



MARES

Marine Ecosystem Services Program



**Conserving Ocean Ecosystems and
Safeguarding Coastal Communities**



**F O R E S T
T R E N D S**

Marine Ecosystem Services

Supporting Coastal Ecosystems and Communities

Ecosystem services are produced by healthy, well-functioning environments and provide great benefit to humans worldwide. Such services include provisioning of food and water resources, as well as regulating and supporting functions such as flood control, waste management, water balance, climate regulation, and other processes. Human reliance on these ecosystem services is fundamental – although we rarely recognize the value of ecosystem services until they are lost.

The oceans provide a great many of these critical but undervalued services supporting not only coastal inhabitants but all life on the planet. Wetlands maintain hydrological balances, recharge freshwater aquifers, prevent erosion, and buffer land from storms. Forty percent of the global population now lives within the thin band of coastal area that is only 5% of the total land mass, and dependence on these coastal systems, especially wetlands, reefs, or estuaries, is increasing.

Nearly 40% of the global population lives within the coastal zone, depending directly on coastal ecosystem services for livelihoods, as well as general human well-being.

Coastal and marine ecosystems are naturally dynamic, but recent changes have been unparalleled. Waterways have been dredged; wetlands, filled or drained; and coastal areas, developed. Overfishing and destructive fishing have caused major fisheries collapses and disrupted food webs. However, the impacts to the marine environment extend beyond those activities immediately along the coasts and in the oceans. Land and freshwater use in watersheds have dramatically altered sediment transport and hydrology. Too many and too much nutrients reaching our shores have made coastal waters the most highly chemically-altered environments in the world. All of these impacts compound the vulnerability to rising sea levels and more frequent and more severe storm events due to global climate change.



Protecting Humans on Land by Looking Out to Sea; Protecting Oceans by Looking Back to Land

Coastal ecosystems are near thresholds for healthy functioning, putting coastal populations ever more at risk. Innovative solutions must be sought to complement conventional coastal and marine management to safeguard human well-being.

The very complex nature of coastal and marine ecosystems, while posing conservation challenges, also provides vast opportunities for marine conservation. The many ecosystem functions and services that coastal and marine ecosystems provide are in fact tightly interlinked. For example, by conserving mangroves to protect biodiversity, fish nursery habitats remain intact leading to increased fisheries production; the natural waste processing function of mangroves remains leading to better water quality; coastal zones are also better buffered from the potential damaging impacts of storms; and the carbon remains stored in mangrove soils and trees. Similar cases can be made for other marine ecosystem services.

Not only are marine ecosystem services themselves interconnected; coastal and marine ecosystems are also inextricably linked to the activities on land.

Recognizing the impacts terrestrial systems have on coastal and marine areas, marine and coastal conservation strategies are increasingly taking a more holistic, or “ridge-to-reef,” approach. Focusing on the ecological relationships between terrestrial and marine ecosystems, such marine conservation strategies examine the “upstream” agricultural and industrial activities whose impacts flow “downstream” from the watershed and rivers to the coasts and the oceans. As such, effective marine conservation and coastal sustainable development will require more and more that this holistic approach be undertaken to identify the full spectrum of threats, impacts, and their causes in marine and coastal ecosystems.

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MARES Focus on Marine Ecosystem Services

Ecosystem services can be categorized into several types of functions: provisioning (e.g. food and water), regulating (e.g. climate regulation), supporting (e.g. waste processing), and cultural (e.g. aesthetics). MARES focuses on key services that are currently at risk around the world, in particular, the four key services described below.



Water Quality

Water quality is both a public health issue and a broader economic one, especially in many developing countries. Lowered water quality in places like coral reef and beach environments affects livelihoods such as fishing and tourism as well as human health. It is especially suitable for the development of markets, building upon the tried and true examples of trading practices in the freshwater market with full private sector support and enormous growth potential. Water quality standards already exist in many coastal countries, so the conditions exist to allow development interests upriver and along the coast to mitigate and trade credits in water quality.



Marine Biodiversity

Marine biodiversity is a valuable service in its own right and also acts to support the marine productivity upon which so many communities and nations depend. 'Species banking' and biodiversity offsets are two tool sets, whereby development in one location is exchanged for protection, i.e. 'banking' or offsets, of the same species or community at another comparable habitat. Where strong regulatory environment for the protection of marine and coastal species exists, species banking has great potential. As regulation for coastal and offshore development emerges, these two strategies will become even more important for marine conservation.



Coastline and Beach Stabilization

Marshes and other coastal wetlands naturally buffer land from storms and prevent shoreline erosion, highlighted particularly in recent natural disasters. Besides buffering from storms and erosion, healthy coastal habitats also serve to maintain beaches by continually depositing back the sand and sediments removed by natural erosional processes. Commercial interests, such as private landowners, the tourism sector, and the insurance industry, all have much to gain by investing in and protecting coastal habitats and reducing their exposure to risk.



Fish Nurseries

The fisheries management community has long recognized the value of fish nursery areas; however, since these are rarely the sites of fisheries harvest, i.e., not typically fishing grounds themselves, it has been difficult to get the sector involved with their protection. Fishing interests are keen to look for ways to enhance or maintain production, and protection of nursery habitat provides a nexus for fishing and conservation interests to come together. There is great potential to target private sector investment in the protection of fish nursery habitat in those developed and developing countries with robust commercial fisheries.

MARES Mission & Objectives

Our **mission** is to protect crucial marine ecosystem services by harnessing markets and private sector investment, in order to complement conventional coastal and marine management and safeguard human well-being.

We target the following four main **objectives** in promoting our overall goal of protecting marine ecosystem services:

- developing a solid foundation of understanding of marine ecosystem services and their economic value;
- elaborating best practices for the conservation of those services;
- communicating information about ecosystem services and the potential to effectively and efficiently protect them, in order to raise awareness and generate political will; and
- helping to build a community of practice for marine PES and other innovative financing mechanisms.



In meeting these objectives, we use analyses, assessments, pilot projects, and other tools to derive lessons learned from PES initiatives and to build capacity for marine ecosystem services protection.

Market-Based Solutions

The recent focus on ecosystem services has shifted the way we practice conservation, manage ecosystems, and even relate to the natural world. The recognition of the immense value of ecosystem services has also opened up the door to innovative approaches to conservation and greater engagement of the private sector.

On the marine front, such innovative tools and private sector investments are badly needed. Marine management has not prevented the loss of ecosystem services. Yet, the value of these services is so great, and the public sector protection of them so ineffective, that private sector involvement is both logical and necessary. The business community is interested in engaging more fully in the kinds of marine conservation that can support their sustainable use of marine resources, but they lack guidance in how to engage.



Coastal payment for ecosystem services (PES) systems and associated market offsets have the potential to achieve significantly better and more cost-effective conservation outcomes than currently result from projects which seek to isolate and protect coastal areas from human encroachment. By clarifying the linkages between ecological function, ecosystem service delivery, and market incentives, PES systems and conservation offsets can become a standard tool for humans operating at a broad range of economic sectors to lower risk and manage projects.

Much can be learned from terrestrial PES systems for application to marine PES systems, but marine and coastal areas face some unique challenges. Coastal ecological systems are highly complex and exist at the interface of terrestrial and oceanic systems and, thus, often suffer from the classic 'tragedy of the commons' dilemma. They are generally poorly understood, undervalued, and largely at risk from coastal development

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