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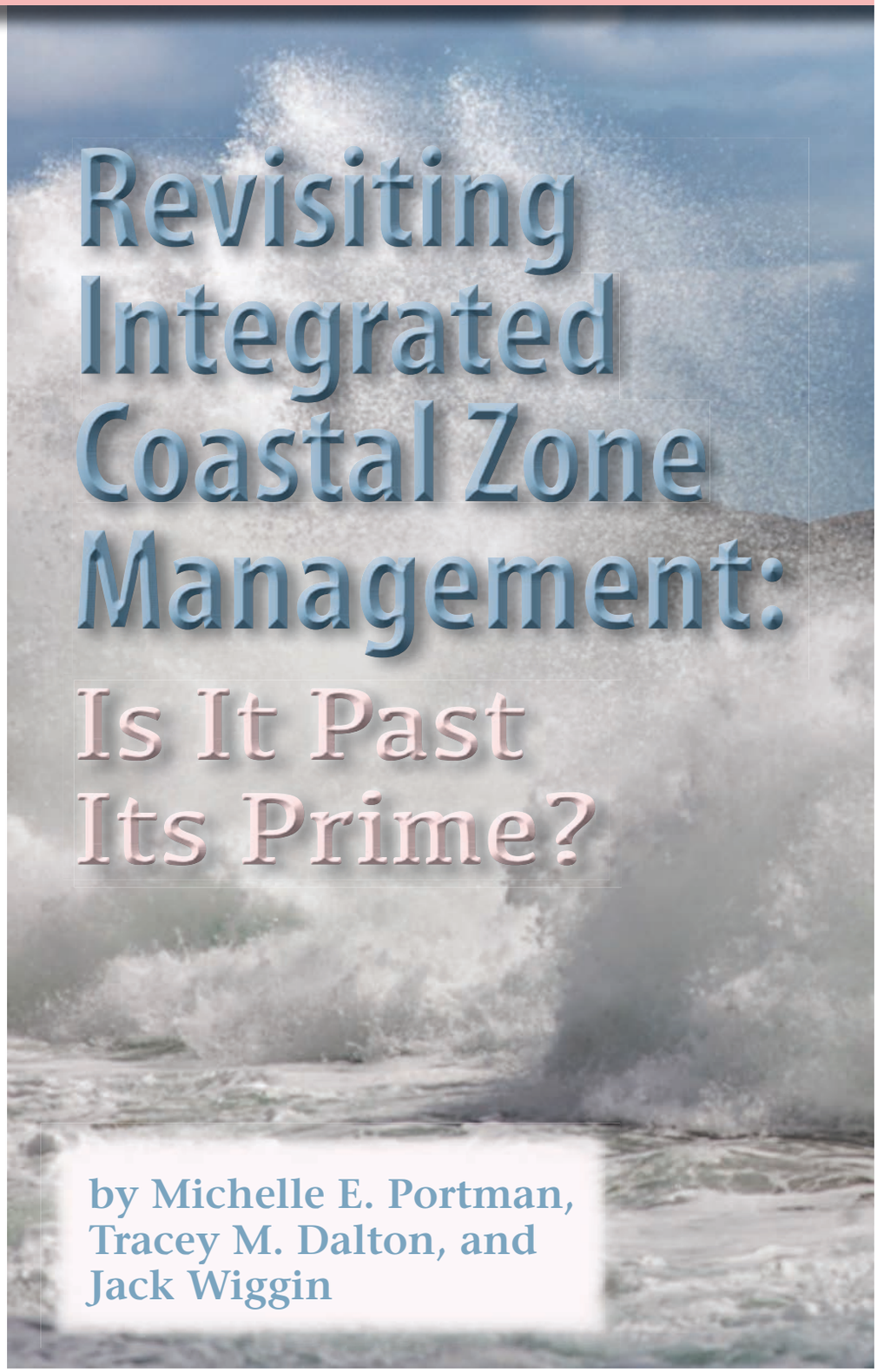

Revisiting Integrated Coastal Zone Management: Is It Past Its Prime?

by Michelle E. Portman, Tracey M. Dalton, and Jack Wiggin

Human populations in coastal zones have grown at unprecedented rates in recent decades. The United Nations (UN) estimates that 44% of the world's population (more people than inhabited the entire globe in 1950) live within 150 km (~93.2 miles) of the coast.[1] In 2010, more than 123 million people, or 39% of the U.S. population, lived in coastal shoreline counties, yet these counties represent less than 10% of the continental U.S. land area. U.S. shorelines are expected to hold the most densely packed communities in the country by 2020, with 446 people per square mile (~2.6 km^2) versus the national average of 105 people per square mile (excluding Alaska).[2] In European Union (EU) countries that have a sea border, a majority of the population lives in statistical regions that are within 50 km from the sea; economic assets within 500 m of the sea in EU countries are estimated to have a collective value of between EUR 500 and 1,000 billion.[3]

As the interface between land and sea, coastal areas are among the most fragile environments on the globe; they consist of ecosystems continually in flux, balancing kinetic and gravitational forces and containing mosaics of abiotic and biotic resources. The meeting of land and sea provides significant benefits to humans, including coastal protection (e.g., barrier islands), fish nurseries (e.g., reefs), recreational sites, and the provision of beach sand that originates in uplands is transported to the coast by rivers and streams, and then is carried by ocean currents. Yet human development, coupled with the effects of climate change including sea-level rise and more frequent and intensified storms, renders coasts increasingly malleable and human populations highly vulnerable.

Beginning approximately four decades ago, the failure of traditional approaches for managing fragile coastal and marine environments, particularly those applied to commercial fisheries and for coastal conservation, led many countries to adopt integrated coastal zone management (ICZM). This approach focuses on the principle of integration, a widely used (or at least desired) practice, with myriad applications for management of resources such as energy and water, as well as for general environmental policy.[4]

One of the earliest articulations of the importance of integration is from

Intensified and more frequent storm action endangers infrastructure.

the seminal publication framing sustainable development, *Our Common Future*. The text of Agenda 21 adopted at the UN's Earth Summit in Rio de Janeiro shortly thereafter (1992), established integration as a sought-after principle of sustainable resource management. Chapter 17 of Agenda 21 dealt with applying integration specifically to the coastal environment. Related conventions and legislation of the mid 1990s, such as the Jakarta Mandate on Marine and Coastal Biodiversity under the Convention on Biological Diversity and the UN Food and Agriculture

Old bridge on the Overseas Highway, Florida.

Development that results in significant shoreline change threatens coastal ecosystem services, such as natural shoreline protection provided by coastal wetlands.

Wharfside Shops near Duck, North Carolina, on the Albemarle Sound.

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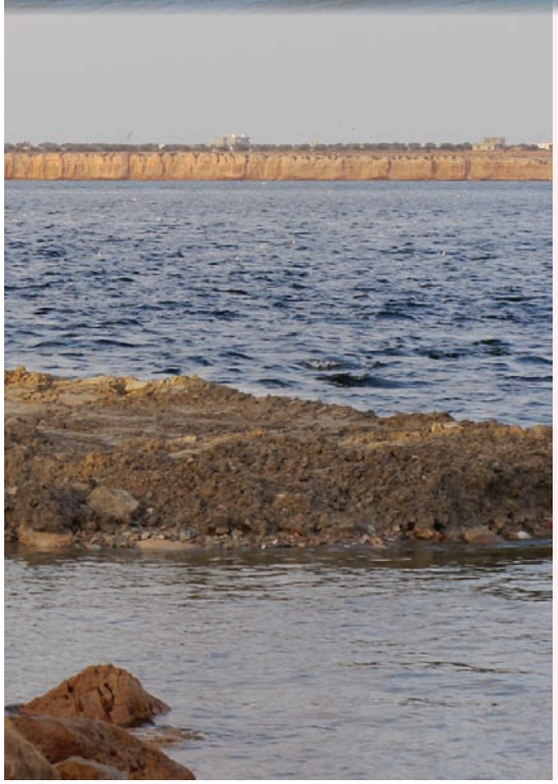

Organization's Code of Conduct for Responsible Fisheries (both of 1995), established principles for European coastal development and protection, as they did for much of the developing world, based on tenets of ICZM.[5] Definitions of the approach have evolved over time and vary, often depending on policymakers' specific objectives or on the particular conditions and problems to be addressed.

Broadly, ICZM is defined as a "process by which decisions are made for the sustainable use, development and protection of coastal and marine areas and resources."[5] A recent description of ICZM as a "multi-sectoral governance approach which strives to balance development, use and protection of coastal environments … based on principles such as holistic and ecosystem-based approach[es], good governance, inter and intra-generational solidarity, safeguarding the distinctiveness of coasts, precautionary and preventive principle[s]"[6] adds further detail to what is an already lofty ideal. Hundreds of ICZM efforts have been implemented around the world, with sponsors spending millions of dollars on these efforts,[7] many of which include significant capacity building in the developing world by those countries more experienced with the approach.

The United States established legislation in the early 1970s that encouraged coordination among government levels and emphasized planning and management of multiple human activities at the land-sea interface.[8] In 2002, the EU

ratified the "Recommendations concerning the implementation of ICZM in Europe (2002/413/EC)," establishing eight principles to guide member states in ICZM projects and requiring that they report at set intervals on their progress in ICZM.[9] Since these developments, the European research establishment has invested significant resources in researching and promoting further implementation of the approach (see, for example, in note 4), and in some respects efforts have paid off. As recently as 2010, a new ICZM Protocol to the Barcelona Convention for the Mediterranean Sea entered into force, directing countries and management agencies to ensure that decision making about coastal resource use is transparent and involves stakeholders and local populations, and that use allocation is balanced among diverse activities.[10] Other countries and regions continue to establish ICZM programs today.

Yet with all these efforts, has there been much tangible progress in achieving ICZM goals? Some experts say no or not enough.[11] Concerns have been raised as ICZM enters its fourth decade about the feasibility of the approach and its usefulness. Sustainable development, promoting the achievement of both environmental and economic development goals, underpinned the earliest ICZM efforts. Recent discussions of sustainable development have been increasingly critical

Looking across Assawoman Bay from the Isle of Wight Nature Park near Ocean City, Maryland, at the Ocean City skyline.

of the ability to achieve multiple goals simultaneously, and they encourage more critical evaluation of resource management outcomes.[12] ICZM efforts have been criticized over the years for being implemented from the top-down or by external agents, and ignoring important social dynamics in local coastal communities.[7,13] Another challenge is the tendency for ICZM efforts to operate independently from other comprehensive management initiatives, like ecosystem-based management (EBM) or marine spatial planning and management (MSPM).

In contrast to earlier coastal management approaches, ICZM emphasizes integration across multiple dimensions, including space, sectors, levels of government, science and management disciplines, and international boundaries. Spatial integration refers to management across landscape units, that is, integration of management of upland, coastal, and marine areas.[4] Yet the more recent emergence of MSPM, putting independent emphasis on management of marine areas (usually in the near-shore territorial sea area of coastal states), would seem to indicate that there has been limited success at integration in this regard. By the same token, MSPM is almost always described as "integrated," yet if coastal uplands are left out of the planning process, how integrative is this approach?[14] And what is the relationship of MSPM to integrated coastal planning and management?

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Aerial view from a helicopter shows cultivated farm land and the Pacific Ocean.

Integrating Integration

It has become increasingly clear that the ICZM of four decades ago cannot be the ICZM of today, even though implementation in various country contexts varies widely.[12,13] We propose that ICZM be more responsive to recent shifts in academic and practical perspectives. In particular, ICZM efforts should recognize that fully achieving economic development and environmental protection goals is not always attainable. Assessments of ICZM should consider multiple outcomes of coastal policy initiatives and explicitly compare synergies and trade-offs among these outcomes.[15] For instance, coastal management interventions can simultaneously improve biological resources while increasing conflict within local communities or enhance stakeholder communication while reducing fish abundance.[16]

To be fully integrative, ICZM efforts should also accommodate other approaches that affect the land–sea interface, like MSPM, EBM, or integrated watershed management (IWM).[17] Since it is unclear what the boundaries of ICZM are, especially within territorial sea jurisdictions, policies derived from MSPM, EBM, or IWM and those addressing the coastal zone will undoubtedly overlap. Boundaries are frequently an issue of concern for resource policy that has spatial dimensions and there is much to be learned from these other approaches. Finally, ICZM evaluations should shift focus away from a primarily national perspective to detailed investigations of local level context and dynamics which considerably influence the performance of coastal management efforts.[18]

The Future of ICZM

We propose not giving up on ICZM, but rather tailoring it so that it can keep pace with recent advances in science and management related to coastal systems. ICZM should continue with an eye toward more critical assessment of trade-offs associated with coastal management efforts, integration with other comprehensive management approaches (such as marine spatial planning and coastal adaptation to climate change), and greater understanding of local-level dynamics in communities with ICZM programs. All these should be supported by further research on

conditions promoting success or failure of integrative aspects of such programs.

Integrated marine management efforts in Europe reflect the discussion and controversy regarding new uses of the sea and the need to meet commitments to protect the marine environment in a way that includes the coasts. Following earlier communications about the marine environment (such as the Thematic Strategy on the Protection and Conservation of the Marine Environment), the European Commission published its guidelines for integrated marine policy in 2008. The "Roadmap for Maritime Spatial Planning: Achieving Common Principles in the European Union" of November 2008 was followed by the 2010 Communication "Maritime Spatial Planning in the EU—Achievements and Future Development." The latest effort (as of this writing) is reflected in a European Commission communication proposing a directive that will establish a framework for maritime spatial planning *and* integrated coastal management for Europe.[19] This proposal, seen as essential to the development of Europe's "Blue Economy," is particularly interesting due to its treatment of both ICZM and MSP, although the result has been the Directive 2014/89/EU which focuses mostly on the latter.[20]

Another promising area for the integration of efforts and initiatives is that of hazard and adaptation planning. The 2014 Working Group II report of the Intergovernmental Panel on Climate Change (IPCC) warns that low-lying coastal areas are increasingly exposed to risks from sea-level rise, flooding, and extreme storm events.[21] Low-lying coasts of developing countries are particularly vulnerable because (1) they lack capacity to respond quickly and effectively to natural disasters, and (2) as coastal habitats disappear, so does natural protection for people and property in these areas. Integration could aid through international efforts of disaster relief in the short term (for such instances as Typhoon Haiyan, which occurred in the Philippines in 2013) and through scientific research aimed at identifying vulnerable coastal population and regions, forecasting scope and scale of future threats, and developing realistic long-term coastal adaptation strategies.[22] These activities conform with objectives of the Global Environment Facility (GEF) Adaptation Program,[23] which serves as a financial mechanism to the United Nations Framework Convention on Climate Change and could also take a lead in capacity building for integrated coastal management practices.

Leveraging such programs and efforts could breathe new life into the ICZM of old, but only if tailored to local contexts and appropriately scaled down. Contextual factors, like the amount of tourism, level of developed

Aerial view of Ipanema and Leblon Beach and Vidigal Favela, Rio de Janeiro, Brazil.

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coastline, or relationships among individuals in a community, can affect the success of ICZM efforts. For instance, outcomes of community-based ICZM projects in the Philippines were influenced by the level of tourism in the community, with higher levels of tourism associated with more ICZM rule compliance and decreased quality of life.[24] Coastal management activities in Brazil and Indonesia further highlight the importance of understanding preexisting hierarchies of power and relationships among government agencies, scientists, and local resource users before implementing ICZM measures.[25] Ignoring local context can hinder ICZM efforts, as seen in the implementation of Japan's ICZM Guidelines, which created new coastal districts that do not align with existing administrative boundaries and did not take into account ongoing, potentially overlapping planning efforts.[26]

Conclusions

While moving forward with efforts such as integrated marine planning and coastal adaptation planning, policymakers and practitioners should not neglect or forget ICZM, but they should perhaps strive to change it. They must consider its lessons and principles within a larger context and focus on issues far beyond "integration". Despite the many dimensions of integration—political, spatial, temporal, and so on—the fact that other approaches (i.e., marine spatial planning, coastal adaptation to climate change, etc.) have developed quickly, recently, and more or less in parallel, hints at the many challenges to ICZM and to its shortcomings as well.

The good news is that there are many case studies that shed light on new directions for ICZM. Some we mentioned briefly here. In summary, ICZM's principles are still important and can contribute, but its proponents should be aware of dedicated research results and findings. This means crossing the science–policy divide. This divide engenders responses to climate change, such as protection against coastal hazards and sea-level rise adaptation strategies, that fail to include principles of ICZM. Integrating science and policy should be the new focus of ICZM. Too much good work has been done to be ignored.

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