Introduction

Overfishing has occasioned the collapse of many coastal and marine ecosystems globally. With these collapses come increased pollution and a degradation of water quality that can have adverse effects on human health. In addition, significant numbers of people rely on marine ecosystems for their livelihood, either from extractive uses, such as fishing, or from tourism. Diverse policy approaches have been used in order to combat marine degradation, including marine protected areas, ecotourism, catch shares, and community-based marine conservation. This bibliography reviews relevant literature regarding current threats to marine ecosystems, approaches to marine conservation policy, and fisheries management approaches aimed at sustainable fisheries development.

General Overviews

Given the broadness of marine conservation as a topic, texts that provide general overviews can be hard to come by, especially those targeted to undergraduates. Hinrichsen 2011 accomplishes this rare feat, however, in a short and accessible text. Both Vallega 2001 and Leslie 2005 broadly examine policy approaches to marine management, while Carneiro 2011 reviews connections between marine management and human development. Chapters in Dallmeyer 2003 cover a diverse set of topics related to the connections among environmental ethics, the marine environment, and its management. The websites of the Marine Conservation Institute and the Nature Conservancy: Oceans and Coasts are valuable resources for understanding current threats and conservation efforts. Veitch, et al. 2012 reviews twenty years of progress, and sometime lack thereof, regarding international commitments for sustainable management of marine capture fisheries.


Carneiro reviews two decades of marine management literature to decipher the impacts such systems have had on human development.


This edited volume explores environmental ethics with regard to the marine environment, such as native versus exotic species, traditional ecological knowledge, and fishermen’s rights. This text may be more appropriate for upper-class undergraduate or graduate students.


This short and accessible text gives a brief overview of a wide range of topics affecting marine ecosystems, such as climate change, aquaculture, and management issues. Vibrant and easy-to-read graphics make it a suitable resource for undergraduates.


This article provides a comprehensive synthesis of marine conservation approaches globally.

Marine Conservation Institute.

The Marine Conservation Institute is a nonprofit organization that works with scientists, politicians, and other organizations in order to conserve our oceans. Its website is a good resource for current issues as well as several publications on a variety of topics, including climate change, fisheries enforcement, and marine spatial planning.

Nature Conservancy: Oceans and Coasts.

The Nature Conservancy is America’s largest environmental nonprofit organization and is active around the globe. Its Ocean and Coasts website provides overviews of current threats to marine and coastal environments, as well as current projects.


This book is an excellent reference for the history and composition of marine policy and its relation to ocean geography. This text may be more appropriate for upper-level undergraduate or graduate students.


The authors review the status of sustainable marine management goals outlined at the 1992 UN Conference on Environment and Development and the 2002 World Summit on Sustainable Development.

Textbooks

Marine conservation is often discussed in sections of broadly focused conservation textbooks. Kaiser 2011 provides a comprehensive undergraduate text that, while focusing on marine ecology in general, does address current threats to marine ecosystems. Similarly, Roff and Zacharias 2011 takes a marine ecology approach, although it is more focused on conservation topics appropriate for upper-division and graduate students. McLeod and Leslie 2009 focuses on ecosystem-based marine management and would be suitable for graduate-level classes. It not only discusses the theory behind ecosystem-based management but also gives many examples of it in practice. For those looking for a text with a fish/biological focus, Helfman 2007 is a good reference for upper-division and graduate students.

Helfman, Gene S. *Fish Conservation: A Guide to Understanding and Restoring Global Aquatic Biodiversity and Fishery*

This upper-division to graduate-level text is an extremely comprehensive look at fish conservation both in marine and freshwater environments. While most should be able to find this book a useful reference, it is better suited as a whole for those with some background in ichthyology.


This undergraduate text is divided into three sections: processes, systems, and impacts. The first two provide a great background to understand marine ecosystems. The third deals with the primary threats facing marine ecosystems today, including climate change, overfishing, and pollution.


While less a textbook than an edited volume, this book provides a diverse set of articles on ecosystem-based management in a marine environment. This text would be appropriate for graduate-level classes with students who already have some knowledge of marine ecosystems.


A fantastic textbook and reference for upper-division and graduate students. While focusing on marine ecology in general, this book does discuss many areas of marine conservation, including ecosystem-based conservation, fisheries management with marine conservation objectives, and protected areas.

Journals

Several excellent journals publish articles related to marine conservation and fisheries management. Aquatic Conservation: Marine and Freshwater Ecosystems and Journal of Coastal Conservation are two sources that provide articles directly related to marine conservation. Conservation Biology, while not having a specific marine focus, also frequently publishes on matters related to marine and coastal conservation. Coastal Management and Ocean & Coastal Management are excellent resources for management perspectives, both social and ecological, while also publishing on marine applied ecology and sustainable systems. Marine Policy focuses on all aspects of ocean policy, while Fish and Fisheries focuses on fisheries policy and a wide variety of other topics related to fisheries. Finally, the Marine Pollution Bulletin is an excellent resource for all issues related to marine pollution.

Aquatic Conservation: Marine and Freshwater Ecosystems.
Publishes research on marine and freshwater ecosystems and encourages cross-ecosystem research.

Coastal Management.
An applied-research journal that focuses on all aspects of coastal management, including policy, social perspectives, political issues, and applied ecology.
Conservation Biology.
This journal focuses on research that aims to preserve global biodiversity. While it does not have a marine focus, it frequently publishes research related to marine and coastal conservation.

Fish and Fisheries.
While focusing on a variety of issues surrounding fish and fisheries, this journal frequently publishes articles related to marine conservation.

Journal of Coastal Conservation.
Journal of Coastal Conservation publishes research on the sustainable management of coastal environments and associated resources.

Marine Policy.
This is where to seek research related to all aspects of ocean policy, including fisheries management, conservation, and pollution.

Marine Pollution Bulletin.
While concentrating on aspects of marine pollution, including management, reduction, and economics, this journal also frequently touches on conservation issues related to pollution.

Ocean & Coastal Management.
Ocean & Coastal Management remains an excellent resource for research on sustainable ocean use and conservation that spans both physical and social sciences.

Conservation and Policy Approaches
While conservation approaches in a marine context can be quite varied and diverse, the following section will focus on some of the most prominent trends in marine conservation. Marine protected areas (MPAs) and marine spatial planning (MSP) are spatial approaches to conservation planning. Unlike terrestrial approaches, where land can be neatly divided into discrete areas for specific conservation goals, spatial strategies for marine conservation face unique challenges owing to high species mobility and dispersal. Ownership also presents distinct issues regarding the common-pool resource context. Community involvement and comanagement have also gained popularity as ways to develop/implement sustainable policy. Often this is the case with tourism, particularly ecotourism, where conservation is also seen as a tool to accomplish human development goals. Much research has also been done on incorporating social perspectives into policy design.

MARINE PROTECTED AREAS
MPAs have become an increasingly popular tool for marine conservation globally. MPAs have been criticized as a false
panacea and a one-size-fits-all approach to marine conservation, when in actuality they vary greatly in size, scope, and conservation goals. The National Marine Protected Areas Center provides a look at MPA use in the United States. Both Mayr 2010 and Claudet 2011 provide thorough overviews of MPA use, although Mayr does have a primarily US focus. Agardy, et al. 2003 addresses current discussions around the effectiveness and problems associated with MPA design and implementation, while Balmford, et al. 2004 looks at what a worldwide network of MPAs would actually cost and examines whether the net gains are worth the expense. Finally, Agardy, et al. 2011 discusses how to address some of the drawbacks of MPAs through comprehensive MSP (see also Marine Spatial Planning).


Agardy and colleagues explore the many problems associated with MPAs, including premature implementation, lack of empirical data, scientific uncertainty, and the great disconnect in opinions regarding the overall effectiveness of the approach.


Agardy and colleagues discuss the shortfalls of MPAs and argue for them to be used as one tool in a broader MSP approach.


This paper explores how much a worldwide network of MPAs would actually cost to implement and maintain, arguing that while it would be extremely expensive, the benefits would likely outweigh the costs when considering social and ecological gains.


This text covers a wide range of topics related to MPAs, including connectivity, effects on fisheries, and management systems. While some excerpts may be appropriate for an upper-level undergraduate student, graduate-level audiences would find it more beneficial.


This short text provides a good introduction to MPA use, focusing mostly on the United States.

National Marine Protected Areas Center.

The National Marine Protected Areas Center provides an inventory of all US MPAs as well as data sets and useful fact sheets.

MARINE SPATIAL PLANNING

MSP, while similar to MPAs in its spatial approach to conservation, is different in that it aims to view the marine environment


Agardy provides global perspectives and guidance on ocean zoning as a valuable conservation tool.

**Coastal and Marine Spatial Planning, National Oceanic and Atmospheric Administration.**

This website is a good source for current US policy regarding MSP, as well as useful data sets and descriptions of regional activities.


The aim of this article is to provide a clearer definition the scope and objectives of MSP.


This paper summarizes a special issue of the journal *Marine Policy* on MSP. It is a good resource for current research and practices surrounding MSP.


This paper aims to identify priorities surrounding MSP and highlight which ones are currently being managed.


Halpern and colleagues outline priorities for coastal and MSP implementation and design. They discuss four specific areas that should take priority: process, communication and engagement, tradeoffs and valuation, and decision support.


Through a case study in Belgium, this paper explores how to make the implementation of marine spatial plans more effective from a policy perspective.

In order to elucidate the potential benefit of MSP, the authors outline a framework for analysis by using tradeoff analysis borrowed from economics. They use an example of an offshore wind energy project in Massachusetts to show how, through the use of MSP, significant losses can be avoided or greatly lessened to specific fishing industries and conservation goals.

COMMUNITY AND COMANAGEMENT

Community-based management, comanagement or collaborative management, and community involvement have become a popular means to developing sustainable policy. Community-based management is defined by local entities managing their own resources, while under comanagement different bodies share management of a system, such as a government and a fishing cooperative. Community or stakeholder involvement is often used for the design of policy. All these approaches describe different levels at which local communities are involved with marine conservation and resource management. White and Hale 1994 and Wamukota, et al. 2012 examine community-based and collaborative management of coral reefs, while Gelcich, et al. 2006 discusses the downfalls of comanagement when transitioning from a community-based system. Gleason, et al. 2010; Gopnik, et al. 2012; and Pomeroy and Douvere 2008 review stakeholder involvement in MSP (see also Marine Spatial Planning). Pomeroy, et al. 1997 and St. Martin 2001 explore community-based resource management.


This article addresses the downfalls of comanagement in a setting where traditional community-based natural-resource management has been in place historically.


Through a case study of MPAs in north-central California, this paper identifies successful components of transparent public planning that can lead to greater stakeholder involvement and subsequent support.


This article discusses the value of bringing various, and sometimes conflicting, stakeholders together early on in the MSP process.


Pomeroy and Douvere outline a comprehensive method for conducting sustainable stakeholder analysis.

This article is an evaluation of community-based coastal resource management in the Philippines. Pomeroy and colleagues examine factors contributing to success and positive perceptions by those involved.


Through a case study in New England, St. Martin explores how incorporating bioeconomic approaches with fisherman's perceptions can present new opportunities for area-based development that may foster a sense of community responsibility and avoid a case of “tragedy of the commons.”


This article is an evaluation of the literature surrounding the co-management of coral reef fisheries. The authors found that there are theoretical and empirical gaps in current evaluations of the common-pool resources.


This edited volume provides examples of collaborative and community-based management of coral reefs across the globe.

TOURISM

Tourism, especially ecotourism (tourism that is seen as ecologically sound), is argued by some as a sustainable replacement for, or a supplement to, consumptive marine-resource use, while potentially accomplishing human development goals through economic benefits. Two edited texts (Garrod and Gössling 2008, Garrod and Wilson 2003) give broader overviews of marine ecotourism. Buckley 2004, while covering ecotourism in diverse ecosystems, provides discussions of the environmental impacts of marine ecotourism. Young 1999 and Wilson and Tisdell 2003 explore the potential economic benefits and downfalls of tourism. Finally, Stonich 2000 takes a comprehensive look at the effects of tourism, through a case study in the Bay Islands of Honduras.


While this edited volume is not specifically devoted to marine ecotourism, some chapters provide perspectives on the impacts of ecotourism on the marine environment.


While this edited text covers topics beyond conservation, it does at times focus on environmental impacts and environmental education.

This edited volume explores various issues surrounding marine ecotourism, including ecotourism as a conservation tool, determining carrying capacity of an ecosystem, and community participation.


Drawing on years of fieldwork in the Bay Islands of Honduras, Stonich explores how conservation efforts and tourism development affected local populations.


Wilson and Tisdell highlight the positive impacts that wildlife-based tourism can achieve, through two case studies in Queensland, Australia.


Young explores how although ecotourism can be an environmentally friendly nonconsumptive use of marine resources, it may not provide enough economic incentives to impede destructive consumptive uses.

**INCORPORATING SOCIAL PERSPECTIVES**

Many communities are connected to marine ecosystems in a variety of ways. These can include economic ties, as in the case of fisheries or tourism, or cultural associations. Therefore, incorporating social perspectives into marine and coastal conservation policy has become a priority for many. Symes and Phillipson 2009 argues that fisheries policy is lacking in its incorporation of social goals (see Fisheries Management). Drew 2005 and Scholz, et al. 2004 discuss how taking into account local or traditional ecological knowledge can lead to the development of better policy. In addition, Aidon, et al. 2011; Cinner and Pollnac 2004; and Lundquist and Granek 2005 explore how sociocultural contexts, environmental perceptions, and political associations are important to recognize during conservation planning.


Through a case study in the Philippines, this paper highlights how understanding stakeholders’ knowledge and perceptions can be an important conservation tool.


Through an example in Mahahual, Mexico, this paper examines how socioeconomic factors can affect perceptions of coastal resources in order to discern how perceptions such as these can be used to design more effective conservation strategies.

Drew explores how traditional ecological knowledge can be an important tool for marine conservation, through a case study in Micronesia.


This paper offers an overview of how to include socioeconomic and political factors in marine conservation planning as an important tool in the conservation process.


As a way to include fishermen’s knowledge into the MPA planning process, the authors developed a rapid socioeconomic assessment protocol in the case of MPAs in California.


This article provides a critique of current fisheries policy and its lack of incorporated social objectives.

**Fisheries Management**

Fisheries and their management have had massive effects on marine ecosystems. Historically, unsustainable practices have brought about the collapse of many fisheries worldwide. This section will not only examine general fisheries management but will also note specific approaches and their effects. Grafton, et al. 2010 and Worm, et al. 2009 explore the links between fisheries management and conservation. Grafton, et al. 2008 and Hilborn, et al. 2005 assess the state of fisheries management and its future development. Daw and Gray 2005 explores obstacles that prevent scientific data from translating into effective fisheries management. Berkes, et al. 2001 discusses small-scale fisheries management, while Soma 2003 gives an example of how to involve stakeholders in the management process (see Community and Comanagement). Finally, Sumaila, et al. 2000 explores the use of marine protected areas (MPAs) to mitigate the negative effects of consumptive uses (see Marine Protected Areas).


This comprehensive volume explores diverse aspects of small-scale fisheries management and conservation strategies. While some of the introductory text may be appropriate for upper-level undergraduates, the majority of the text will be useful for graduate students and instructors alike.


By examining the European Union’s Common Fisheries Policy, Daw and Gray highlight institutional obstacles that prevent scientific data from translating into effective management.


These authors examine the current challenges facing fisheries and explore how only significant change in management structures can achieve sustainability.


This edited volume aims to link fisheries management and conservation issues while exploring diverse topics such as policy perspectives, best practices, socioeconomic issues, and degradation of ecosystems.


This paper provides compelling examples of successes and failures in fisheries management, in order to elucidate lessons learned that can be useful in future policy and management design.


Through a case study in Trinidad and Tobago, Soma illustrates how an analytical hierarchy process methodology can be employed to engage stakeholders and to facilitate positive change in fisheries management.


These authors provide a synthesis of literature to decipher how the establishment of MPAs can mitigate fisheries’ negative effects on marine ecosystems.


While examining current trends in conservation and fisheries management, the authors highlight ways in which conservation goals can be achieved through a global perspective.

INDIVIDUAL FISHING QUOTAS

Individual fishing quotas (IFQs) operate by assigning a dedicated share of an available fish population to individual commercial fishing operations. These quotas are then tradable between entities, thereby forming a market-based approach to marine conservation. Eythórsson 2000 gives an overview of the use of IFQs in Iceland. Newell, et al. 2005 discusses how IFQ programs have been promoted as positive tools for marine conservation. Costello, et al. 2008 explores the potential of IFQs to halt or even reverse widespread fishery collapse. Griffith 2008 discusses the potential for IFQs to have positive impacts on the
marine environment, while Pinkerton and Edwards 2009 argues that IFQs can have negative economic and societal effects. Through an example in New Zealand, Stewart, et al. 2006 illustrates how IFQs may lead to small fishers leaving the industry, though stating that this does not necessarily represent a social loss.


From a bioeconomic approach, Costello and colleagues highlight how catch shares have the potential to halt and even reverse the collapse of fisheries.


Eythórsson gives a comprehensive overview of individual transferable quota (ITQ) use in Iceland that looks at historical and current stakeholder conflict.


While identifying problems associated with IFQs, Griffith discusses their potential for positive impacts on marine ecosystems.


These authors evaluate an ITQ program operating in New Zealand for the past fifteen years. Their results suggest the ITQs can be used effectively for fisheries management.


Pinkerton and Edwards challenge positive reviews of ITQs, by looking at the negative economic and societal effects through a case study in British Columbia.


Stewart and colleagues discuss the exit of many small fishers from New Zealand fisheries after the implantation of a quota system. While acknowledging this effect, the authors explain that this does not indicate social costs, because most who left the fishery successfully entered alternative employment.

ARTISANAL FISHING

Unlike large-scale commercial fishing, artisanal fishing consists of small-scale fisheries usually employing traditional means, whether for commercial or subsistence purposes. Artisanal fishing is usually considered less ecologically damaging than large-scale operations. While this is generally true, Hawkins and Roberts 2004 and Ruttenberg 2001 discuss how intensive
artisanal fishing can have significant effects on delicate ecosystems. Rueda and Defeo 2003 explores how conservation planning and management is still needed in order to mitigate these effects.

This article aims to demonstrate how intensive artisanal fishing can have significant effects on reef systems.

In a case study from Colombia, this paper illustrates the effects of artisanal fishing gear and proposes management measures to mitigate effects and to accomplish conservation goals.

Through an example in the Galápagos, Ruttenberg illustrates how artisanal fishing can have cascading effects on marine ecosystems, even in areas that are believed to be relatively pristine.

AQUACULTURE
Aquaculture is the farming of marine species in order to supplement or replace traditional catch means. While aquaculture may remove some of the threats to ocean-dwelling species, Diana 2009 discusses the negative and positive effects on marine biodiversity, while Naylor, et al. 2001 specifically explores how aquaculture can lead to the introduction of invasive species.

This paper explores the negative and positive impacts of aquaculture on biodiversity conservation, while predicting that aquaculture will likely continue to grow rapidly in the future.

This short paper highlights how aquaculture is frequently the cause of the introduction of invasive species, calling for policy interventions to prevent the degradation of ecosystems.

HISTORICAL PERSPECTIVES
Much of the degradation of marine ecosystems is due to historical overfishing. A short article that appeared in Science, Jackson, et al. 2001, examines historical overfishing and its ecosystem effects as a way to understand current ecological trajectories. Providing more-narrative texts, Roberts 2007 explores a millennium of fishing practices, and Ellis 2003 examines marine degradation through species-specific examples.

This narrative text explores examples of extinction and degradation among many marine species as the result of human actions.


This paper gives a historical perspective on overfishing and subsequent ecosystem effects in order to understand current ecological change.


In this easy-to-read text, Roberts provides more than one thousand years of the history of consumptive use of our oceans. While not specifically dealing with conservation, this book provides background to understanding the state of our oceans today.

**Current Threats to Marine Ecosystems**

In addition to the negative effects that result from overfishing, marine and coastal ecosystems are also facing other threats to ecosystem health. This section will examine three such threats: biodiversity loss, climate change, and pollution.

**Biodiversity Loss**

Biodiversity, for these purposes, can be defined as the variation of species in a particular ecosystem or species. Duarte 2000 and Worm, et al. 2006 explore how marine biodiversity is important because of its positive correlation with ecosystem services. Ecosystem services are the life-supporting services that ecosystems provide, such as oxygen and clean water. Bax, et al. 2003 explains how biodiversity is often negatively affected by the introduction of invasive species. Douglas 2003 and West and Salm 2003 discuss the phenomenon of coral bleaching and its negative effects on biodiversity. Sala and Knowlton 2006 provides a comprehensive overview of marine biodiversity and its current trajectories, while Lotze, et al. 2006 explores historical biodiversity as a way to set current conservation goals. Kunich 2006 argues for international policy in order to combat a current mass extinction that is particularly wreaking havoc on marine ecosystems.


This article discusses the biological, social, and economic effects of invasive species on marine ecosystems.


In this article, Douglas gives a comprehensive overview of what coral bleaching is, its possible causes, and its negative impacts.


Through a case study of a sea grass community, this paper aims to show the positive link between biodiversity and ecosystem services.


Kunich argues that we are in the middle of a mass extinction affecting our marine ecosystems. He explores the history of marine policy and discusses the future of marine conservation through international policy and cooperation.


This article examines historical habitat and biodiversity loss in order to establish a baseline for restoration that can inform conservation goals.


This article explains marine biodiversity, its significance, and current and future trends. This is a good resource for upper-level undergraduate students to introduce them to the concept and importance of marine biodiversity.


West and Salm specifically examine temperature-reduced coral bleaching, in order to identify specific reef areas that may be naturally resistant to this type of bleaching in the face of climate change. Identifying these target areas can be used to maximize conservation efforts when designing marine protected areas (MPAs).


This paper illustrates how biodiversity loss in oceans is leading to a decrease in ecosystem services, such as the ability to provide food and preserve water quality.

**CLIMATE CHANGE**

Cheung, et al. 2009; Perry, et al. 2005; and Scavia, et al. 2002 explain that much as in terrestrial ecosystems, climate change has the potential to greatly affect species dispersal, abundance, and diversity (see Biodiversity Loss). However, climate change effects on marine systems are often poorly understood. Harley, et al. 2006 argues that predictive frameworks need to be improved in order to prepare for these effects. Fisheries, and those who depend on them, will be especially vulnerable to these changes. Badjeck, et al. 2010 and Brander 2007 discuss how management changes are needed in order to make existing systems more adaptive, and therefore resilient, to climate change. McLeod, et al. 2009 explores how MPAs can become more resilient to climate change (see Marine Protected Areas).

The authors explore climate change’s potential effects on those who depend on fisheries for their livelihood. The authors argue that management policy approaches should take into account livelihood factors in order to reduce vulnerability and plan for adaptation.


This paper highlights the interactions between the effects of fishing and climate and argues that the best way to reduce the impacts of climate change on fisheries is to reduce fish mortality.


This article provides an example of a modeling approach to ascertain climate change’s effects on marine biodiversity, by projecting the distributional ranges of more than one thousand species. Results of this study suggest heavy ecological disturbances that could disrupt ecosystem services.


This paper highlights the need for improvement of existing predictive frameworks currently used to understand how climate change will affect marine ecosystems.


The authors discuss how MPAs can be improved to be more resilient to the emerging effects of climate change.


This paper highlights how specific fisheries can change in the face of rising sea temperature, through an example of changes in abundance and distribution of North Sea fisheries. This study suggests that further temperature rise is likely to have significant impacts on global fisheries.


This research summarizes the predicted effects of climate change on US coastal and marine ecosystems. The authors explore topics such as sea level change, differing precipitation patterns, and change in ocean temperature.
POLLUTION

Like other systems, marine and coastal ecosystems are vulnerable to the negative effects of pollutions. Derraik 2002 explores the effects of plastic debris on our oceans, while Islam and Tanaka 2004 provides a synthesis of the effects of various pollutants on coastal and marine ecosystems, as well as management approaches to mitigate these effects. Diaz and Rosenberg 2008 and Fabricius 2005 explore the effects of terrestrial runoff on marine ecosystems.

This article highlights the negative effects of plastic debris on marine environments, through a synthesis of current literature.

Diaz and Rosenberg describe marine dead zones and their link to nutrient enrichment caused by anthropogenic activities.

Fabricius provides a review of the effects of terrestrial runoff on coral ecosystems.

This synthesis paper provides a comprehensive overview of varying ocean pollutants and their impacts.

LAST MODIFIED: 02/26/2013
DOI: 10.1093/OBO/9780199874002-0073
BACK TO TOP

Copyright © 2014. All rights reserved.