

GESTÃO AMBIENTAL E SUSTENTABILIDADE EM ÁREAS COSTEIRAS E MARINHAS: CONCEITOS E PRÁTICAS – Volume I

ENVIRONMENTAL MANAGEMENT AND SUSTAINABILITY IN COASTAL AND MARINE AREAS: CONCEPTS AND PRACTICES – Volume I

PART I - CONCEPTS

I.1 - Os limites espaciais da zona costeira para fins de gestão a partir de uma perspectiva integrada

Spaced boundaries of the coastal zone for management purposes from an integrated perspective

Flavia Moraes Lins-de-Barros e Celene Milanés Batista

ABSTRACT

Deep conceptual, theoretical and methodological studies are required when analyzing coastal limits with the aim of achieving better understanding and greater contribution to the right planning and management of those geographical spaces. Some considerations about the aim of coastal zones, as well as different criteria for their spatial delimitation, are given in the present Chapter. Results of a research work about the great diversity of approaches and methodologies influencing on coasts for getting effective integrated coastal planning and management, are also given here, establishing, at the same time, critical assessment of every approach analyzed. Contribution and insufficiencies of previous works about coastal and marine areas are also detailed as a result of the bibliographical review, reality observation and authors' great knowledge about the theme. Coastal zone boundaries is analyzed in this Chapter taking into account the geomorphological, ecological, socio-demographic and other approaches more integrally influencing on territorial planning and management. At the end of the Chapter, a review is given about different criteria to delimitate the coastal zone, with special emphasis on management of beach ecosystems. Coastal management in Brazil and Cuba are analyzed as Study Cases. In both cases, spatial delimitation of coastal zones constitutes one of the most important challenges for coastal management. The new methodologies, norms and plans of those countries regarding management, represent important contribution to territorial delimitation, leading to guarantee adequate coastal and marine Management and Planning.

Keywords: Coastal boundaries, integrated coastal zone management, spatial delimitation of coastal zones, Cuba, Brazil.

I.2 – Circulação nas escalas costeira, de plataforma e de grande escala e sua influência na zona costeira

Circulation at coastal, Continental Shelf and large scales and their influence on the coastal zone

Douglas Vieira da Silva

ABSTRACT

The coastal zone are the transition between the influence of terrestrial and marine processes, characterized by the interplay of the fluvial discharge and transports due ocean currents and its physical parameters. The circulation of the coastal zone are associated with the local and remote processes, booths ranging in the temporal and spacial scales, generating a wide variability of currents and transport mechanism in this smaller environment when compared with the open ocean. Large scale processes are originated from the deep ocean and propagate to the continental shelf, forcing other processes in this shallower environment merging with mechanisms developed in the coastal zone. This downscale of circulation processes assume different scales, hence the influence of these processes over structure of the coastal zone and marginal sea are distinctive from behavior of the continental shelf and ocean. Definitely, the coastal zone represents a point of convergence between various processes, implying that this environment have abrupt changes, as by the landfall of coastal storms or by disruptive human interference. Also, long term changes can affect coastal zones due changes in the relative sea mean level, which shift the equilibrium between terrestrial and marine processes. This effects are characterized by changes in the pattern of currents, which can alter the pattern of sediment transport and hence the evolution of the coastline. In this chapter the major processes of circulation and transport which occur from the deep ocean, to the continental shelf and finally progress to the coastal zone are presented, and some of the problems related to human impacts associated with theses processes over this transitional zone.

Keywords: Circulation, Transport, coastal ocean, continental shelf, nearshore.

I.3 – Áreas protegidas marinhas e costeiras no Brasil: um diagnóstico a partir das categorias de manejo

Marine and coastal protected areas in Brazil: a diagnosis based on management categories

Deividson Brito Gatto

ABSTRACT

The chapter “Protected Areas in the Brazilian Coastal Zone: A Review Based on Management Categories” aims to present the set of protected areas in the marine and associated biomes in Brazil using the National Register of Conservation Units database (CNUC) maintained by the Ministry of Environment (MMA) in cooperation with the governing bodies of the three levels of government and the private sector. As a management tool, if properly implemented and managed, protected areas can contribute to the pursuit of biodiversity conservation and minimization of the process of global biodiversity loss. In the coastal zone, protected areas have increased more than 15 times since 1993, and since 2016, more than 8 million km² of new areas have been added on the globe, this growth is the result of the declaration of extensive marine reserves created by Brazil and Mexico driven by international agreements of 2030 agenda for Sustainable Development and the Aichi Targets. The chapter provides a review of protected areas in the coastal zone available in the Brazilian conservation units CNUC panel distributed in the full protection group and the sustainable use group. Characteristics related to the size of protected areas in km², administrative level, year of creation, management plan and management council are presented. Also, an example of the implementation of each existing conservation unit (UC) category advertised on the UC web page is presented. An opportunity to know the presence of these units in the geographical spaces in which they operate, recognize their importance and their limits to the conservation and combat of biodiversity loss.

Keywords: Coastal Zone; Conservation units; Sustainable Use; Integral protection.

I.4 - Indicadores aplicados ao Gerenciamento Costeiro Integrado sob a ótica dos Objetivos de Desenvolvimento Sustentável das Nações Unidas

Indicators applied to Integrated Coastal Management from the perspective of the United Nations Sustainable Development Goals

Raquel Dezidério Souto e André Cavalcante da Silva Batalhão

ABSTRACT

This chapter discusses aspects of the thematic of the coastal zone and how the sustainability indicators can assist in coastal diagnosis and management. Fundamentals of the integrated coastal zone management are also presented, including normative references for the development of this field in Brazil, through the approval of important legal mechanisms, such as the Federal Law 7661/1988, which instituted the National Coastal Management Plan, and its regulation by through the Decree 5300/2004. The goals and indicators for coastal and marine areas contained in the United Nations' Sustainable Development Goal 14 are contemplated, due to their importance for the conservation of the environments in question. Finally, some initiatives using sustainability indicators in coastal areas in different countries are presented in this chapter. From reading it, the reader is expected to understand the importance of conserving coastal and marine areas, and the importance of applying manageable metrics in sustainability assessments for coastal areas.

Keywords: sustainability indicators, integrated coastal zone management, sustainable development goals.

PART II - PRATICES

II.1 - Mapeamento participativo como ferramenta para conhecer a qualidade ambiental da zona costeira

Participatory mapping as a tool to know the environmental quality of the coastal zone

Raquel Dezidério Souto

ABSTRACT

The Coastal Zone is an important biome from an environmental and economic point of view, which suffers anthropic pressures from the most varied origins. With the advent of the Integrated Coastal Zone Management, several plans and actions have been developed to manage coastal resources in order to conserve the ecological integrity of this area and increase the quality of life of the population that inhabits it. In Brazil, Federal Law No. 7661/1998 instituted the National Coastal Management Plan, which was regulated by Decree No. 5300/2004, which, in turn, provided for some instruments for its effectiveness. However, the implementation of the instruments is still incipient in the country. Participatory mapping can be a valuable tool for environmental evaluation, the first phase of the coastal management process. In addition, this type of mapping helps to raise environmental awareness among the population, providing the means to act as a protector of the coast, through the empowerment of the community in decision-making processes. With this chapter, it is expected to discuss aspects of the use of participatory mapping and to contribute with informational support for the proposal of new research projects involving the coastal zone.

Keywords: participatory mapping, integrated coastal management, coastal zone, environmental evaluation.

II.2 – Comparação de dois índices de determinação do grau de trofia das águas em bacias hidrográficas costeiras

Comparison of two indices for determining the degree of water trophy in coastal watersheds

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ABSTRACT

Eutrophication of coastal systems is a global problematic, which compromises the quality of inland and marine waters. The classification of trophic status of waters is by using indicators and indices that use variables that describe the primary symptoms and / or secondary eutrophication. The trophic status index are tools that classify the aquatic system against anthropogenic pressure, from ultraoligotrophic to hypereutrophic. This research evaluated the decade variation, from 2006 to 2017, of the trophic state of estuaries that flow into the Bay of Santa Catarina Island, Florianópolis - Santa Catarina, the Ratonas, Itacorubi and Tavares estuaries. The Trophic State Index (TSI), Trophic Index (TRIX) and efficiency coefficient (EC) were estimated from data available in the scientific and academic literature. The eutrophication process in the estuaries was associated with the advance of the urban area and the deficiency in the collection and treatment of domestic effluents throughout the analyzed period. The TSI results classified the waters of rivers Ratonas, Itacorubi and Tavares as mesotrophic to hypertrophic. The categorization by TRIX identified the states between mesotrophic to eutrophic. The classification given by the TSI indicated a worse trophic state in the environments, in comparison to the results generated by TRIX. With the application of the Efficiency Coefficient (EC) it was found that the abiotic variables (nitrogen and phosphorus) represented 54% of the composition of TRIX, that is, that the amount of nutrients that enter the environments are the greatest stressors in the estuaries. The TRIX is an index built with more variables than the Tsi and when combined with the result of the EC gives better information on the trophic status of coastal waters, which justifies its use in coastal management. This index has been widely used by the European Union. The lack of systematic monitoring undermines a more accurate and integrated analysis of eutrophication and its impacts on aquatic ecosystems. In addition to establishing water quality monitoring, there is a need to create specific legislation to control the eutrophication process in the coastal zone and the application of more robust indices that assist in decision-making by environmental agencies.

Keywords: Watershed Coastal; Eutrophication; Trophic State Index; Trophic Index.

II.3 – Condições oceanográficas multiescala e processos costeiros associados: Estudo de caso do litoral de Marataízes (ES)

Multiscale oceanographic conditions and associated coastal processes: Case study of the Marataízes coast (ES)

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ABSTRACT

Oceanographic conditions impose a series of adaptations on the coastal morphology, both in time and space making coastal environments highly dynamic. Superimposed over the natural dynamics, the urbanization of coastal areas along with the high density of occupation affects the sedimentary budget of the coastlines from the installation of rigid structures. The knowledge about the different variables involved in coastal modelling is a condition for an efficient prognosis about the possible social and economic risks and damages arising from oceanographic changes at different scales. The use of techniques and tools for geomorphological analysis appears as an alternative for the diagnosis of current conditions and can support projections of future risks. On the southern coast of Espírito Santo, a natural fragility associated with the urbanization process resulted in an intense erosion process. To identify the causes and evolution of the process, different multiscale methods and tools were used. This chapter provides a review of the main oceanographic forcings at different temporal and spatial scales, including the accelerated climatic variations predicted for the 21st century, and the resulting changes in coastlines. A case study of the coast of Marataízes is presented, in which the evolution of erosive processes and concerns about their causes are discussed.

Keywords: Coastal geomorphology; geomorphological analysis; beach morphodynamics; sea level variations.

II.4 – Portos marítimos e os desafios para a sustentabilidade costeira

Seaports and challenges for coastal sustainability

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ABSTRACT

The seaport and maritime sector have been growing in the last decades in Brazil, and it has established as a strategic activity for socioeconomic development. The coastline geographical features have historically benefited the seaports installation, but on the other hand, the port activity works as a significant driver of pressure for the social and environmental components. Through the cabotage and long navigation routes increasing, in addition to new harbors and port complex dynamization, with brings cargos handling growth, besides the demand for coastal green field areas, there are an increasing of risks and threatens to coastal environment sustainability. Negative environmental impacts and conflicts promoted by seaports degrade the coastal and marine ecosystem quality and functioning, diminishing its capacity to provide ecosystem services and essential goods to society, as well as for economic activities and the port sector itself. The scenario set up becomes coastal governance even more complex and urgent to be applied. The research approaches the current demand for strategies and goals under an Integrated Coastal Management perspective, associated with integrated diagnostics development, strategic environmental assessment, and the inclusion of seaports planning in the context of marine and coastal management, as well. There were analyzed different port activities in the whole sector of the Brazilian coastal zone, focusing on the challenges and opportunities of linkage and integration between policy, normative, management and planning tools related to seaports and coastal environment. Thus, the reflection made in this book chapter aimed to contribute to a high-level discussion of ports expansion trends and its implications on coastal sustainability, in the scope of Integrated Coastal Zone Management and natural resources management and policy.

Keywords: Integrated Coastal Zone Management, seaports, environmental management.