

Coastal Human Ecology: Uniting Science and Society for the Preservation of Marine Ecosystems

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Abstract

Coastal ecosystems are vital to the health of our planet. They provide essential services such as food, protection from storms, and carbon sequestration, while also serving as valuable habitats for a diverse range of marine species. However, coastal areas face numerous threats from human activities, including overfishing, habitat destruction, pollution, and climate change. To address these challenges effectively, it is crucial to adopt a holistic approach that considers both the ecological and human dimensions of coastal systems. This is where Coastal Human Ecology (CHE) comes into play, offering a valuable perspective for marine conservation. Coastal human ecology (CHE) is a mixture of different theoretical and thematic approaches straddling between the humanities and social and natural sciences which studies human and coastal/marine interactions at the local-scale and through intense fieldwork. Topics of interest include human coastal adaptations past and present; the historical ecology of fisheries and future implications; local forms of marine governance and economic systems; local food security and livelihoods, and indigenous/local ecological knowledge systems among many research themes.

Introduction

Coastal Human Ecology is an interdisciplinary field that integrates social, economic, and cultural aspects with ecological knowledge to understand the complex interactions between humans and coastal environments. It recognizes that humans are not separate from nature but are an integral part of it, and their actions significantly impact the health and sustainability of coastal ecosystems. By examining the relationships between people and their coastal environments, CHE seeks to develop strategies that promote both human well-being and the conservation of marine resources [1].

Coastal and near shore marine ecosystems are severely threatened by human activities. While this threat is spread across all habitat types coral reefs are among the most vulnerable coastal ecosystems in the world. Multiple anthropogenic stressors such as marine pollution and sedimentation, overfishing, ocean acidification, plastics, sea level rise, etc. are severely impacting the oceans and coasts and this degradation is likely to worsen as the human population continues to grow and move to the coast. From a research perspective, dealing with human driven threats to coasts and oceans will require mustering and combining a number of natural and social science disciplines to improve marine habitat management and increase the effectiveness of local interventions. Paying attention to the interactions between humans and the environment for resource management and conservation has been recognized for decades with economic approaches being emphasized in mainstream management and conservation [2].

Archaeology and coastal adaptations

Because many countries lack sufficient laws to protect archaeological sites, particularly in coastal areas where development is extremely desirable, archaeologists are working quickly to survey and record the wide array of prehistoric settlements in these regions before they are disturbed or destroyed [3]. Given the volume of coastal archaeological sites around the world, the complexities of site preservation, and the dearth of funding, this is often a daunting task that goes unrecognized by the non -archaeologist. Trying to convince local governments of the need to preserve coastal archaeological sites becomes even more complicated when one considers the growing threat of climate change that will lead to sea level rise and a host of associated issues such as

more intensive and frequent storm activity [4].

Indigenous navigational systems and trade networks

The archaeological study of human navigation and coastal adaptation strategies stretches back for decades and in the context of shipwreck/nautical and underwater archaeology, George Bass' seminal research stretched across the Mediterranean to provide a unique window into the ancient past of maritime cultures through the in situ excavation of ancient shipwrecks. The trade route included bridges, causeways, stairways and crossed plains, deserts and mountains. The route was used for trade, to move armies, connect communities and included bridges, causeways and stairways; substantial portions of the network survive today [5].

Historical ecology of fisheries and seascapes

This thesis has lifted a central role in addressing important seascape ecology questions and tools in the temperate marine environment. Specifically, it highlights the importance of analyzing patterns and processes at multiple scales to gain a more comprehensive understanding of the relationships between fish and their environments, which is relevant for marine spatial planning and conservation. The importance of connectivity of a marine predator was discovered using acoustic telemetry and network analysis [6]. This study demonstrated that sea surface temperature was of major importance for Atlantic cod movement dynamics within a fjord system as well as revealing the significance of localized connectivity at varying spatial and temporal scales [7].

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Contributions to marine conservation

Marine conservation focuses on activities that make a positive impact in maintaining the health of the ocean environment and marine life. Because creatures in the sea and on land depend on our oceans, we could all benefit from a proactive approach to marine conservation. Our oceans contain 97 percent of the world's water resources [8].

They are rich in biodiversity and supply natural resources, food as well as active substances for medicines. Furthermore, they store energy supplies, serve as routes of transport and offer high recreational value. Marine conservationists rely on a combination of scientific principles derived from marine biology, Ecology, oceanography, and fisheries science, as well as on human factors, such as demand for marine resources, maritime law, economics, and policy, in order to determine how to best protect and conserve marine species [9].

Climate change is one of the most significant threats to coastal ecosystems and human communities. Rising sea levels, increased storm intensity, and ocean acidification are just some of the challenges that coastal areas face. CHE recognizes that climate change adaptation and mitigation efforts must be integrated into marine conservation strategies. This includes building coastal resilience, developing sustainable adaptation measures, and reducing greenhouse gas emissions. By incorporating community-based approaches and engaging local stakeholders, CHE can foster resilience and empower coastal communities to adapt to the changing climate [10].

Conclusion

Perspectives in Coastal Human Ecology offer valuable insights and approaches for marine conservation. By integrating ecological knowledge with social, economic, and cultural perspectives, CHE can contribute to more effective and sustainable management of coastal ecosystems. Through community engagement, consideration of local knowledge, and promotion of social equity, CHE can help bridge the gap between humans and nature, fostering a harmonious relationship that supports both the well-being of coastal communities and the conservation of marine resources. Embracing this interdisciplinary perspective is crucial for ensuring a healthy and prosperous future for our coastal environments.

In this sense, CHE researchers through their long-term engagements with people and nuanced understanding of their social and ecological systems can provide, in part, the foundational knowledge that is so necessary for environmental education and to perhaps begin changing our environmental attitudes for saving the oceans. It is also time to stop pretending that “big science” and international environmental treaties alone can solve environmental problems locally. Perhaps we need to reinvigorate research traditions that scale down to uncover micro-ecological and micro-socioeconomic processes, and using this actionable knowledge to build marine conservation programs one at the. And then use cross-case and cross-cultural examples to scale-up to regional, national, and international interventions.

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