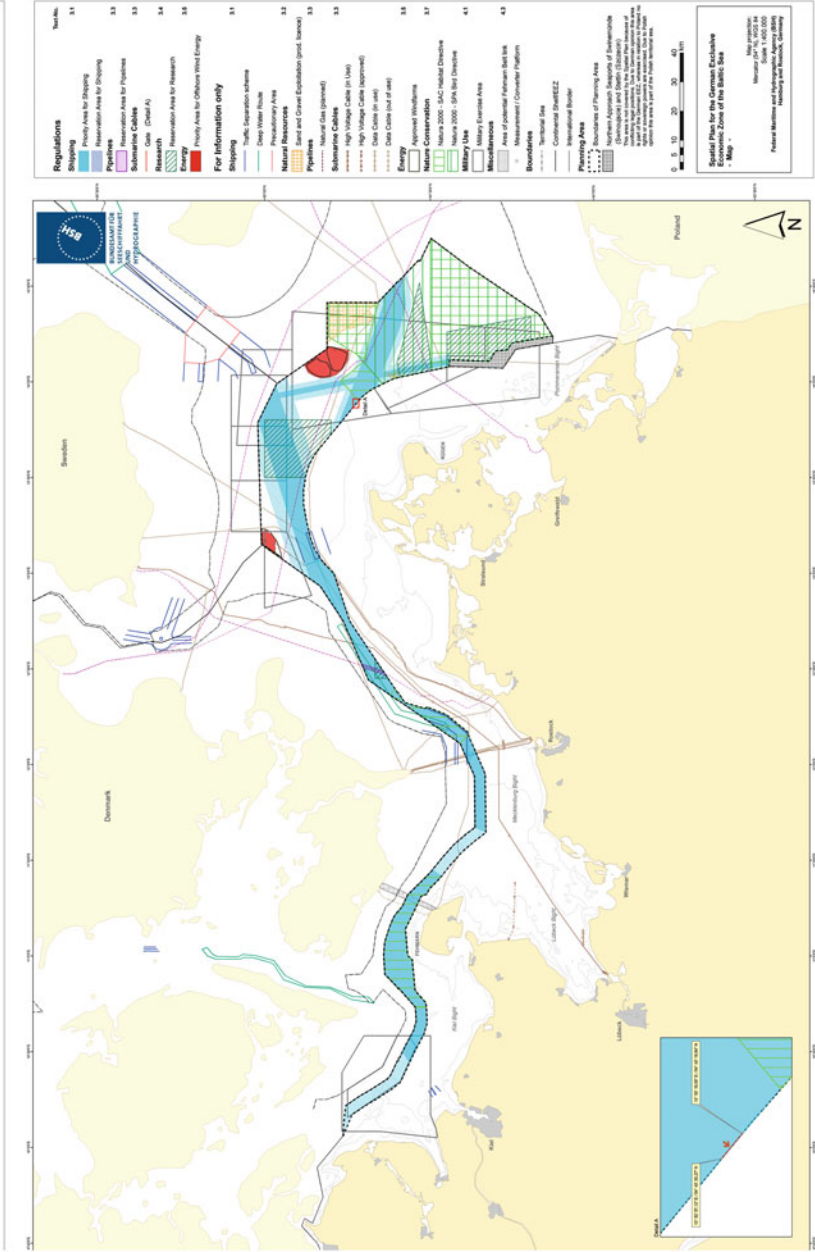


Fig. 2.4 An example of a marine spatial plan for the Baltic Sea, Germany (Reprinted with permission of the Bundesamt für Seeschifffahrt und Hydrographie 2014)

2.4.1 *Regulatory Principles*

Most ocean and coastal policies draw their authority from the public trust doctrine (PTD). This doctrine was first administered through Roman Civil Law and later promulgated by English Common Law. It holds that the air, the sea and the shore belong not to any one person, but to the public at large. The PTD has developed into one of the most important doctrines in public property law (Box 2.4).

Like other aspects of planning and management discussed in this chapter, the PTD has evolved considerably – from being implemented by monarchs to being implemented by federal or sub-federal states. For centuries, England protected its tidelands and waters in the king’s name for all English subjects. In the American colonies, for example, the Colonial Ordinances of 1641–1647 codified the PTD based on the British monarchy’s example. As states joined the union following American independence, they acquired jurisdictions similar to those of the original 13 British colonies that had already acquired all sovereign rights from the British Crown for management of tidelands and submerged coastal areas. Today, most US coastal states have jurisdiction seaward to 3 nm, which is distinct from federal jurisdiction (Archer et al. 1994). In England, the near-shore area is still officially owned by the monarchy’s Crown Estate (Portman 2009).

Box 2.4: The Public Trust Doctrine

“By the law of nature these things are common to all mankind – the air, running water, the sea, and consequently the shores of the sea. No one, therefore, is forbidden to approach the seashore.”

– Principles of Justinian (Liber 2, Tract 1, Section 1), Roman Civil Law Digest, circa 500 A.D.

Major principles of the PTD direct marine and coastal planning: firstly, the public has fundamental rights and interests in the natural resources of the sea and the shore; and secondly, the state, as trustee of the public interest, has a duty to preserve and enhance these resources and to protect the public’s right to use them (Turnipseed et al. 2009). This means that it is the state’s duty to protect access to coastlines and to submerged marine areas *for the public*. Navigational servitude for purposes of commerce and fishing is guaranteed as a public right in most nations that have a system of common law.

All over the world, laws and regulatory programs are administered by a myriad of agencies that have important roles in planning and management of the coastal and the marine environments. To describe all of these agencies – from local, to regional, to global – is beyond the scope of this book. However, some examples are worth noting. The following descriptions are organized according to scales of administration from international/global to those administering local or state programs at the subnational (sub-federal) level.

2.4.2 *International Bodies*

Most international regulatory bodies have limited enforcement power and are based on mutual agreements between nation-states. For example, the UN Convention on the Law of the Sea (UNCLOS) has created a number of institutions to settle conflicts: the International Seabed Authority (Article 156 of UNCLOS) and the International Tribunal of the Law of the Sea (Article 186 of UNCLOS) are two of them. However, nation-states must submit to this authority by signing and ratifying the UNCLOS.

Many international institutions are not regulatory in nature. Rather, they create and execute programs. Some international bodies are characterized by use-sector specialization and thus they serve particular constituencies (e.g., fishermen, ship builders or fiber-optic cable operators). Others may be limited geographically (e.g., to states in a region). Both of these types, sectoral and geographic, operate by cooperating with lower-level governance agencies (e.g., nation-states) and coordinating with other international institutions.

The UN has sponsored many international bodies. For example, the UN Regional Seas Programmes are administered under the auspices of the United Nations Environment Programme (UNEP). Each program comprises a non-regulatory agency that operates at the regional level, bringing together a number of countries that share a sea. The UN also sponsors advisory agencies such as the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), established in 1967 by several UN agencies. Many of these agencies are specialized – they have particular roles such as advising regarding fisheries, regulating commerce or pollution prevention. For example, the International Maritime Organization serves as the UN agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships (see Chap. 5).

The European Union (EU), representing the economic and political union of 28 member states located primarily in Europe, has advanced entities and programs targeting oceans and coasts, operated respectively through a system of supranational, independent institutions and intergovernmental decisions negotiated by its member states. The EU's highest decision-making institution consists of three bodies: the Commission, the Parliament and the Council of Ministries (often referred to as the "Council"). Many EU regulations and directives,³ executed by directorate-generals, impact activities carried out at sea or on the coasts (see Tables 2.1 and 2.2). The EU also issues "Communications" which articulate visions but do not have the authority of regulations or directives. Communications are important in that they signal to interested parties and stakeholders that legislation is being considered or is under development.

³ A directive is a legislative act of the European Union, which requires member states to achieve a particular result without dictating the means of achieving that result. It can be distinguished from EU regulations, which are self-executing and do not require further implementing measures.

Table 2.1 Legislative actions of the EU that impact marine planning and management

Action	Acronym	Type	Responsible directorate ^a
Integrated Maritime Policy	IMP	Regulation	MARE
Common Fisheries Policy	CFP	Regulation	MARE
Marine Strategy Framework Directive	MSFD	Directive	ENV
Natura 2000	N2000	Director	ENV

^aSee Table 2.2 for full name**Table 2.2** Directorates of the EU with some connection to marine and coastal planning and management

	Directorate	Acronym	Selected mandates related to marine/coastal management
Most relevant directorates	Maritime Affairs and Fisheries	MARE	Environmental protection
			Financing fisheries sector
			Maritime policies
			Maritime safety
			Resource management
	Environment	ENV	Climate change
			Coastal management
			European Environment Agency (coast, tourism, transport, energy)
			Water protection
			Marine strategy
			Nature and biodiversity
General directorates influencing marine/coastal management	Research and Innovation	RTD JRC	Biotechnology
			Energy
			Environment/sustainability
			Industrial technologies
			Scientific support for fisheries
	Regional Policy	REGIO	Sustainable maritime transport
			Baltic Sea/Adriatic/Atlantic/Azores
			Coastal zones
			Shipbuilding
	Foreign Policy Instruments Service	EEAS	Tourism
			Transport
			EU in the UN (oceans and Law of the Sea)
	Competition	COMP	Euro-Mediterranean partnership
			External relations (environmental protection, non-EU countries, commercial aid)
			Aid to fisheries sector
			Fishing industry (economic support)
			Maritime transport (freedom, competition, aid transport, aid shipbuilding)

The EU issued its communications on coastal management at the turn of the millennium (European Commission 2000). The Recommendation Concerning the Implementation of Integrated Coastal Zone Management in Europe (2002/413/EC), adopted by the European Parliament and European Council of Ministers, followed in May 2002. This recommendation was momentous as it marked the formalization of eight principles of Integrated Coastal Zone Management (ICZM) that were to be implemented in the member countries of the EU through national strategies for management of the coast (see a list of these principles in Chap. 3).

The EU bases its marine policy on four main pillars: the Marine Strategy Framework Directive (MSFD), the Common Fisheries Policy, the Integrated Maritime Policy (IMP) and Natura 2000. Although these four pillars articulate the EU agenda for planning, management and conservation of its marine areas, various other directives (e.g., the Water Framework Directive, focused mostly on inland waters) also impact the sea and coastal areas.

Complementing these four pillars, the new Maritime Spatial Planning Directive, “Establishing a framework for maritime spatial planning” (2014/89/EU), will require EU member states to develop a spatial, place-based approach to take a long-term look and to improve coordination of activities taking place in marine areas. This latest directive will help implement management and maritime governance policies established in the IMP including, as its environmental pillar, the MSFD (2008/56/EC). The directive clarifies the EU’s commitment to implementing an ecosystem-based approach whilst aiming for “blue-growth”, i.e., economic development of ocean and coastal resources.

2.4.3 *National Entities*

Most countries of the world have promulgated laws and regulatory programs aimed at coastal zone management at the nation-state level for some time. The US example, the Coastal Zone Management Act, in place since 1972, has already been mentioned as one of the first national-level laws addressing coastal planning. In the past decade, new institutions (i.e., agencies and regulation) have developed rapidly for planning and management of the seas.

In the US, although policy makers have considered devising national ocean policy for many years (Stokstad 2009), only in 2010 did President Obama issue Executive Order 13547 for Stewardship of the Ocean, Our Coasts, and the Great Lakes. This Executive Order founded the US National Ocean Council to coordinate the work of the multiple federal agencies already involved in marine conservation and marine planning. It also established advisory committees for the development of regional coastal and marine spatial plans (CMSP) (White House Office of the Press Secretary 2010).

Similarly, in the UK, The Marine and Coastal Access Act of 2009 was mandated to ensure clean, healthy, safe, productive and biologically diverse oceans and seas

by putting in place better systems for delivering sustainable development of the marine and coastal environment. This Act has set up a framework for management and proactive planning. One of its most innovative features is the creation of a “super” overarching management agency, the UK’s Marine Management Organisation (MMO). This approach is distinctly different from most other countries, where governments have created either inter-sectoral committees or appointed a lead agency from those already in existence to oversee the nascent regional marine spatial planning processes.

Beyond the establishment of the MMO, there are two main parts to the system set up by the new Act – the marine policy statement and marine plans. Once these exist, decisions with respect to proposed developments must comply with them. The marine policy statement guides and directs decisions at the national level and sets objectives for sustainable development. The marine plans constitute a source of information to be referenced by stakeholders when considering where and how they might carry out activities. Marine plans are designed to interpret and present national policies based on the marine policy statement and to apply area-specific policy where appropriate.

2.4.4 Sub-federal Agencies

On the subnational and even on the local level, programs once concerned with the terrestrial coastal zone are being extended further and further out to sea. Germany’s federal Spatial Planning Act (*Raumordnungs-gesetz*), enacted in 1965, was amended in 2004 to mandate offshore spatial planning. Germany’s planning establishment has moved forward by addressing both the country’s territorial sea and its EEZ (with the siting of offshore wind farms having been the impetus). The provincial *Länder* governments have taken an active role in planning for territorial waters, whereas the Federal Maritime and Hydrographic Agency (the BSH) has taken the lead for MSP in the EEZ.

Successful subnational regional coastal and marine programs are being extended to more states and provinces and they are being replicated from place to place. Many countries follow the US example in which a national law, such as the Coastal Zone Management Act, gives a great amount of authority and discretion to the subnational states.

Another interesting example is India – an enormous country with a huge coastline. In 1991, India adopted a system (similar to that of the US) with its Coastal Regulation Zone (CRZ) Notification law. This law is administered under India’s Environmental Protection Act of 1986. The CRZ Notification requires the state Coastal Zone Management Authorities to prepare Coastal Zone Management Plans (CZMPs) in consultation with stakeholders, experts, academic institutions or other organizations. Since 1991, the CRZ Notification law has been amended about two dozen times with different guidance and requirements being imposed over the

years. Although the CZMPs are required for regions or states, they ultimately require approval of the Indian Ministry of the Environment and Forests (Portman et al. 2012).

Although many countries have adopted hierarchical planning and management policies for their coastal areas as planning is conducted in areas further out to sea, this model may be less appropriate. The reason is that in these areas, subnational jurisdictions wield less influence. This, together with the newness of planning efforts directed at areas further out to sea, could be an opportunity for greater integration between subnational entities.

2.4.5 Other Groups: Private and Nonprofit

Advocates for proper environmental management among stakeholders interested in particular ocean and coastal activities may be hard to identify at first, but these groups are increasingly vocal and visible. Examples are fishermen who have lost their livelihoods due to overfishing or environmental NGOs interested in moratoriums on whaling. Furthermore, if the ecosystem-based management⁴ approach (described in Chap. 6) is adopted for MSP, then advocacy will be needed to attend to “interests of nature” that are not always represented by stakeholder groups.

In the mid-nineteenth century, when the roots of the environmental movement took hold, private philanthropists were instrumental in setting the conservation agenda. Natural areas were understood to have an inherent worth by “preservationists” such as John Muir, a forefather of the modern conservation movement. Such areas were worthy of financial support for management (and in some cases for purchase) to maintain them in their natural state and protect them from development. Today, organizations such as The Nature Conservancy, the Bahamas National Trust and the Dorset Wildlife Trust do just that on a global, national and local scale respectively and they are expanding their work along coasts to include submerged marine areas (Table 2.3).

Regardless of public trust, private ownership or participatory planning processes, in most democratic societies numerous advocacy groups influence coastal and marine planning. Private individuals can make an impact through monitoring, collecting and reporting data on the marine and coastal environment, and through sharing traditional environmental knowledge (Newmaster et al. 2011).

⁴This approach is defined as an integrated approach to management that considers the entire ecosystem, including humans and their needs, and particularly ecosystem services within them (Mengerink et al. 2009).

Table 2.3 Some marine protection tools used by land trusts with their related opportunities, challenges and limitations

Tools	Opportunities	Challenges/limitations
Protected area co-management	Taps varied expertise	Coordination may be complex
	Involves multiple jurisdictions/authorities	Administrative costs
	Cost-sharing	Possible conflicting objectives
	Facilitates cross-boundary approaches	
	Possibilities for greater public participation	
Acquisition	Greater control for conservation	Expense
	Permanency	Possible in limited areas
		Navigational servitude protection
		Demarcation challenges
		Limited to stationary resources
Strategic planning	Systematic	Long time frame required
	Replicable for networks	Good data needed
	Opportunities for public participation	Demarcation challenges
Zoning	Enables various uses	Good data needed
	Enables various protection levels	High implementation costs
		Statutory authority necessary

Adapted from Portman (2009)

2.5 Summary

In the form of four W's: Why? Where? When? and Who?, this chapter has described some of the institutional conventions related to ocean and coastal environments, why they are needed and who implements them. There are many more issues related to institutions for environmental planning of oceans and coasts. The topics discussed in subsequent chapters will build and expand on this information.

Nevertheless, being acquainted with rudimentary concepts, doctrines and conventions that apply to oceans and coasts at various scales of governance is important. Although large portions of the public seem unaware and unconcerned about what goes on at sea, this is likely to change in the near future. The public trust doctrine still holds, rendering the sea a resource for all – belonging simultaneously to all and to none – and leading to calls for “freedom of the seas” (Van Dyke et al. 1993). Yet freedom does not translate to chaos; planners must determine how human activities can best be allocated while considering relevant values and needs of the populations they serve.

The rest of the chapters in this book are concerned more specifically with tools and mechanisms for planning and management of oceans and coasts. Many of these tools and mechanisms are only functional if the fundamental institutional constructs discussed within are heeded. As alluded to herein, some constructs are dependent on (physical) conditions of the ocean and coastal environment, while others are less so. The next chapter focuses on some physical aspects of coastal and marine environments that set the foundations for delineating constructs used in the planning and management of oceans and coasts.

References

- Agardy T (2000) Information needs for marine protected areas: scientific and societal. *Bull Mar Sci* 66(3):875–888
- Archer JH, Connors DL, Laurence K, Chapin S (1994) The public trust doctrine and the management of America's coasts. University of Massachusetts Press, Amherst
- Balaguer P, Sardá R, Ruiz M, Diedrich A, Vizoso G, Tintoré J (2008) A proposal for boundary delimitation for integrated coastal zone management initiatives. *Ocean Coast Manag* 51(12):806–814
- Beatley T, Brower DJ, Schwab AK (2002) An introduction to coastal zone management. Island Press, Washington, DC
- Beaudoin Y, Pendleton LE (2012) Why value the oceans? A discussion paper. The economics of ecosystems and biodiversity. UNEP and GRID Arendal, Nairobi
- Brenner J, Jimenez JA, Sardá R (2006) Definition of homogeneous environmental management units for the Catalan coast. *Environ Manage* 38(6):993–1005
- Bundesamt für Seeschifffahrt und Hydrographie (2014) Spatial plan for the German exclusive economic zone of the Baltic Sea – map. http://www.bsh.de/en/Marine_uses/Spatial_Planning_in_the_German_EEZ/index.jsp. Accessed July 4, 2014
- Carson R (1941) Under the sea wind. Simon & Schuster, New York
- Carson R (1951) The sea around us. Oxford University Press, Oxford
- Carson R (1955) The edge of the sea. Oxford University Press, Oxford
- Carson R (1962) Silent spring. Houghton Mifflin, New York
- Cicin-Sain B, Knecht RW (1998) Integrated coastal and ocean management: concepts and practices. Island Press, Washington, DC
- Clark JR (1996) Coastal zone management handbook. Lewis Publishers, New York
- Davis RJ, Fitzgerald D (2004) Beaches and coasts. Blackwell Science Ltd., Malden
- Douve F, Maes F, Vanhulle A, Schrijvers J (2007) The role of marine spatial planning in sea use management: the Belgian case. *Mar Policy* 31(2):182–191
- Eastern Research Group I (2010) Marine spatial planning stakeholder analysis. NOAA Coastal Services Center, Lexington
- EEA (2006) The changing faces of Europe's coastal areas. European Environment Agency, Copenhagen
- Ehler C, Douve F (2009) Marine spatial planning: a step-by-step approach toward ecosystem-based management. Intergovernmental Oceanographic Commission and Man and the Biosphere Programme, Paris
- European Commission (2000) Communication from the Commission to the Council and the European Parliament on Integrated Coastal Zone Management: a strategy for Europe. COM (2000)547 final, Brussels

- European Parliament (2002) Recommendation of the European Parliament and Council of 30 May 2002 concerning the implementation of ICZM in Europe (2002/413/EC). *Off J Eur Communities L* 148:24–28
- Halpern BS, Walbridge S, Selkoe KA, Kappel CV, Micheli F, D'Agrosa C, Bruno JF, Casey KS, Ebert C, Fox HE, Fujita R, Heinemann D, Lenihan HS, Madin EMP, Perry MT, Selig ER, Spalding M, Steneck R, Watson R (2008) A global map of human impact on marine ecosystems. *Science* 319:948–952
- Hering J, Ingold K (2012) Water resources management: what should be integrated? *Science* 336(6086):1234–1235
- Klinger T (2004) International ICZM: in search of successful outcomes. *Ocean Coast Manag* 47(2004):195–196
- Lubchenco J, Sutley N (2010) Proposed US policy for ocean, coast, and Great Lakes stewardship. *Science* 328(18):1485–1486
- Mengerink K, Schempp A, Austin J (2009) Ocean and coastal ecosystem based management: implementation handbook. Environmental Law Institute, Washington, DC
- Newmaster AF, Berg KJ, Ragupathy S, Palanisamy M, Sambandan K, Newmaster SG (2011) Local knowledge and conservation of seagrasses in the Tamil Nadu State of India (research report). *J Ethnobiol Ethnomed* 7:37
- Portman ME (2006) Tidelands management: implementation of the Massachusetts Public Water-front Act. *J Environ Policy Plan* 8(4):293–308
- Portman ME (2009) From land to sea: the role of land trusts in marine protection. *Soc Nat Resour* 22(1):12–26
- Portman ME, Duff JA, Köppel J, Reiser J, Higgins ME (2009) Offshore wind energy development in the exclusive economic zone: legal and policy supports and impediments in Germany and the US. *Energy Policy* 37(9):3596–3607
- Portman ME, Esteves LE, Le XQ, Khan AZ (2012) Improving integration for integrated coastal zone management: an eight country study. *Sci Total Environ* 439:194–201
- Roberts CM (2007) The unnatural history of the sea. Island Press, Washington, DC
- Sohn LB, Juras KG, Noyes JE, Franckx E (2010) The law of the sea in a nutshell, 2nd edn. West Publishing, St. Paul
- Sorensen J (1997) National and international efforts at integrated coastal management: definitions, achievements, lessons. *Coast Manag* 25:3–41
- Souder W (2012) On a farther shore, the life and legacy of Rachel Carson. Random House, New York
- Stokstad E (2009) US poised to adopt national ocean policy. *Science* 326:1618
- The White House Office of the Press Secretary (2010) Executive order – Stewardship of the ocean, our coasts, and the Great Lakes, Washington, DC
- Turnipseed M, Roady S, Sagarin R, Crowder LB (2009) The silver anniversary of the United States' exclusive economic zone: twenty-five years of ocean use and abuse, and the possibility of a blue water public trust doctrine. *Ecol Law Q* 36:1–70
- UNEP (2006) Marine and coastal ecosystems and human well-being: a synthesis report based on the findings of the Millennium Ecosystem Assessment. UNEP, Nairobi
- Vallega A (1999) Fundamentals of integrated coastal zone management. Kluwer Academic Publishers, Dordrecht
- Vallejo SMA (1991) The development and management of coastal and marine areas. In: Smith H, Vallega A (eds) The development of integrated sea-use planning. Routledge, London
- Van Dyke JM, Zaelke D, Hewison G (eds) (1993) Freedom for the sea in the 21st century: ocean governance and environmental harmony. Island Press, Washington, DC

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