

**This is the printable  
version of the**

**Social Science for Marine  
Protected Areas Web site**

*([www.csc.noaa.gov/mpass](http://www.csc.noaa.gov/mpass))*

This version is in printable document  
format (PDF) and has links and  
bookmarks that allow you to  
navigate the document.

The Web site was developed by the  
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# Table of Contents

|   |            |
|---|------------|
| <b>Social Science for Marine Protected Areas (MPAs) Home.....</b> | <b>1</b>   |
| <b>Introduction to Social Science for MPAs.....</b>               | <b>2</b>   |
| <b>Social Science Themes .....</b>                                | <b>4</b>   |
| <i>Attitudes, Perceptions, and Beliefs .....</i>                  | <i>5</i>   |
| <i>Use Patterns .....</i>   | <i>11</i>  |
| <i>Communities.....</i>   | <i>17</i>  |
| <i>Economics .....</i>  | <i>24</i>  |
| <i>Submerged Cultural Resources.....</i>                          | <i>31</i>  |
| <i>Governments, Institutions, and Processes .....</i>             | <i>35</i>  |
| <b>Tools .....</b>  | <b>41</b>  |
| <b>Case Studies .....</b>   | <b>86</b>  |
| <b>References.....</b>  | <b>114</b> |
| <b>Photo Credits .....</b>  | <b>123</b> |

## Social Science Methods for Marine Protected Areas

### *An Overview for MPA Managers and Staff*

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This site is designed to help marine protected area (MPA)\* managers use social science to accomplish their goals. Specifically, this site provides basic information about social science concepts and methods, and guides managers in determining the appropriate tools, such as surveys and cost-benefit analyses, to address their specific issues. Managers will learn, too, how to be informed users of social science research.

#### How to use this site

##### **New to the field of social science?**

Review the [introduction](#).

##### **Already familiar with social science?**

Visit [tools](#) to learn about numerous social science methods.

##### **Exploring which social science methods to use to address an issue?**

See [research themes](#) to learn which tools work best for various situations.

##### **Want to see how other MPAs are using social science?**

Read the [case studies](#).

\*A marine protected area (MPA) is "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein" (Executive Order 13158). MPAs include national marine sanctuaries, fishery management zones, national seashores, national parks, national monuments, critical habitats, national wildlife refuges, national estuarine research reserves, state conservation areas, state reserves, and many others.

## Introduction to Using Social Science for MPA Management

[Social Science Application](#) | [Information Gaps](#) | [Contributions of Social Science](#) | [Legislation](#) | [About This Site](#)

*Social science is the process of describing, explaining, and predicting human behavior as practiced by individuals or groups. (NOAA Science Advisory Board)*

### Social Science Application

Marine protected areas (MPAs) can be a valuable tool in conserving the marine environment. However, in establishing an MPA, marine refuge, or reserve, managers need to consider how these areas may impact the people who use them, and how users, in turn, impact those areas.

Historically, most research on MPAs has focused on natural science; however, recent studies have shown that social factors, rather than biological or physical factors, determine the success of an MPA. Therefore, applied social science research is a key component in the successful planning, development, management, and monitoring of an MPA.

As with all sciences, when conducting social science research, the reliability and credibility of any information is dependent on the precision of the data collected and the accuracy of the method of analysis.

### Information Gaps

The use of social science can solve a variety of problems by filling some information gaps and helping managers identify

- Public attitudes and perceptions
- Use patterns, uses of the marine environment, users of the environment, and relationships between different user groups
- Impacts of MPAs on the character of a community
- Direct and indirect economic impacts of the MPA over time
- Relationships between submerged cultural resources and local populations
- Existence of difference in opinion between users and government
- Socioeconomic trends or demographic characteristics

### Potential Contributions of Social Science

Social science has the potential to support and improve MPA management across a wide variety of issues. Here are five ways social science can contribute to management:

**Assessment** – Managers must have an understanding of conditions before making decisions, by gathering baseline information. Incorporating social science into the assessment process can identify affected groups, as

well as potential areas of conflict. Incorporating social science early in the decision-making process can be useful in predicting potentially avoidable problems and resistance.

**Feedback** – Regular feedback can be helpful in establishing the effectiveness of management techniques and tracking effectiveness over time. Social science research can be used to gauge public perceptions of management focus and effectiveness while also giving the public the opportunity to suggest management changes. Eventually the feedback process may lead to open dialogue between managers and stakeholders.

**Prediction** – A range of social science tools, including economic tools and case studies of similar communities, can predict the potential outcomes of management decisions and strategies. By developing models to predict the outcomes of specific management actions, considerable time and effort might be saved and potential problems identified.

**Mitigation** – Identifying stakeholder motivations and areas of concern may help reduce, or even avoid, conflicts among users.

**Acceptance** – Social science can be used to understand and address public concerns. Concerns can be addressed through targeted outreach and education programs, which may lead to increased support from the public and constituents.

## Legislation

The MPA Center's Social Science Strategy for Marine Protected Areas reports that virtually all federal mandates relevant to MPAs refer to the integral role of social and economic factors in MPA policy, development, and management decisions. Some examples of federal legislation involving social science can be found in Appendix C of the [Social Science Research Strategy for Marine Protected Areas](#).

## About This Site

A recent [MPA Needs Assessment](#) revealed that many managers desire a greater understanding of social science. The National MPA Center has a number of efforts underway to address this need, including a recently-completed national [Social Science Research Strategy](#), and an ongoing series of workshops to identify regional social science needs. This interactive Web site was developed to bring social science information directly to MPA managers.

## Social Science Research Themes

### What Are the MPA Social Science Themes?

There are many ways to use social science research tools and methods in marine protected area (MPA) management. The following six themes were created during a social science workshop sponsored by the MPA Center to categorize common applications for MPAs. Further discussion about each theme can be found in the [MPA Social Science Research Strategy](#).

### MPA Social Science Theme Areas

#### Attitudes, Perceptions, and Beliefs

Examines factors influencing human preferences, choices, and actions, including

- Public support and opposition
- Quality of life
- Public expectations
- Aesthetic values

[Questions and Tools](#)

#### Economics

Focuses on economic conditions and trends, including

- Market and nonmarket valuation
- Costs and benefits
- Socioeconomic change

[Questions and Tools](#)

#### Communities

Examines social and geographic aspects of stakeholder communities and community decision making, including

- Demographic characteristics
- Information flow
- Carrying capacity
- Community character

[Questions and Tools](#)

#### Use Patterns

Addresses how stakeholders access and use resources, including

- Recreational and commercial uses
- Historical use of resources
- Where, when, and how groups use resources
- Anthropogenic change
- Subsistence use

[Questions and Tools](#)

#### Submerged Cultural Resources

Addresses protection and evaluation of cultural heritage and resources, including

- Nautical history (wrecks, replicas, etc.)
- Submerged artifacts, anthropology, and archaeology
- Historical documents (books, pictures)

[Questions and Tools](#)

#### Governments, Institutions, and Processes

Explores public processes and institutional structures, including

- Decision-making processes
- Use rights
- Conflict management
- Monitoring and enforcement

[Questions and Tools](#)

## ATTITUDES, PERCEPTIONS, AND BELIEFS

*Examines factors influencing human preferences, choices, and actions and how these behaviors affect marine protected areas.*

The attitudes, perceptions, and beliefs theme covers the underlying motivations that influence human preferences, choices, and actions. It examines the factors that shape human behavior and how these behaviors affect and are affected by marine protected areas. Some areas addressed here include public preferences, stakeholder expectations, quality of life, and aesthetic values.

### Possible Questions

- [How do users perceive management agencies and policies?](#)
- [What do MPA resource users know about the marine resource environment and its use?](#)
- [How do people value the marine environment? MPAs?](#)
- [What do people expect of a particular MPA over the short and long terms?](#)
- [What do people believe the effect of MPAs will be on their jobs and livelihoods?](#)

### What Are Some Tools I Can Use?

[Observation](#)

[Historical Research](#)

[Case Study Research](#)

[Interviewing](#)

[Content Analysis](#)

[Focus Groups](#)

[Social Assessment](#)

[Surveys](#)

[Rapid Rural Appraisal](#)

[Secondary Data Analysis](#)

## How Do Users Perceive Management Agencies and Policies?

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Resource users will often have preconceived ideas of the effectiveness of particular management agencies and their policies. These perceptions may be based on past experiences, agency image, media coverage, or word of mouth. If a user does not agree with a policy, then the likelihood of compliance may be low.

### How Can Knowing This Help Me?

Understanding how users perceive management agencies and policies will enable managers respond to user perceptions in order to maximize compliance. Studying perceptions can help managers

- Understand and address user concerns
- Build on positive perceptions of users
- Address any cases of misinformation
- Promote increased compliance by tailoring policies to the understanding of user groups
- Identify potential conflict areas

### What Are Some Tools I Can Use?

- [Surveys](#)
- [Historical Research](#)
- [Content Analysis](#)
- [Rapid Assessment](#)

## What Do MPA Resource Users Know about the Marine Resource Environment and Its Use?

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The types of resource users in any given area are varied. Recreational users might include swimmers, S.C.U.B.A. divers, jet skiers, and recreational fishermen. Commercial users could include fishermen, research divers, and tourism operators. Land-based users such as industry, hotels, and agriculture may also impact the resource. The knowledge these users have about any given area and its resources will vary, as will their interest in and motives for conservation.

### How Can Knowing This Help Me?

Identifying what resource users know about the resource and its use can help managers

- Focus education and outreach efforts toward resource understanding and protection
- Direct efforts to encourage compliance toward specific user groups
- Identify user groups that can assist in monitoring and reporting of problems in the area
- Educate users to safely interact with the environment and other users

### What Are Some Tools I Can Use?

- [Surveys](#)
- [Rapid Assessment](#)
- [Secondary Data Analysis](#)
- [Observation](#)
- [Interviews](#)

## How Do People Value the Marine Environment? MPAs?

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People's perceptions of the marine environment and MPAs will vary, as will the values they assign to different resources and resource uses. Since people's perceptions and values vary, so will their responses to management actions and inactions.

### How Can Knowing This Help Me?

Determining how people derive value from their environment and what they perceive as important for a given area will assist managers in making decisions. Studying people's perceptions and values can help managers to

- Identify what is important to different uses in an MPA
- Determine outreach and education needs
- Justify management decisions
- Promote resource protection within an MPA
- Identify potential conflict areas that management might address

### What Are Some Tools I Can Use?

- [Nonmarket Valuation](#)
- [Surveys](#)
- [Interviewing](#)
- [Content Analysis](#)

## What Do People Expect of a Particular MPA Over the Short and Long Terms?

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When MPAs are created, those directly and indirectly involved in their creation usually have expectations regarding their impact.

People often expect immediate results from an MPA, and consider it to be ineffective if it does not deliver these results. Many people do not realize that in most cases it takes many years before MPA effectiveness is observable.

Managers need to be aware of what people expect of an MPA over both short and long terms to be able to avoid any problems that might arise if these expectations are not met.

### How Can Knowing This Help Me?

Knowing the short- and long-term expectations of an MPA helps managers

- Manage expectations
- Focus outreach and education efforts
- Direct management goals to be more consistent with those of the public
- Address concerns related to MPA effectiveness over time

### What Are Some Tools I Can Use?

- [Surveys](#)
- [Historical Research](#)
- [Content Analysis](#)
- [Rapid Assessment](#)

## What Do People Perceive the Effect of MPAs Will Be on Their Jobs and Livelihoods?

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When an MPA is created, the primary concern for most people is how it might impact their lives. Their support for opposition to the MPA could be based on this factor. While some may think their source of livelihood is at risk, others may expect the MPAs to provide them with more jobs and a better livelihood. Others may not see the impacts of the MPA until decisions are made. MPA managers and staff need to understand who will be impacted and how they will be impacted, and in some cases address these expectations to avoid future conflict.

### How Can Knowing This Help Me?

Knowledge of how people perceive the impacts MPAs might have on their jobs and livelihoods will help managers

- Identify the primary areas of fear and over expectations
- Determine which individuals are opposed to or support the MPA and why
- Focus education and outreach efforts
- Modify management strategies to reduce any negative impact on users

### What Are Some Tools I Can Use?

- [Focus Group](#)
- [Interviews](#)
- [Surveys](#)
- [Content Analysis](#)

## USE PATTERNS

*Addresses how stakeholders access and use resources in existing and proposed marine protected areas.*

Analysis of use patterns may provide managers with a better understanding of human, political, economic, and historical dynamics of an area to help make informed decisions. Use patterns include things such as recreational and commercial use, public rights and responsibilities of use, historical use of resources, and subsistence use.

### Common Questions

- [Who uses the marine environment in and near MPAs? How?](#)
- [How many stakeholder and user groups are there? Approximately how many individuals are in each group?](#)
- [In what ways do various users affect the MPA?](#)
- [How do use patterns affect resource quality and user experience in an MPA? How will changing use patterns of one group affect other users?](#)
- [How might resource users, groups, and communities choose to, or be required to, adapt or change their use patterns once an MPA has been designated?](#)

### What Are Some Tools I Can Use?

[Observation](#)

[Historical Research](#)

[Case Study Research](#)

[Focus Groups](#)

[Interviewing](#)

[Content Analysis](#)

[Cost-Benefit Analysis](#)

[Social Impact Assessment](#)

[Predictive Modeling](#)

[Surveys](#)

[Secondary Data Analysis](#)

[Rapid Assessment](#)

## Who Uses the Marine Environment in and near MPAs? How?

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Many users benefit from the marine environment; they are members of multiple sectors, including tourism, recreation, real estate, industry, and commerce.

In addition to those sectors that directly use the resource, additional indirect users may be affected by MPA decisions. For example, when restrictions are put upon a marine resource, additional business owners who depend on the resource for a portion of their livelihood may be affected. Therefore, MPA staff members must be able to identify the direct and indirect resource users and consider how decisions will impact each sector.

### How Can Knowing This Help Me?

Knowing who uses the marine environment may help identify

- Who is impacted by decision making and to what extent
- Sources of conflict among users
- Who should be involved in the decision-making process
- Where to efficiently direct educational efforts

### What Are Some Tools I Can Use?

- [Observation](#)
- [Secondary Data Analysis](#)
- [Historical Research](#)
- [Surveys](#)
- [Rapid Assessment](#)

## How Many Different Stakeholders and User Groups are There? Approximately How Many Individuals Are in Each Group?

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For any given marine environment the list of stakeholders can be lengthy, consisting not only of user groups and organizations but also of interest groups.

Managers need to determine not only how many members are in each group but also the identity of these groups, their objectives, their interests, their activities, and how influential their members are within the community.

### How Can Knowing This Help Me?

Identification of stakeholders and their issues may help MPA managers

- Focus on management strategies
- Make more informed decisions. For example, knowing how particular user groups affect the marine environment can help target an education and outreach campaign or encourage involvement in collaborative processes
- Lessen disagreement and compliance issues that might have arisen if stakeholders were not consulted
- Efficiently allocate resources to address problems or potential problems

### What Are Some Tools I Can Use?

- [Observation](#)
- [Secondary Data Analysis](#)
- [Focus Groups](#)
- [Content Analysis](#)

## In What Ways Do Various Users Affect the MPA?

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A number of different user activities may impact MPAs. Some of these activities might include scientific research, snorkeling, scuba diving, fishing, surfing, coral and shell collection, and swimming.

Because of this variety of activities, much effort may be required to successfully monitor and manage them. One of the first steps in this process is to determine which activities are taking place, how frequently they are taking place, and the relative impact to the resource of each activity.

## How Can Knowing This Help Me?

This may help MPA managers by

- Providing evidence of which impacts are the most detrimental to the area and need to be addressed
- Creating baseline data that can be used to determine any changes in impacts over time. It can also help determine the impacts of management decisions
- Creating standards, or levels at which impacts are to be kept
- Justifying management decisions
- Providing direction for both education and outreach efforts

## What Are Some Tools I Can Use?

- [Surveys](#)
- [Case Study Research](#)
- [Observation](#)
- [Rapid Assessment](#)

## How Do Use Patterns Affect Resource Quality and User Experience in an MPA? How Will Changing Use Patterns of One Group Affect Other Users?

Use patterns vary among user groups and their activities. Activities have different impacts on the resource and on other user groups depending both on the nature of the activity, where it is performed, when it is performed, and how.

For example, SCUBA divers, while not often a threat to the marine environment, are capable of creating significant damage to corals through direct contact. Divers may cause other impacts if they engage in spearfishing or lobster removal.

If a use type or pattern is highly destructive it may prevent users from enjoying the resource in the future. Some uses may prevent multiple users or user types to use the resource at the same time. Jet skiers, for example, might prevent fishermen or snorkelers from using the resource due to the noise level and potential threat they appear to pose.

### How Can Knowing This Help Me?

Determining how use patterns affect resource quality and user experience might help managers

- Determine if use patterns have any effect on resource quality and user experience
- Classify different impacts to the resource
- Understand user groups and their behaviors
- Determine cumulative impacts of various user groups
- Direct usage to decrease negative impacts
- Develop educational and outreach material
- Identify changes in use patterns

### What Are Some Tools I Can Use?

- [Surveys](#)
- [Secondary Data Analysis](#)
- [Case Study Research](#)
- [Observation](#)
- [Historical Research](#)

## How Might Resource Users, Groups, and Communities Choose to, or be Required to, Adapt or Change Their Use Patterns Once an MPA Has Been Designated?

Designation of an MPA will undoubtedly affect how certain stakeholders or user groups use the resource. Changing how people use a resource can be controversial and may be met with resistance if some level of communication is not established throughout the process.

### How Can Knowing This Help Me?

Understanding the impact of the MPA's designation on stakeholder behavior may help

- Determine which, if any, users, groups, or communities would need to change their use patterns
- Find alternatives for those most affected prior to the MPA designation. Although it might appear that certain communities would have to give up behaviors, there could be acceptable alternatives, such as changing location or slightly altering a behavior
- Identify future sources of conflict. This knowledge can help mitigate these conflicts and find acceptable alternatives (conflict resolution)
- Identify areas to focus enforcement and compliance efforts
- Focus education and outreach initiatives

### What Are Some Tools I Can Use?

- [Cost-Benefit Analysis](#)
- [Case Study Research](#)
- [Social Impact Assessment](#)
- [Interviewing](#)

## COMMUNITIES

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The Communities theme area considers stakeholder characteristics and the way these communities function with regard to the use and conservation of marine resources. Factors in this theme include community decision making, information flow, carrying capacity, lessons learned, community character, and socioeconomic data.

### Common Questions

- [What impacts do MPAs have on communities?](#)
- [How does the public believe MPAs affect quality of life?](#)
- [What are the primary factors in community-based decision making?](#)
- [How is community character linked to local resources?](#)
- [What can managers do to help preserve a community's character?](#)
- [What is the carrying capacity of an MPA Community?](#)

### What Are Some Tools I Can Use?

[Observation](#)

[Case Study Research](#)

[Focus Groups](#)

[Nonmarket Valuation](#)

[Social Impact Assessment](#)

[Content Analysis](#)

[Secondary Data Analysis](#)

[Ethnography](#)

[Interviewing](#)

[Surveys](#)

[Rapid Assessment](#)

## What Impacts Do MPAs Have on Communities?

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How an MPA affects a community depends on both the nature of the community and the nature of the MPA. An MPA influences commercial, recreational, and residential areas in different ways. For example, an MPA that restricts fishing may have a detrimental impact on fishing communities but might benefit ecotourism and diving communities.

### How Can Knowing This Help Me?

Knowing MPA impacts on the community is helpful for managers. This information allows them to

- Determine who is affected by the MPA and how
- Identify communities that may have alternate sources of income for subsistence and recreation
- Focus outreach and educational efforts
- Consider these impacts when planning or making decision making

### What Are Some Tools I Can Use?

- [Social Impact Assessment](#)
- [Focus Groups](#)
- [Secondary Data Analysis](#)
- [Observation](#)

## How Does the Public Believe MPAs Affect Quality of Life?

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Often public knowledge and perceptions are based on limited information that may be from unreliable sources. This information gap may lead to assumptions that may not be completely accurate. It is important for MPA managers to identify the actual and perceived effects that the MPA will have on stakeholders' quality of life in order to better understand expectations and effectively address management issues in a more supportive environment.

### How Can Knowing This Help Me?

Determining how members of the community believe MPAs may affect their quality of life might help managers

- Identify potential areas of conflict
- Determine major issues within the community related to MPAs
- Understand the basis of concern
- Direct education and outreach efforts

### What Are Some Tools I Can Use?

- [Focus Groups](#)
- [Case Study Research](#)
- [Surveys](#)
- [Content Analysis](#)

## What Are the Primary Factors in Community-Based Decision Making?

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Community decisions are based on many factors, including

- Culture
- Traditions
- Informal institutions
- Formal regulations
- Attitudes, perceptions, and beliefs
- Religion

The importance of these factors in the MPA decision-making process is dependent on the situation. While some communities rely upon enforcement of formal regulations, other cultures may place a greater value on traditions and formal influences.

### How Can Knowing This Help Me?

Knowing how communities make decisions helps identify their value systems. This information can be used to

- Focus education and outreach efforts
- Orient regulation and enforcement strategies towards factors that communities are most likely to respond to
- Understand the dynamics of the community
- Identify how formal and informal community groups and institutions adopt positions

### What Are Some Tools I Can Use?

- [Social Impact Assessment](#)
- [Historical Research](#)
- [Surveys](#)
- [Interviewing](#)

## How Is Community Character Linked to Local Resources?

---

Community character is the aspect of the community unique to its residents and visitors, providing them with a feeling of "home." Many older communities and native cultures have particularly strong ties to natural resources. Discovering and understanding these links, however, may not be evident without conducting research.

### How Can Knowing This Help Me?

Understanding and identifying the links between community culture and natural resources might allow management to

- Build on these traditional ties to natural resources to focus education and outreach efforts
- Determine attitudes, perceptions, and beliefs toward local resources
- Predict the effects of the MPA on the community

### What Are Some Tools I Can Use?

- [Content Analysis](#)
- [Focus Groups](#)
- [Social Assessment](#)
- [Secondary Data Analysis](#)
- [Historical Research](#)

## What Can Managers Do to Help Preserve a Community's Character?

Community character or quality of life is the aspect of the community unique to its residents and visitors, providing them with a feeling of "home." However, there is no individual element that creates this feeling; rather, it is based on a combination of elements including but not limited to

- Natural resources
- Culture
- Economy
- Physical structures and monuments
- Community interactions
- History

At the same time, community character is vulnerable. Positive or negative impacts to any aspect of quality of life could have a detrimental impact on the community character.

### How Can Knowing This Help Me?

Knowing what elements are most important in community character allows managers to orient management practices in ways that strengthen and maintain the community character.

This strategy may help increase the acceptance of MPAs by the community as a whole.

### What Are Some Tools I Can Use?

- [Interviewing](#)
- [Social Impact Assessment](#)
- [Focus Groups](#)
- [Historical Research](#)

## What Is the Carrying Capacity of an MPA Community?

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Carrying capacity can be described in three ways: environmental, social, and managerial.

**Environmental** carrying capacity addresses sustainable use of resources, such as how many fishermen can use a reef without depleting the fish populations.

**Social** carrying capacity is a measure of how many people are considered too many for a given area. For example, beachgoers might be happy to share the beach with 100 people but might leave if they arrived and 1,000 were present.

**Managerial** carrying capacity indicates that carrying capacity can differ depending on the amount and type of management applied. For example, by separating different user groups, a manager might increase the social carrying capacity of an area. With the removal or displacement of jet skis, other users might be able to tolerate a higher concentration of people.

### How Can Knowing This Help Me?

Knowing how many people are tolerated in a given area and how people can use the area without depleting the resources can give managers an idea of what type of restrictions they need to implement to balance the users' interests with resource protection.

### What Are Some Tools I Can Use?

- [Surveys](#)
- [Observation](#)
- [Nonmarket Valuation](#)
- [Secondary Data Analysis](#)

## ECONOMICS

*Focuses on economic conditions and trends associated with marine protected areas and how these conditions affect decision making.*

*"Questions of financial viability and economic sustainability are of central importance to the success of MPAs" (International Union for the Conservation of Nature)*

**New to economics and economic valuation?** Go to [Introduction to Economics for MPA Managers](#).

Economics assesses the financial implications of decision making and looks at the impact on people and communities. Some areas for consideration include market and nonmarket valuation, costs and benefits, and socioeconomic data.

In determining the total economic value of an MPA, managers must consider all forms of value that may be derived from the resources they protect. Environmental economists define these values in many ways. For a visual representation see the "[Economic values associated with marine and coastal ecosystems](#)" diagram.

### Common Questions

- [How do managers assess and monitor the potential economic impacts associated with MPAs?](#)
- [What are the economic costs and benefits associated with an MPA?](#)
- [What kinds of existing socioeconomic data can be gathered in the analysis of an MPA?](#)
- [What techniques are available to managers to help them assign a market value to specific resources?](#)

### What Are Some Tools I Can Use?

[Cost-Benefit Analysis](#)

[Secondary Data Analysis](#)

[Nonmarket Valuation](#)

[Social Impact Assessment](#)

[Surveys](#)

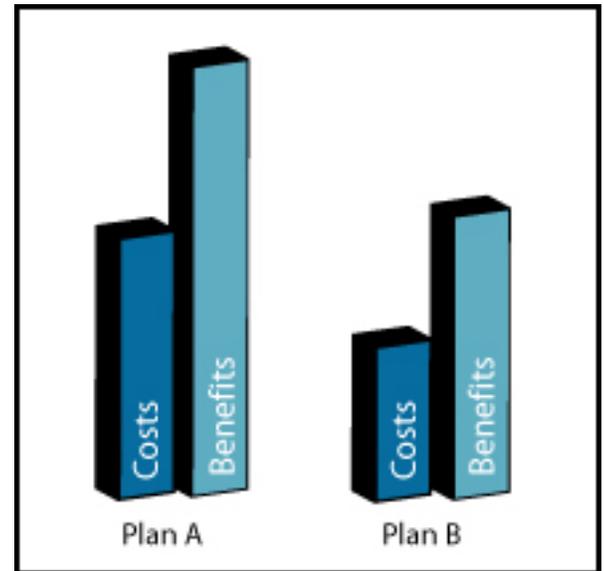
[Interviewing](#)

## Introduction to Economics for MPA Managers

### How Can Economic Tools Help Me?

Any time there is more than one way to approach a problem such as declining fish populations, the alternatives must be valued and evaluated to make a choice. This sort of analysis lies at the very heart of economics. For this reason, some standard economic tools can be very useful in managing MPAs. Additionally, economic analysis may be an effective tool to use with commercially minded stakeholders who think in terms of economics.

One of the best-known economic tools, for example, is [cost-benefit analysis](#). This tool is designed to do precisely what was described above: compare the pluses and minuses of the alternatives and make a choice. In the example to the left, Plan B provides less benefits than Plan A, but its costs are much lower, resulting in a greater net benefit.



*Plan A or Plan B?  
A cost benefit analysis can help you determine the best plan of action.*

### What if the Project Costs Are in Dollars but the Outputs Are Not?

Not all costs and benefits, especially for environmental projects, are readily measured in dollars. Several economic tools exist that help estimate monetary values

1. Specialized analytical methods, such as cost-effectiveness analysis and incremental cost analysis, can be used to allow the "apples and oranges" comparisons of monetary costs and non monetary outputs.
2. Specialized measurement techniques, or [nonmarket valuation methods](#), can be used to estimate the dollar value of environmental goods and services produced by the project tools designed to convert oranges to apples.

## Economics



Economic values associated with marine and coastal ecosystems. (Based on IUCN: Marine and Coastal Protected Areas, 2000)

## How Do Managers Assess and Monitor the Potential Economic Impacts Associated with MPAs?

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The establishment of an MPA can have a variety of different economic impacts on communities. Such impacts might include

- Increased or decreased revenue from tourism
- Changes to the overall business climate in the area
- Rising or falling values of property adjacent to MPAs
- Changes in seafood availability and costs

### How Can Knowing This Help Me?

Assessing and monitoring economic impacts of an MPA helps identify areas of critical economic importance. This data allows managers to make more informed management decisions. In addition, knowing who is most affected economically as a result of an MPA helps managers target who may need alternative employment solutions. Compiling economic information will also serve as baseline data for managers to compare changes over time.

### What Are Some Tools I Can Use?

- [Social Impact Assessment](#)
- [Cost-Benefit Analysis](#)
- [Surveys](#)
- [Interviewing](#)
- [Nonmarket Valuation](#)
- [Secondary Data Analysis](#)

## What Are the Economic Costs and Benefits Associated with an MPA?

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Although MPAs have traditionally been created to preserve ecological populations, economics now plays a more prominent role in the MPA process. The success of an MPA is now highly dependent on its financial viability and economic sustainability.

Proving that the long-term value of marine ecosystem conservation will benefit society is often insufficient for individuals to support the MPA. Evidence is required to show that both the long-term and short-term benefits outweigh the costs. These costs might include loss of revenue to fishermen, offshore oil and gas concerns, and to other businesses. However, benefits might include increased ecotourism and improved fish populations over the long term.

### How Can Knowing This Help Me?

Knowing the economic costs and benefits associated with an MPA will help managers accurately identify and measure the impacts that an MPA has on communities.

It will also provide the managers with information that can justify, at an economic level, some of the decisions they make in the management of an MPA.

Additionally, economic analysis may be used to demonstrate the value of the resources to commercial and private-sector stakeholders that are more accustomed to decision making based on economic factors.

### What Are Some Tools I Can Use?

- [Nonmarket Valuation](#)
- [Secondary Data Analysis](#)
- [Surveys](#)
- [Cost-Benefit Analysis](#)

## What Kinds of Existing Socioeconomic Data Can Be Gathered in the Analysis of an MPA?

Socioeconomic data includes economic and other quantifiable social data. Social and economic data can be used to estimate how these social and economic variables can affect an MPA. These data may include

- Local business and industry statistics
- Census data
- Regional economic data

## How Can Knowing This Help Me?

Although MPAs have traditionally been created to preserve ecological populations and enhance biodiversity, economics now plays a more prominent role in MPA management. The success or failure of an MPA is now highly dependent on its financial viability and economic sustainability.

Illustrating how the long-term value of ecosystem conservation will benefit society is often insufficient for individuals to support the MPA. Knowing the social and economic climate of a community allows managers to make more informed decisions and can help defend these decisions to stakeholders and the public.

## What Are Some Tools I Can Use?

- [Cost-Benefit Analysis](#)
- [Nonmarket Valuation](#)
- [Secondary Data Analysis](#)
- [Social Impact Assessment](#)
- [Surveys](#)

## What Techniques Are Available to Managers to Help Them Assign a Market Value to Specific Resources?

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Nonmarket economic valuation is a way to determine the monetary value of natural and environmental resources not normally traded in a conventional market.

Excluding nonmarket values when making decisions in an MPA may lead to inefficient allocation of resources and reduced social welfare. Managers must consider that there are real economic values associated with both environmental and natural resources. Estimating these values is critical to efficient use of resources.

Assigning value to nonmarket resources is one of the greatest challenges for economists. It is very important, however, as the establishment of a value for a resource helps justify its need to be protected. Many tools can help in making these calculations.

### How Can Knowing This Help Me?

Knowing the economic value of resources allows managers to

- Better justify the need to protect the resource
- Show the value of the resource over time
- Determine the amount of compensation in the event of damage to the resource

### What Are Some Tools I Can Use?

- [Nonmarket Valuation](#)
- [Secondary Data Analysis](#)
- [Surveys](#)
- [Interviewing](#)
- [Cost-Benefit Analysis](#)

## SUBMERGED CULTURAL RESOURCES

*Addresses the protection and evaluation of cultural heritage and resources of marine protected areas.*

The cultural heritage and resources theme includes the historical aspects of marine protected areas. These aspects include nautical heritage (wrecks, replicas, submerged archeological sites, etc.), maritime infrastructure (piers, lighthouses, locks, ports), historical documents (books, pictures, music, recipes), and prehistoric sites (fossils, human dwellings, etc.).

### Common Questions

- [What is the public value of submerged cultural resources?](#)
- [What formal and informal rules govern cultural and heritage resource use, protection, and preservation?](#)
- [How can managers balance access to the resource and resource preservation?](#)

### What Are Some Tools I Can Use?

[Historical Research](#)

[Focus Groups](#)

[Interviewing](#)

[Non-Market Valuation](#)

[Rapid Assessment](#)

[Secondary Data Analysis](#)

[Case Study Research](#)

[Cost-Benefit Analysis](#)

[Social Assessment](#)

## What Is the Public Value of a Submerged Cultural Resource?

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The public may value a resource for different reasons and in different ways. One way a community may value the resource is through the level of cultural pride associated with a submerged cultural resource. This cultural pride may be linked with the history, traditions, and folklore of the area.

The resource may also have economic value. Aspects of the resource may generate tourism-related income. The resource might also host organisms such as fish, seaweed, or shellfish that can be harvested to generate income. If such organisms are not protected, the community may lose a source of income.

## How Can Knowing This Help Me?

Knowing the value the public places on submerged cultural resources helps managers

- Determine the amount of support, both moral and financial, the community will give to the resource
- Estimate the amount of involvement the public will have with the resource
- Prioritize management strategies
- Ensure that management priorities are synchronized with those of the public
- Focus outreach and education initiatives
- Justify management decisions
- Regulate resource use

## What Are Some Tools I Can Use?

- [Nonmarket Valuation](#)
- [Historical Research](#)
- [Content Analysis](#)
- [Surveys](#)

## What Formal and Informal Rules Govern Cultural and Heritage Resource Use, Protection, and Preservation?

Often cultural resources play an important role in both past and current cultures. While culture may dictate some of the rules relating to resource use protection and preservation, these rules may differ from more formal regulations.

In some cases a group or community may have strict unwritten rules and policies that dictate their interaction with others and the allocation of the resource. Many groups feel strongly about resource use, and in particular, resources that involve cultural heritage and identity.

### How Can Knowing This Help Me?

Knowing what formal regulations exist can help managers

- Support management decisions
- Direct management efforts
- Engage other agencies in enforcement efforts

Knowing informal rules can help managers

- Understand the actions and motivations of the public
- Create a foundation for current rules and standards
- Focus outreach and education efforts
- Increase efficiency of regulations

### What Are Some Tools I Can Use?

- [Secondary Data Analysis](#)
- [Interviewing](#)
- [Historical Research](#)
- [Surveys](#)

## How Can Managers Balance Access to the Resource and Resource Preservation?

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It is a challenge to provide access to cultural resources by various and often conflicting user groups while protecting the resource at the same time.

While scientific research is beneficial to society it may limit access, thus decreasing the number of people that can enjoy the resource.

If access to the resource is not controlled, it may be seriously damaged. The particular approach taken will depend on the nature of the resource and the individual circumstances.

### How Can Knowing This Help Me?

Considerations in determining how to address access issues often help

- Protect the resource
- Provide guidelines for outreach and education efforts
- Determine alternatives for resource use, such as providing film, exhibits, etc.
- Establish how much enforcement will be required

### What Are Some Tools I Can Use?

- [Interviewing](#)
- [Case Study Research](#)
- [Social Assessment](#)
- [Cost-Benefit Analysis](#)

## GOVERNMENTS, INSTITUTIONS, AND PROCESSES

*Explores agency authorities, institutional structures, public participation, and collaborative processes.*

Marine protected areas may be established and governed by federal, state, local, or tribal authorities. Many additional governmental and institutional partners are likely to be involved in how resources are managed, with each entity operating under its own mandates with its own structure. Balancing the relationships between these groups, community groups, NGOs and tohers, as well as the formal and informal rules in place, can be complex and challenging.

The governments, institutions and processes pages involve identifying which entities will affect an MPA, what authorities and responsibilities each entity has, and how these entities will interact with each other and with public stakeholders.

Some of the issues addressed here include authorities, institutional structure, public participation and processes, and enforcement.

### Common Questions

- [What agencies and organizations have jurisdiction and authority in the area, and how will these groups engage in MPA processes?](#)
- [How can public participation be used effectively in the planning and management of MPAs?](#)
- [How do governmental and nongovernmental organizations \(NGOs\) influence decision making?](#)
- [What formal and informal rules govern resource use?](#)
- [What types of interventions are used in addressing violations of MPA regulations and for changing user behavior?](#)

### What Are Some Tools I Can Use?

[Comparative Research](#)

[Historical Research](#)

[Focus Groups](#)

[Ethnography](#)

[Secondary Data Analysis](#)

[Case Study Research](#)

[Interviewing](#)

[Surveys](#)

## What Agencies and Organizations Have Jurisdiction and Authority in the Area, and How Will These Groups Engage in MPA Processes?

Federal, state, local, and tribal government agencies may all have different levels of jurisdiction and authority for providing services or enforcing laws and regulations for any given MPA. Engaging these agencies in the MPA planning and management processes can impact how successful or unsuccessful an MPA will be.

When preparing to engage agencies and organizations in the MPA process, it could be helpful to

- Identify which agencies may affect or be affected by the MPA
- Understand the agency structure and identify key divisions and personnel for interactions
- Understand the mandated roles for that agency, including the resources and services it provides and the relevant laws and regulations it enforces
- Seek to involve the appropriate agencies in relevant processes to build collaborative relationships

### How Can Knowing This Help Me?

Knowing the different agencies and jurisdictions in a surrounding area may help managers

- Identify information sources and potential partners
- Determine how best to address issues by involving multiple agencies and organizations
- Establish networks of communication and information exchange among different agencies and organizations that might help identify parameters of jurisdiction and authority for issues such as monitoring and enforcement
- Create forums for specific issues such as a hazards mitigation or water quality

### What Are Some Tools I Can Use?

- [Secondary Data Analysis](#)
- [Ethnography](#)
- [Historical Research](#)
- [Comparative Research](#)

## How Can Public Participation Be Used Effectively in the Planning and Management of MPAs?

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Collaborative processes and public meetings can be used to incorporate public participation into MPA planning and management decisions. Public participation is effective when it is open, understandable, and consistently followed. The public must understand what, if any, impact its comments will have on decision making, and the process should be designed to identify or address the issues and concerns of all stakeholder communities. Designing an effective collaborative process will require significant planning and time, but may build awareness, corroboration, and, consensus on the best way to protect an area.

### How Can Knowing This Help Me?

Knowing and understanding how public participation can be used in effective planning and management of MPAs may help

- Increase support and build relationships with stakeholders
- Empower the public in the decision-making process
- Incorporate public participation
- Inform the public in a timely manner
- Educate stakeholders on management issues

### What Are Some Tools I Can Use?

- [Ethnography](#)
- [Secondary Data Analysis](#)
- [Interviewing](#)
- [Case Study Research](#)

## How Do Governmental and Nongovernmental Organizations (NGOs) Influence Decision Making?

The different ways government agencies and nongovernmental organizations influence decisions are wide-ranging and varied from one entity to another.

Government agencies have structured ways to make decisions within their delegated and mandated powers, which may be influenced by political processes, public opinion, scientific data, economics, and other external factors. NGOs may use political processes, public relations, education, and economics to influence public decision-making processes and may seek opportunities to be actively involved in collaborative processes.

The organizational culture, level of authority, reputation, expertise, public support, and many other factors can all determine how much or how little influence an agency or organization will ultimately have on decision making.

### How Can Knowing This Help Me?

Knowing how your own agency and other agencies and organizations influence decision making can help answer many questions, including

- What issues should be avoided?
- How do you determine the most effective interagency coordination?
- What level of decision making is appropriate for an agency?
- How do you avoid bias?
- Who is responsible for what?
- How do you involve stakeholders in the development and execution of policies?

### What Are Some Tools I Can Use?

- [Historical Research](#)
- [Focus Groups](#)
- [Interviewing](#)
- [Comparative Research](#)

## What Formal and Informal Rules Govern Resource Use?

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Both formal and informal rules and authorities can have an impact on resource management in an MPA. Formal rules are laws and regulations established legislatively and delegated to agency authorities for enforcement. Informal rules are accepted practices that are based on values, tradition, culture, or common knowledge. Integrating these two types of rules influences the way resources are used and the manner in which new rules are established.

### How Can Knowing This Help Me?

Knowing the formal and informal rules that govern resource use in an MPA helps managers and staff in addition, this knowledge as well as.

- Develop a network of information exchange of established rules as well as the sharing of responsibility for governing resources
- Establish formal rule-making ability
- Learn how informal groups may influence those formal rules

### What Are Some Tools I Can Use?

- [Secondary Data Analysis](#)
- [Interviewing](#)
- [Focus Groups](#)
- [Historical Research](#)

## What Types of Interventions Are Used in Addressing Violations of MPA Regulations and for Changing User Behavior?

The objective of most regulations is to change a behavior or attempt to prevent a negative behavior from occurring by punishing an offender. Yet violations of regulations can occur due to misunderstandings, lack of communication of the regulation and its purpose, cultural conflicts, lack of adequate enforcement, and financial circumstances. Knowing why these violations occur and what motivates a violating party may be a considerable step in avoiding any reoccurrence.

A variety of social science tools and methods may help managers promote compliance with regulations by incorporating the most appropriate type of intervention for any given situation.

### How Can Knowing This Help Me?

Understanding why violations occur and what interventions can be used to address MPA violations may help managers

- Identify the causes of violations and address them through incentives or education, rather than devoting additional resources to enforcement
- Improve communication with violators and the public about the resource, the regulations, and the importance of compliance
- Focus outreach and education efforts to encourage positive behaviors
- Determine the most effective strategy to address violations by identifying the motivations of the violators

### What Are Some Tools I Can Use?

- [Secondary Data Analysis](#)
- [Surveys](#)
- [Case Study Research](#)
- [Historical Research](#)
- [Ethnography](#)

## Tool Table

This table contains summaries of a combination of selected social science tools and methods that can be used in research design, data collection, and data analysis. More in-depth information on each tool or method, and its applications to marine protected area (MPA) management, as well as case studies illustrating the use of the tool or method, can be accessed through the provided link.

| Tool/Method   | What Is It?  | What Can It Be Used For?  |
|---|--|---|
| <a href="#">Case Study Research</a>                 | An in-depth investigation of issues at specific instances and locations.   | To identify the attitudes, perceptions, and beliefs of most groups involved, as well as the interactions among those groups.  |
| <a href="#">Comparative Research</a>                | A comparison of different analyses, that compares attributes, characteristics, or particular treatments across two or more situations.   | Managers can compare certain characteristics of one MPA or compare the same group over time (also called "longitudinal comparison").  |
| <a href="#">Content Analysis</a>                    | A review of interview transcripts, newspapers, books, manuscripts, Web sites, or other documents to identify underlying meanings, or qualify occurrences of key words or phrases.        | To help identify patterns and trends in discussions about biological, social, and political phenomena. Also to identify patterns that depict associated attitudes, perceptions, and values.                       |
| <a href="#">Cost-Benefit Analysis</a>               | A tool for comparing the benefits of proposed projects with the costs to identify the alternative with the maximum net benefit (benefits minus costs).                                   | To understand the social costs and benefits of the marine protected area on to stakeholders or to identify alternatives that are the most cost-effective.   |
| <a href="#">Demographic Analysis</a>                | A tool used to study the characteristics of human populations, such as size, growth, density, and distribution.  | To highlight trends in the size, distribution, and density of human populations in communities.   |
| <a href="#">Ethnographic Research</a>               | A method for obtaining an in-depth understanding of the history, practices, values, traditions, and circumstances of the groups and surrounding resources being studied.                 | To help managers better understand the stakeholder groups with whom they interact. Also, to reveal cultural values and practices, helping managers identify how these values and practices affect MPA management. |
| <a href="#">Focus Groups</a>                        | A focus group is a group interview, typically involving 8 to 12 people about a specific topic.   | To identify opinions, attitudes, and perceptions about a specific idea. Focus groups can also be used to inform survey development.   |
| <a href="#">Geographic Information System (GIS)</a> | A compilation of hardware, software, and data that enables users to manipulate, analyze, and display geographically referenced information.  | To document human use patterns, identifying culturally sensitive areas, prioritizing regions for additional public access, or highlighting demographic trends within a community.                                 |
| <a href="#">Historical Research</a>                 | A review or analysis of past resource use and the social and population characteristics related to a particular geographic resource. A type of <a href="#">secondary data analysis</a> . | To determine past social attitudes and community structure, as well as how these have changed over time. Also to identify how the attitudes, perceptions, and uses of communities and groups have evolved.        |

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|--|--|--|
| <a href="#">Interviewing</a>             | A method of eliciting answers to predetermined questions from one individual at a time. Questions can be modified to fit a given situation.                                      | To collect detailed information from individuals which may not be available in written or published format. To provide insight into individual feelings and experiences.   |
| <a href="#">Nonmarket Valuation</a>      | A method used to estimate the economic value of items that have no assignable market value, such as ecosystems and environmental services.                                       | To estimate the value of a reef, beach, or any other resource or use that has no assignable market value.  |
| <a href="#">Observation</a>              | An information-gathering technique based on personal observation and recording of human activities and behaviors.  | To collect information about social groups, community behaviors, and resource use in normal-use situations.  |
| <a href="#">Predictive Modeling</a>      | A technique that creates a model to simulate real-world situations to predict future conditions.   | To understand possible long-term impacts of management decisions and to prevent future problems from occurring.  |
| <a href="#">Rapid Rural Appraisal</a>    | A broad-level evaluation, usually through consultation with experts and stakeholders, that provides a general overview of the relationship between humans and natural resources. | To identify areas of concern in an MPA, such as safety issues or access issues, quickly and thoroughly. In addition, this type of broad-level evaluation can be used as a precursor to planning and can help justify decisions that need to be made quickly. |
| <a href="#">Secondary Data Analysis</a>  | Analysis of data that were collected by individuals other than the investigator. These data include newspapers, census data, maps, etc.  | To identify or analyze characteristics of a group, populations, or issue using existing data and information.  |
| <a href="#">Social Assessment</a>        | A method of data collection and analysis used to characterize the social environment in the area in which one manages (e.g., watershed, protected area).                         | To identify the principal stakeholders and to generate information about social structures, processes, and changes being produced in any given area or community. Used as a precursor to management planning.  |
| <a href="#">Social Impact Assessment</a> | Used to predict impacts related to implementation of management resources or policy changes.   | To identify how people and communities could potentially react to changes and to predict probable impacts of the implementation of rules and regulations.  |
| <a href="#">Social Network Analysis</a>  | A method used to collect, analyze, and graphically represent data that describe patterns of communication and relationships within a community.                                  | To identify community opinion leaders and other influential individuals, as well as those most responsible for disseminating information, and to determine how new ideas or information will spread through a community and how fast.                        |
| <a href="#">Surveys</a>                  | A standardized list of questions administered by mail, telephone, Internet, or in person.  | To obtain information and opinions from a representative sample of stakeholders related to specific MPA issues.  |

## Case Study Research

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### What Is Case Study Research?

Case study research is used to conduct an in-depth investigation of an issue at a specific instance and location. When used in social science research, case studies may help determine the attitudes, perceptions, and beliefs of groups the researchers wish to examine, as well as describe the interactions among those groups. Case study research may also involve assessing economic or behavior trends within a community. Case study research involves collecting in-depth information in a limited area and usually includes many social science tools such as [surveys](#) and [demographic](#) information.

### MPA Application

Development of case studies concerning MPAs is an effective way for managers to explain social trends related to a particular area or issue, thus allowing them to make more informed decisions. For example, an MPA manager could use case study research to determine what user groups think of a new policy or regulation. It could also be used to record traditional practices within a specific area.

### Expertise Needed

This technique may require some technical assistance from skilled researchers.

### Advantages

- Powerful means to portray a situation, study, or event to others
- Fully depicts the experiences, processes, and lessons learned from a situation, study, or event

### Limitations

- Time-consuming to collect, organize, and describe
- Represents depth of information rather than breadth

### Case Studies



[Involving the Community in Decision Making in Folkestone Marine Reserve, Barbados](#)  
Identifying stakeholders and providing them with a forum to voice their views and opinions.

### Additional Resources

## Articles and Books

Yin, R.K. 2002. 3rd Edition. *Case Study Research : Design and Methods (Applied Social Research Methods)*. SAGE Publications.

Yin, R.K. 2002. 2nd Edition. *Applications of Case Study Research (Applied Social Research Methods)*. SAGE Publications.

## Web sites

### [Case Studies](#)

This complete guide from Colorado State University includes an in-depth overview of case study research, types, and designs, approaches for conducting a case study, and additional commentary on case study strengths and weaknesses.

### [Basics of Developing Case Studies](#)

This resource from the Free Management Library for nonprofits and for-profits includes insightful information on the uses for and development of case studies, as well as some sample case study reports.

## Comparative Research

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### What Is Comparative Research?

Comparative research looks at two or more similar groups, individuals, or conditions by comparing them. This comparison often focuses on a few specific characteristics. This method can also be used to compare the same group, condition, or individual over time (also called longitudinal comparison). Comparisons may be qualitative or quantitative.

### MPA Application

The use of comparative research in an MPA can be applied in many ways. Managers can compare certain characteristics of one MPA to another MPA to determine how well a management strategy is working. For example a manager could compare two neighboring MPAs - one in which artisanal fishing is regulated and another where no regulations are in place.

### Expertise Needed

This technique may require a basic understanding of statistics and knowledge of issues being researched.

### Advantages

- If data are available, research can be conducted quickly
- Results can be used to provide support for management decisions
- Provides direct comparisons of two or more areas or elements, both geographical and temporal (this is also known as longitudinal)

### Limitations

- Difficult to control for all factors
- Requires quantifiable data if statistical comparison is desired
- Needs baseline data or control group

### Case Studies



#### [Willingness to Pay in Rocky Intertidal Ecosystems in Orange County, California](#)

Estimating how much visitors would be willing to pay to prevent further degradation to the rocky intertidal zone.



#### [Entrance Fees for Marine Sanctuaries in the Philippines](#)

Determining how many tourists are willing to pay to dive in areas where fishing is prohibited.

## Additional Resources

### [Comparative Research Methods](#)

A discussion of comparative research methods by Linda Hantrais, Director of the European Research Centre, Loughborough University. Article published by the Department of Sociology at the University of Surrey.

### [How to Write a Comparative Analysis](#)

Guidelines from the Harvard Writing Center.

## Content Analysis

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### What Is Content Analysis?

Content analysis, a type of [secondary data analysis](#), is used to analyze text, including, interview transcripts, newspapers, books, manuscripts, and Web sites to determine the frequency of specific words or ideas. The results of content analysis allow researchers to identify, as well as quantify, specific ideas, concepts, and their associated patterns, and trends of ideas that occur within a specific group or over time.

### MPA Application

Content analysis can help identify patterns and trends in discussions about biological, social, and political phenomena. It can also help managers differentiate ways in which different groups and individuals discuss particular issues. One of the greatest strengths of content analysis lies in its ability to identify patterns that suggest trends or characteristics of attitudes, perception, and belief values.

### Expertise Needed

This technique often requires some assistance from skilled experts or the use of specialized software that can analyze text for underlying meanings.

### Advantages

- Provides objective analysis of written materials and can identify meaning from text data
- Allows managers to go through very large amounts of text quickly
- Can quantify qualitative data

### Limitations

- May not include all the values present in the study
- Results can be skewed and slanted if words misinterpreted
- Requires preparation and training of all individuals involved
- Different researchers may have different interpretations of the material, causing inconsistent or conflicting results
- Accuracy of the method depends on analyzing data that are representative of what is occurring to prevent inaccurate or biased results

### Case Studies



### [Rapid Evaluation of Proposed Marine Conservation District in St. John, U.S. Virgin Islands](#)

Assessing the perceptions of user groups through content analysis and observation.

## Additional Resources

### Articles and Books

Krippendorff, K. 1980. *Content analysis: An introduction to its methodology*. Beverly Hills, CA: Sage.

Weber, R. P. 1990. *Basic content analysis*. Newbury Park, CA: Sage.

### Web sites

#### [Content Analysis Resources](#)

Provides links to sites that provide information regarding people who are working with content analysis, the projects on which they are working, and the facilities in which they work.

#### [An Introduction to Content Analysis](#)

This complete guide from Colorado State University includes an in-depth overview of content analysis including history, uses, and types. Additional commentary includes issues of reliability and variability and advantages and disadvantages when using this method.

## Cost-Benefit Analysis

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### What Is Cost-Benefit Analysis?

Cost-benefit analysis is a tool for comparing the benefits of proposed projects with the costs to help users identify the alternative with the maximum net benefit (benefits minus costs). The more the benefits exceed the costs, the more society will benefit from the project activity or policy decision.

There are four basic steps to performing a cost-benefit analysis:

- Identify the project or program and alternatives
- Describe quantitatively the inputs and outputs of each alternative
- Estimate the value of the costs and benefits
- Compare benefits and costs

### MPA Application

Cost-benefit analysis, when done correctly, can give a manager a better understanding of the impact of the marine protected area on stakeholders, in terms of costs and benefits. This knowledge can help a manager identify alternatives that are the most beneficial, comparing projects that differ in magnitude and duration.

Cost-benefit analysis requires the conversion of all benefits and costs into common units—typically dollars. Because many environmental outputs cannot be easily measured in monetary terms, it may be possible to apply this tool in only a limited range of project decisions. Where it can be applied, however, cost-benefit analysis is an important tool for helping managers do the most environmental good with limited time, funding, and other resources at their disposal.

### Expertise Needed

This technique often requires some assistance from skilled experts or the use of specialized software that can analyze text for underlying meanings.

### Advantages

- Compares costs and benefits using equal terms
- Provides a clear indication of net cost or benefit of the MPA or a specific regulation. This helps justify decisions at various levels
- Simplifies complex concepts and processes
- Accepted by society more readily than other economic methods
- Can be carried out at many levels (i.e., local, regional, national, international)

## Limitations

- Can be difficult to determine accurately the discount rate of future costs and benefits as well as indirect impacts
- Needs to be used with [nonmarket valuation](#) methods to be accurate
- Costs are easier to estimate than benefits
- Can be a time-consuming and expensive process
- Does not always consider the source of the costs and benefits – needs to consider factors such as environmental justice and indirect impacts

## Case Studies



### [Analyzing the Costs and Benefits of Human Activities for Indonesian Coral Reefs](#)

Using cost-benefit analysis and predictive modeling to show others the need to protect coral reefs.

## Additional Resources

### [Cost-Benefit Analysis](#)

Developed by the National Center for Environmental Decision-Making Research, this interactive research module provides in-depth information on many aspects of cost-benefit analysis and is geared towards the environmental decision-making process.

### [Marine Protected Areas: Economic and Social Implications](#)

A guide to better understanding of the economic and social values of MPAs. Discussions of benefits and costs as well as economic and social tradeoffs are included.

### [Overview of Benefit Cost Analysis](#)

Cost-benefit analysis is described and discussed in detail. Alternative methods including cost-effectiveness analysis and incremental analysis are described and examples of each are provided.

### [Generational Cost Benefit Analysis for Evaluating Marine Ecosystem Restoration](#)

This guide from Colorado State University includes an overview of cost-benefit analysis, including types, history, and uses. Issues of reliability and variability as well as advantages and disadvantages are also discussed.

For general economic resources see [Economics](#).

## Demographic Analysis

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### What Is Demographic Analysis?

Demography is the study of the characteristics of human populations, such as size, growth, density, and distribution. Demographic analysis provides insights into the links between these characteristics and the cultural, economic, geographic, and other social attributes present in a given area.

### MPA Application

Understanding the population dynamics around a marine protected area (MPA) can be a valuable tool for managers. Demographic analysis can highlight trends in the size and density of communities adjacent to a protected area as well as factors attracting or discouraging individuals from residing in these areas. By linking population data and use patterns, demographic analysis can help managers target the sources of practices that are detrimental to the health of marine ecosystems. This type of information can be incorporated into a geographic information system (GIS) to display demographic patterns spatially, linking ecological and human characteristics within a landscape.

Demographic analysis can also be used to establish the percentage of the total population involved in a particular resource use activity, such as fishing or tourism. By delineating this information by age, sex, or education level, MPA managers can develop targeted outreach and training activities for local communities.

### Expertise Needed

Technical assistance from a skilled demographer is essential for interpreting population data, conducting statistical analyses, and establishing relationships between different demographic trends. However, more informal use of demographic data by managers themselves may help orient planning, outreach, and education activities around MPAs.

### Advantages

- Provides statistically sound data on human populations
- Has little bias
- Can be used to orient other types of social science analysis (e.g., social assessments, use patterns, and economic studies)

### Limitations

- Population data is not collected specifically for MPAs
- Demographic analysis does not capture individual or community perceptions
- Can require use of sophisticated statistical techniques

## Case Studies



### [MPA Perceptions by Small-Scale Fishermen in Sicily, Italy](#)

Using questionnaires to assess the perceptions of small-scale fishermen toward marine reserves.



### [Using Ethnography to Document Traditional Practices in Kadavu, Fiji](#)

Understanding the history and culture of Fijians and integrating these into current MPA management.

## Additional Resources

### [Demographic Trends and the Planning and Management of Visitor Use in Wilderness](#)

By H. Ken Cordell. This study illustrates the utility of demographic analysis for natural resource and protected area management.

### [The Sonoran Institute](#)

The institute offers an economic profiling system for interpreting socioeconomic data.

### [Spatial Trends in Coastal Socioeconomics \(STICS\)](#)

A NOAA Web resource offering access to demographic information and patterns of human activity in the coastal zone.

### [The U.S. Census Bureau](#)

The U.S. Census Bureau provides a wide range of demographic information on its public Web site as well as links to a variety of sources of state demographic information.

### [U.S. Census Data](#)

This U.S. Census Bureau Web site allows quick, easy access to census data.

## Ethnography

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### What Is Ethnography?

The goal of ethnography is to obtain an in-depth understanding of the history, practices, values, traditions, and circumstances of the individuals, groups and surrounding natural and cultural resources being studied. Research is focused on interactions within and among the groups. Ethnographic research requires the use of multiple methodologies, including, [secondary data research](#) to get background information on the individuals or group being studied, [historical research](#), [observation](#), and [interviewing](#).

### MPA Application

Stakeholders in and near an MPA play a major role in the success of the MPA. Ethnographic analysis may help managers better understand the stakeholder groups and the groups with whom they interact.

Understanding a group provides the benefit of improving the quality of interaction between managers and stakeholder groups. This in turn may help with education and outreach efforts, increasing the buy-in and compliance of management policies and regulations, and improving the quality of future interactions.

Ethnographic research may also reveal cultural values and practices, helping managers identify where these values and practices diverge from the regulations with the MPA, and traditional ecological knowledge (TEK). TEK is a system of understanding one's environment. Generations of a group or culture have often interacted with the marine environment for survival and have intricate knowledge of specific trends and characteristics of the physical area and the organisms that inhabit it. This knowledge may help managers better understand the MPAs they protect.

### Expertise Needed

The level of expertise required depends on the methodology used and the application of the results. Some stakeholder groups have strong customs or beliefs, and managers need to be aware of them. Often an interpreter may be required to translate the language or specific dialect spoken. Some ethnographic research may involve short or long-term stays with the groups being studied. Prior to engaging in ethnographic research, consultation with an expert is recommended.

### Advantages

- Reveals certain characteristics and qualities of stakeholder groups that would otherwise not have been identified
- Records complexities of group behavior and interaction
- Provides context for behavior
- Establishes a baseline for follow-up research

## Limitations

- Researcher bias can affect data collected
- Depends on apparent credibility of sources
- Depends on study groups being representative of entire group or population studied
- Can be problematic to compare because of qualitative nature
- Requires time – to build the level of trust required in ethnographic research, long-term studies are usually required

## Case Studies



[Using Ethnography to Document Traditional Practices in Kadavu, Fiji](#)

Understanding the history and culture of Fijians and integrating these into current MPA management.

## Additional Resources

### Articles and Books

Fetterman, D.M. 1998. *Ethnography: Step by step*. 2nd edition. Newbury Park, CA: Sage Publications.

Geertz, C. 1973. *The Interpretation of Cultures*. New York: Basic Books.

Van Maanen, J. 1988. *Tales of the Field: On Writing Ethnography*. Chicago: University of Chicago Press.

### Web Sites

#### [Ethnography in the Parks - Research Tools](#)

A review of the different types of ethnography and the role of ethnographers. National Parks Service - Archeology and Ethnography program.

#### [Resources in Ethnographic Studies](#)

From the American Folklife Center, Library of Congress.

#### [References on Ethnographic Research](#)

General and information-related ethnography resources. From the Association for Information Systems (AIS).

### Examples

#### [Incorporating Traditional Ecological Knowledge with Geographic Information Systems](#)

Uses ethnography to document indigenous knowledge of Pacific Island coral reef biogeography and develop a conceptual framework on how to adapt this information to a geographic information system (GIS) database.

#### [Traditional Ecological Knowledge of Beluga Whales](#)

Identifies beluga habitat and develops an understanding of beluga behavior through the collection of traditional ecological knowledge.

## Focus Groups

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### What Are Focus Groups?

Focus groups involve a structured process in which a number of participants, typically 8 to 12, are asked their opinion on predetermined questions. The goal of focus groups is not to achieve consensus, but rather to get a range of opinions and ideas and to understand perspectives.

### MPA Application

Focus groups can be a valuable tool in identifying key stakeholders' attitudes and perceptions, as well as other data on a number of issues related to MPAs. For instance, focus groups could help assess and measure stakeholder perceptions on different management issues including no-take zones, recreational uses, and economic impacts. Focus groups could also be used as a way to find out what "special places" local residents or indigenous groups value based on cultural, traditional, or historical use. Focus groups are often used in the [survey](#) design process.

### Expertise Needed

Minimal expertise is needed to organize and conduct informal focus groups. The use of a skilled facilitator can help reduce bias.

### Advantages

- Gathers useful information from multiple individuals with knowledge on a topic.
- Provides community members with a sense of involvement on a topic they feel strongly about.
- Supports findings of other methods.

### Limitations

- Can be time-consuming in preparation as well as in interpretation of results.
- Limited to a small number of individuals involved at one time.
- May require facilitation assistance by a skilled facilitator.
- May be biased through interaction between participants and facilitator.

### Case Studies



#### [Paying for Seagrass Restoration in the Florida Keys](#)

Using habitat equivalency analysis to determine the value of habitat lost.



#### [Involving the Community in Decision Making in Folkestone Marine Reserve, Barbados](#)

Identifying stakeholders and providing them with a forum to voice their views and opinions.



#### [Using Ethnography to Document Traditional Practices in Kadavu, Fiji](#)

Understanding the history and culture of Fijians and integrating these into current MPA management.

## Additional Resources

### Articles and Books

Kruger, R. A. 1994. Focus Groups: A Practical Guide for Applied Research. Thousand Oaks, CA: Sage Publications.

### Web Sites

#### [Conducting a Focus Group](#)

Tips and advice for planning, conducting, and evaluating focus groups from Lehigh University.

#### [Focus Groups and Telephone Focus Groups](#)

Several different approaches for conducting a focus group are provided in these links from Market Navigation, Inc.

#### [Guidelines for Conducting a Focus Group](#)

The University of Wisconsin-Milwaukee has put together a guide that takes you through the preparation, participant selection, session logistics, moderating, and analysis of a focus group session.

#### [How to Conduct a Focus Group](#)

This article from The Grantsmanship Center's magazine takes you through the steps for conducting a focus group and includes answers to some frequently asked questions.

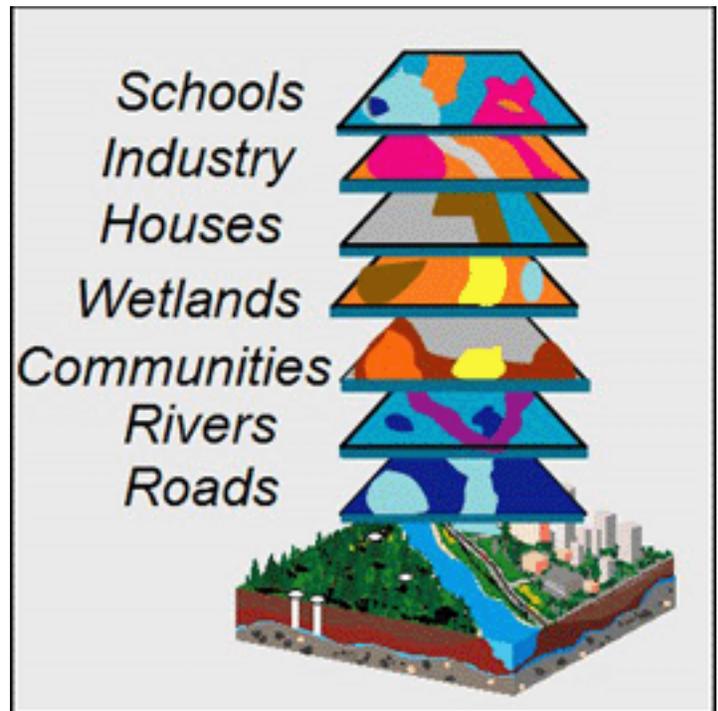
## GIS

### What Is GIS?

A geographic information system (GIS) is a compilation of hardware, software, and data that enables users to

- Produce high-quality maps at a variety of scales
- Store and maintain a large quantity of geographically referenced information
- Visualize and simplify complex data
- Perform complex analyses on data
- Easily make changes to data

GIS helps streamline the process of analyzing a variety of data types. Data can be in the form of reports, maps, tables, or historical records. These documents can be located in a variety of places and in many formats. A GIS is able to integrate all of these resources for display and analysis and share this information with many users for all types of projects.



*An example of GIS data layers.*

### MPA Application

Although GIS technology is relatively mainstream within coastal resource management, the integration of social science data into these maps or spatial analyses is an emerging trend within the MPA community. GIS can be useful for documenting human use patterns, identifying culturally sensitive areas, prioritizing regions for additional public access, or highlighting demographic trends within a community.

GIS also provides a mechanism to encourage stakeholder participation for site selection and impact analysis. Within a public meeting, for example, users may be permitted to view and interact with the data as management issues are discussed. GIS functionality may also be customized in a decision support tool that allows stakeholders to weigh the importance of certain issues or data sets and select regions based on assigned criteria. Often, even groups with disparate views will identify regions of overlap among the selected areas, potentially providing common ground and making the issue less polarized.

For more information on GIS applications see [GIS – Applied](#)

### Expertise Needed

Basic manipulation and simple map display within a GIS can be performed with minimal experience; however, access to training allows users to conduct more complex analyses. Many MPA sites already have access to the

required software and personnel. Still, depending on the needs of the program and the resources available, it may be helpful to seek additional expertise through a partnership agreement or external contract.

## Advantages

- Helps users visualize complex or inaccessible data
- May indicate links between people or between people and the environment that may not otherwise have been identified
- Is effective for outreach and education
- May help visualize "what if" scenarios
- Does not require advanced technical expertise to conduct basic mapping functions

## Limitations

- Cost of data and software packages may be prohibitive
- Cost of experts, such as GIS specialists or programmers, may be prohibitive
- Collection of data may require specialized equipment or software
- Results are limited to the amount and quality of available data
- Data may be hard to access because of confidentiality or proprietary issues

## Case Studies



[Combining Science and Technology in the Tortugas Ecological Reserve, Florida](#)  
Using GIS to analyze socioeconomic data associated with the placement of a reserve.

## Additional Resources

### [Coastal Geospatial Information: Examples of Internet Resources](#)

Links to coast-related spatial data, training resources, and metadata information from a variety of sources.

### [What Is a Geographic Information System?](#)

Basic GIS information from the NOAA Coastal Services Center.

### [MPA Technology Needs Assessment](#)

An assessment published in December 2003 by the Coastal Services Center gauging technical capacity within the marine management community and documenting MPA-related applications of technology.

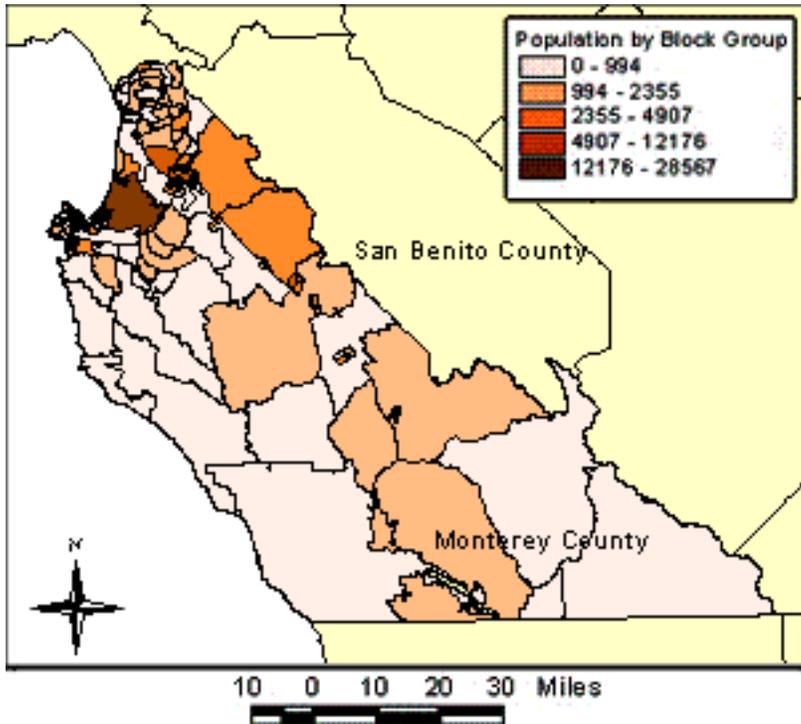
### [Social Sciences: Interest in GIS Grows](#)

The role of GIS in social science. By M. F Goodchild,. University of California, Santa Barbara.

### [Environmental Systems Research Institute, Inc. \(ESRI\)](#)

One of the leading developers of GIS software, ESRI's Web site provides examples of how GIS is used and background information for all levels of users.

## GIS



GIS was used to generate this map of population data from Monterey County, California.

social science data must be manipulated to provide this geographic reference. For example, data gathered from a questionnaire can be linked to existing spatial data, such as census tracts or blocks, counties, or zip codes (see map).

## GIS – Applied

Back to [GIS](#) tool

GIS technology presents managers with the ability to capture stakeholder input for a specific region and integrate that information with existing natural science data for a more comprehensive analysis. GIS provides a powerful mechanism to highlight and communicate concerns regarding environmental threats or proposed management measures from the perspective of both the local community and the scientific or management community.

In order to be viewed by and analyzed within a GIS, the information must be geographically referenced, i.e., associated with a specific point location (latitude/longitude), line (road, river), or region (zip code, town, county). Often raw

## What Other Data Can Be Used with GIS?

GIS can be used to display and analyze a variety of spatially referenced data types.

Examples of data that can be used within a GIS to enhance social science information include:

- Aerial photography
- Satellite imagery
- Global Positioning System (GPS) data
- Bathymetric and topographic data
- Shoreline change data (LIDAR)

- Habitat data
- Fish and wildlife data
- Landscape features

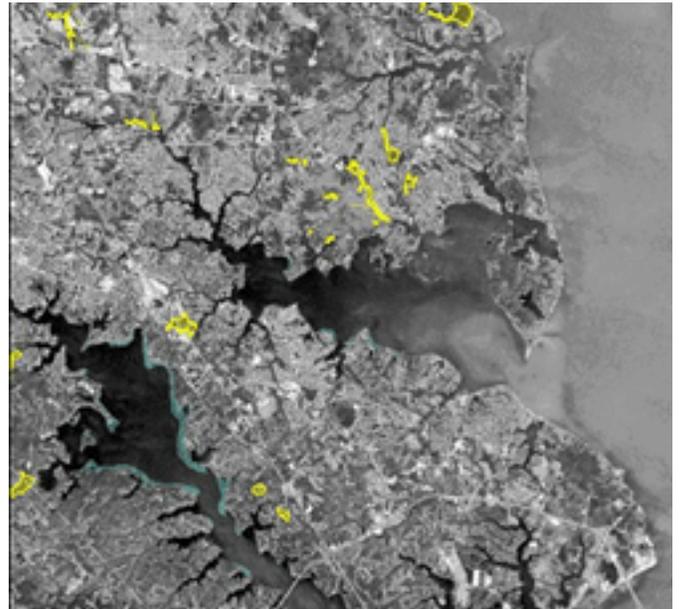
The ability to review such a broad range of information about a specific location can lead to improved decision-making. In particular, the combination of natural and social science data may highlight conflicting uses and identify relationships between human use patterns and observed impacts.

## Case Studies



### [Combining Science and Technology in the Tortugas Ecological Reserve, Florida](#)

Using GIS to analyze socioeconomic data associated with the placement of a reserve.



*Satellite image of Chesapeake Bay, Maryland. The wetlands are shown in yellow.*

## Additional Resources

### [Remote Sensing for Coastal Management](#)

Examples of how GIS is used with other software programs and remote sensing techniques. Developed by the NOAA Coastal Services Center.

## Historical Research

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### What Is Historical Research?

Historical research is a type of secondary data analysis to determine past social attitudes and community structure and how these have changed over time.

Historical research can be accomplished with several types of sources, including

#### Historical Literature

Historical resources may include library materials, special collections, and museum collections. They are often the most effective means of gaining information.

#### Archival Literature

Materials in archives are useful for studying cultural processes through time and finding specific material from original documents.

#### Oral Histories and Traditions

Oral histories help gain insight into an event or situation by gathering personal accounts from informants who recall events, places, or incidents.

Traditions are information and beliefs handed down through generations by word of mouth or by example. An understanding of oral traditions is often key in communicating with different cultures.

### MPA Application

Historical research gives MPA managers a much better picture of who uses the area and how it has been used. Understanding the history of the area will often give a much clearer picture of how communities and groups have evolved regarding attitudes, perceptions, and uses. Historical research gives a manager a better context for making realistic management decisions.

### Expertise Needed

This technique can often be conducted with in-house expertise. Some assistance may be required in locating data sources.

### Advantages

- Provides a comprehensive picture of historical trends
- Uses existing information
- Provides evidence of ongoing trends and problems

### Limitations

- Time-consuming
- Resources may be hard to locate
- Resources may be conflicting
- May not identify cause of a problem
- Information may be incomplete, obsolete, inconclusive, or inaccurate
- Data restricted to what already exists

## Case Studies



### [Using Ethnography to Document Traditional Practices in Kadavu, Fiji](#)

Understanding the history and culture of Fijians and integrating these into current MPA management.

## Additional Resources

### [Institute for Historical Research](#)

This institute provides resources on historical research and publishes the Historical Research journal.

### [Oral History: A Guide for Conducting Naval Historical Interviews](#)

Guidelines and resources to conduct interviews and develop transcripts.

### [Oral History Resources](#)

Links related to methodology, organizations, projects, and workshops.

### [What Is Oral History?](#)

A collection of oral history information from Ohio University. This site describes oral history, its uses, planning and conducting oral history interviews, and videotaping techniques.

## Interviewing

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### What Are Interviews?

Interviews are a method of eliciting answers to predetermined questions from one individual at a time. Different formats and types of questions can be used to fit a given situation. Interviewing is one of two basic components in [ethnographic](#) research; the other is [observation](#).

There are four major types of interviewing that fall within a continuum of control that is exercised over people's responses:

#### Informal

Characterized by a lack of structure or control. Researcher recalls conversations and writes these down afterwards. Used by scientists to familiarize themselves with a new environment.

#### Unstructured

A clear plan is present but minimum control is exercised over responses. This allows interviewees to express themselves in their own terms, at their own pace, uses open-ended questions. Often used in [ethnography](#). Common strategy when time is not a limiting factor.

#### Semi-structured

Similar to unstructured interviews, but interviews are conducted using introductions and a list of questions in a specific order. Researcher may use a combination of open and close-ended questions. This structure is necessary to acquire reliable, comparable qualitative data when interviews are administered by more than one individual. Used when there are limited opportunities to interview or when multiple simultaneous interviews are required.

#### Structured

Characterized by the use of identical questions with a range of choices to answer from; close-ended questions. This type of interview requires less experience to administer than the other interview types, can be done in a fixed amount of time, and provides results that are easy to quantify. Structured interviews, however, can only be used if the researcher has a good understanding of the subject and relevant issues.

### MPA Application

Interviewing is a powerful tool for MPA managers in obtaining in-depth information from key individuals and informants within a community or group. For example, managers may need a better understanding of how different uses in an MPA are affecting a particular group. Interviews with key informants within that group will increase a manager's knowledge and help guide future management decisions.

### Expertise Needed

Less structured interview techniques require active listening skills of the interviewer. With added complexity, this technique may require some assistance from skilled interview designers.

## Advantages

- Can be inexpensive and convenient
- Establishes rapport to increase the accuracy and honesty of answers
- Captures the full range and depth of information

## Limitations

- Can be time consuming and expensive depending on the number of people and whether transcripts of recorded interviews are required
- Presence of interviewer can bias responses
- Can be difficult to analyze and compare
- Translations of recorded interviews may be needed if performed in native language

## Case Studies



### [Identifying Communication Networks Among Fishermen in North Carolina](#)

Determining who are the most influential individuals within a community of king mackerel fishermen.

## Additional Resources

### Articles and Books

Gubrium, J.F. and J.A. Holstein. 2002. *Handbook of Interview Research : Context & Method*. Thousand Oaks, California : SAGE Publications.

### Web sites

#### [A Guide to Interview Guides](#)

Detailed guidelines on conducting interviews.

#### [Conducting the Information Interview](#)

A tutorial organized in seven modules. Links to additional resources are also included.

#### [General Guidelines for Conducting Interviews](#)

This resource from the Free Management Library for nonprofits and for-profits includes general guidelines for conducting research interviews and includes information on preparation, types, questions, carrying out the interview, and other useful information.

## Nonmarket Valuation Tools

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### What Is Nonmarket Valuation?

Nonmarket valuation is a method to estimate the value of goods and services that are not commonly bought and sold in markets. Whereas sales prices give very clear signals of the monetary value for goods and services that are routinely bought and sold, environmental project alternatives often must be converted and compared in monetary terms.

Nonmarket valuation would determine a value for environmental outputs, such as a healthier ecosystem, an underwater reef viewshed, or a fish population that is less likely to become extinct, that can be factored into traditional economic cost-benefit analyses.

Specific economic tools can be used to estimate the economic value of environmental outputs. These tools include

- Using surveys designed to help respondents assign values to nonmarket goods or services (e.g., contingent valuation method)
- Studying market transactions that are influenced by the environmental good or service of interest (e.g., travel cost and hedonic pricing methods)
- Adapting estimates of value developed for one study area for use in another (benefit transfer method)

### Are There Specific Nonmarket Valuation Tools?

#### Contingent Valuation

Surveys are used to help respondents estimate personal willingness to pay for non-market goods or services like clean beaches or healthy corals.

#### Travel Cost

Survey or observation used to calculate the value of a recreational experience. An example would consider how much visitors are willing to pay for access to a resource, considering travel time, fuel, lodging, and entry fees.

#### Hedonic Pricing

Market transactions are compared for goods or services that differ primarily because of the influence of the non-market good or service that is of interest. For example, sales prices of similar homes could be compared where some overlook a healthy saltmarsh and others do not. This comparison could estimate the value of the saltmarsh to the market value of the homes that surround it.

#### Benefit Transfer

Estimates of value derived from a study of one area can be adapted for use in another area. For example, the value of sportfishing that will result from the restoration fisheries in northern California can be estimated using studies of similar fisheries in Oregon.

## What If a Dollar Value Can't Be Assigned to The Outputs?

Cost-benefit analysis requires the conversion of all benefits and costs into common units—typically dollars. Because many environmental outputs cannot be easily measured in monetary terms, it may be possible to apply this tool in only a limited range of project decisions. There are, however, some other economic tools that can help managers make the best use of the limited resources at their disposal.

### Incremental Cost Analysis (ICA)

When a project alternative differs primarily in geographic extent or levels of investment, ICA is a useful tool for identifying the most efficient alternative. The outputs do not have to be measured in dollars so long as they can be measured in common units, such as "acres restored."

For example, if it costs \$50,000 to protect 10 acres of reef, but would cost an additional \$100,000 to protect 5 more acres, and \$250,000 to protect 3 more acres, at what point would it be more efficient to invest funds in other endeavors?

### IncCost Effectiveness Analysis (CEA)

When there is more than one way to achieve the same outcome, CEA is a tool for properly accounting for the costs of the different options to identify the one that is most cost-effective.

## MPA Application

Nonmarket valuation can be used to estimate the monetary value of the resources of MPAs to help guide management decisions. If, for example, fishing practices are damaging to a coral reef, contingent valuation methods can be used to estimate the value of those damages for comparison to the cost to fishermen of restricting the damaging practices. If the value of the damages prevented can be shown to be greater than the value of the incomes that will be lost, this serves as a strong economic justification of the regulatory practice.

Nonmarket valuation can also be used to estimate users' willingness to pay for access to a resource for use in establishing access fees or to set enforcement penalties at a level that will be an incentive for compliance. Also, nonmarket valuation may be used in education and outreach to demonstrate the significance of a resource to business-minded stakeholders who are more accustomed to economic analysis.

## Advantages

- Can be used to facilitate the comparison of the value of market and nonmarket goods and services
- Can be used to estimate the value of almost anything
- Results can be analyzed in a straightforward manner
- Widely used and accepted for estimating total economic value
- Can be used in conjunction with [cost-benefit analysis](#)
- Provides information that can be used to justify complex management decisions

## Limitations

- Some methods can be difficult, time-consuming, and expensive to apply
- Difficult to validate estimated values externally

- Highly vulnerable to sampling and methodology errors; if "wrong" people are surveyed, the value of the resource may be highly over or underestimated
- Uses controversial techniques
- Methods relying on surveys require a high level of specialized expertise to create valid questions
- Need to accommodate a variety of factors

## Case Studies



### [Willingness to Pay in Rocky Intertidal Ecosystems in Orange County, California](#)

Estimating how much visitors would be willing to pay to prevent further degradation to the rocky intertidal zone.



### [Entrance Fees for Marine Sanctuaries in the Philippines](#)

Determining how many tourists are willing to pay to dive in areas where fishing is prohibited.

## Additional Resources

### Articles and Books

Bateman, I.J. and K.G. Willis. 1999. *Valuing Environmental Preferences : Theory and Practice of the Contingent Valuation Method in the US, EU, and Developing Countries*. Oxford; New York : Oxford University Press.

Bjornstad, D.J. and J.R. Kahn. 1996. *The Contingent Valuation of Environmental Resources : Methodological Issues and Research Needs*. Cheltenham, UK ; Brookfield, VT : Edward Elgar.

Champ, P.A., Boyle, K.J., and T.C. Brown. 2003. *A Primer on Nonmarket Valuation*. Dordrecht ; Boston : Kluwer Academic Publishers.

Kopp, R.J., Pommerehne, W.W., and N. Schwarz. 1997. *Determining the Value of Non-Marketed Goods : Economic, Psychological, and Policy Relevant Aspects of Contingent Valuation Methods*. Boston : Kluwer Academic Publishers.

NOAA Coastal Ocean Program. 1995. [Economic Valuation of Natural Resources – A Handbook for Coastal Resource Policymakers](#). Decision Analysis Series Number 5.

### Web sites

#### [Ecosystem Valuation](#)

This link gives a complete overview of non-market valuation, includes case studies, and discusses the advantages and limitations of non-market valuation methods. This Web site is designed for non-economists who need answers to questions about the benefits of ecosystem conservation, preservation, or restoration.

### [The Contingent Valuation Method](#)

This link, developed by East Carolina University, describes the contingent valuation method, explains how the results can be used to estimate benefits and costs, and provides an example of a contingent valuation survey.

For general economic resources see [Economics](#)

## Observation

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### What Is Observation?

Observation is an information-gathering technique based on personal or recorded observation, through systematic documentation, of visible social activity and behavior. Observation techniques sometimes require participation in activities with the subjects being studied, which is called participant observation.

Observation and [interviewing](#) are the two basic methods used in [ethnographic research](#).

### MPA Application

Observing what is happening in and around an MPA provides managers with factual data and qualitative information as it is occurring. This gives managers a better understanding of who and what the users and uses are in any given area to help them make better and more informed management decisions.

### Expertise Needed

Minimal expertise is needed to conduct basic observation research. However, some initial training is needed to conduct systematic observations. Additional skill is required to obtain accurate qualitative results.

### Advantages

- Provides an objective view of social group dynamics and behaviors in different settings
- Captures actions as they are actually occurring within their social context
- Can adapt to events as they occur

### Limitations

- Observer bias
- Time-consuming
- Not all activities or behaviors can be observed
- Can be difficult to interpret seen behaviors
- Can influence behaviors of program participants

### Case Studies



[Rapid Evaluation of Proposed Marine Conservation District in St. John, U.S. Virgin Islands](#)

Assessing the perceptions of user groups through content analysis and observation.



[The Importance of Communication in the Olympic Coast National Marine Sanctuary, Washington](#)

Improving compliance through observation and communication.

## Additional Resources

### [Observational Field Research](#)

This Web page from Cornell University is designed as an introduction to the basic issues and design options in observational research within natural settings.

### [Steps and Methods Used in Qualitative Observational Research](#)

Colorado State University provides detailed steps for observational research and its various methods on this Web site. A section on using computer software is also included.

### [Observation Methods](#)

This site provides guidelines for conducting observation. Additional resources are also included.

## Predictive Modeling

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### What Is Predictive Modeling?

Predictive modeling is a technique that creates a model that can be used to project the future of hypothetical conditions. Models can be used to compare predicted impacts vs. actual impacts of a behavior or to perform an experiment that would not be feasible in the real world. In other words, a predictive model can create a simulation from data and information to predict what may happen in the future: If A equals \_\_\_\_ and B equals \_\_\_\_ then C will equal \_\_\_\_.

### MPA Application

Predictive modeling can be applied in a number of ways that can help estimate long-term impacts of activities and occurrences in an MPA. Understanding and knowing the long-term impacts may guide management decisions to prevent future problems from occurring.

Typically, this method is used to predict aspects such as labor or income; however, it may also be useful for other factors. For example, predictive modeling can help predict the condition of the marine resource at a given time in the future, both with and without the benefit of protection.

Predictive modeling may also be an educational tool for the public and stakeholders because it can demonstrate the impacts of time and specific actions (or lack of action).

### Expertise Needed

This technique requires assistance from skilled experts.

### Advantages

- Helps predict potential outcomes of management decisions
- Determines possible long-term impacts of policies
- Identifies potential issues and generates hypotheses
- Saves money by permitting managers to review the scenarios on a theoretic level without investing in conducting them

### Limitations

- Accurate data not easily available
- Not all future variables can be considered
- Levels of reliability vary
- Can be very costly

## Case Studies



### [Analyzing the Costs and Benefits of Human Activities for Indonesian Coral Reefs](#)

Using cost-benefit analysis and predictive modeling to show others the need to protect coral reefs.

## Additional Resources

Starfield, A. and A. L. Bleloch. 1986. *Building Models for Conservation and Wildlife Management*. New York: McMillan.

Starfield, A. M., K. A. Smith, and others. 1994. *How to Model It: Problem Solving for the Computer Age*. Edina, MN: Burgess International Group, Inc.

## Rapid Rural Appraisal

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### What Is Rapid Rural Appraisal?

A rapid rural appraisal (RRA also know as participatory rural appraisal PRA) is a "quick and dirty" broad-level assessment. RRAs are used to obtain a broad perspective of the community or group being studied, often at the cost of statistical accuracy. An RRA focuses mainly on those key informants most knowledgeable about an area and uses a variety of social science tools and methods, including, [secondary data analysis](#), [observation](#), [GIS](#), [interviews](#), and [case study research](#).

### MPA Application

An RRA's strength is its ability to generate an overall picture of the social interactions within a community. In an MPA this technique it can not only be used to obtain a "quick and dirty" picture of the community, but also to identify details such as who the stakeholders are and what influences their decision-making processes. Often RRAs can be used to pinpoint problem areas that might be addressed in more detail with more specialized tools.

### Expertise Needed

Conducting an RRA may require expert assistance for design, data collection, and analysis depending on the complexity and level of analysis desired. Some levels of a rapid rural appraisal may be completed with available staff.

### Advantages

- Costs less than social impact assessments or social assessments
- Can provide in-depth information quickly
- Allows exploration of new ideas and issues through flexible approach
- Quantifies social aspects related to site
- Requires minimal amount of use of researchers' time

### Limitations

- Limited reliability and validity
- Credibility may be low with decision makers

### Case Studies



### [Rapid Evaluation of Proposed Marine Conservation District in St. John, U.S. Virgin Islands](#)

Assessing the perceptions of user groups through content analysis and observation.

## **Additional Resources**

### [Using Rapid Appraisal Methods](#)

This general guide compiled by the U.S. Agency for International Development includes an overview of rapid appraisal, including advantages, limitations, and information on some of the more common methods used.

### [Rapid Rural Appraisal \(RRA\)](#)

A summary of rapid appraisal. Includes the history of the method as well as both strengths and limitations.

## Secondary Data Analysis

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### What Is Secondary Data Analysis?

Use of data that was collected by individuals other than the investigator. This includes newspapers, census data, maps, etc. Secondary data analysis is often a starting point for other social science research methods.

### MPA Application

Oftentimes, information and data MPA managers need in order to make an informed decision has already been collected. A manager may want to find out particular aspects of the changing human environment in order to identify and manage areas of concern. Secondary data analysis including census reports, government reports, scientific papers, aerial maps, business and industry reports, on-line Web sites, and other secondary data can assist in developing conclusions that will help in decision making.

### Expertise Needed

This technique can usually be conducted with in-house expertise. Some assistance may be needed in locating data sources and analyzing complex data sets.

### Advantages

- Captures comprehensive and historical information
- Uses existing information
- Web-based materials and search engines are readily available

### Limitations

- Information may be incomplete, obsolete, inconclusive, or inaccurate
- Data limited to what already exists

### Case Studies



[Rapid Evaluation of Proposed Marine Conservation District in St. John, U.S. Virgin Islands](#)

Assessing the perceptions of user groups through content analysis and observation.



### [MPA Perceptions by Small-Scale Fishermen in Sicily, Italy](#)

Using questionnaires to assess the perceptions of small-scale fishermen toward marine reserves.

## **Additional Resources**

### [Sources and Uses of Secondary Data](#)

This reference site from Glasgow Caledonian University highlights some types of sources and uses for secondary data research.

## Social Assessment and Social Impact Assessment

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The terms "Social assessment" and "social impact assessment" are often used interchangeably; however, for the purpose of this Web site, the following definitions are used:

### Social Assessment

A social assessment (SA) may help determine various types of social structures, processes, and changes within a specific group or community. Social assessments also encompass a review of political, social, and economic trends that may affect the group or community of interest and provide information about the social environment in which natural resource management occurs.

SA may identify the principal stakeholders, the roles that age, race, and gender play in the community, and the history and level of resource use.

### Social Impact Assessment

A social impact assessment (SIA) helps managers attempt to predict what the social impacts of a program or policy would be on stakeholders or to the local economy. Laws such as the National Environmental Policy Act (NEPA) require the federal government to conduct SIAs.

SIA may identify the geographic area and stakeholders affected, the history of the area, the impact of industry, and the roles that age, race, and gender play in the community.

SA and SIA each require the use of a variety of social science tools. The size and scope of assessments vary greatly depending on factors such as time, level of analysis needed, and the availability of data. Both of these types of assessment, SA and SIA, have the flexibility to focus on specific resources or examine overall trends.

## MPA Application

A **social assessment** conducted in an MPA helps managers characterize the social environment through identifying and understanding past, present, and potential social conditions. This process of identification and understanding can apply in many ways, such as understanding causes and consequences of conflicts and impacts, analyzing potential management strategies, or developing a framework for public participation.

A **social impact assessment** conducted in an MPA can help answer who is impacted and who gains and loses as a result of specific programs or policies. In answering these types of questions, MPA managers and staff members can gain a better understanding of how their decisions influence and impact communities.

## Expertise Needed

Managers generally require assistance from experts specializing in social impact assessment for design, data collection (when needed), and analysis.

## Advantages

- Identifies significant problems and issues

- Helps identify factors that cannot be directly observed
- Helps set priorities for action
- Helps familiarize staff with important social concerns
- Identifies stakeholder groups and relationships

## Limitations

- Can be time-consuming and costly
- Can be controversial and may be met with resistance

## Case Studies



[Combining Science and Technology in the Tortugas Ecological Reserve, Florida](#)  
Using GIS to analyze socioeconomic data associated with the placement of a reserve.

## Additional Resources

### Articles and Books

Burdge, R. J. 1998. *A Conceptual Approach to Social Impact Assessment*. Middleton, WI: Social Ecology Press.

Finsterbusch, K. 1980. *Understanding Social Impacts: Assessing the Effects of Public Projects*. Beverley Hills, CA: Sage Publications.

Finsterbusch, K., L. G. Llewellyn, and others. 1983. *Social Impact Assessment Methods*. Beverley Hills, CA: Sage Publications.

Finsterbusch, K. and C. P. Wolf. 1981. *Methodology of Social Impact Assessment*. Stroudsburg, PA: Hutchinson Ross Publishing Company.

National Marine Fisheries Service (NMFS). [NOAA Fisheries Guidelines for Assessment of the Social Impact of Fishery Management Actions](#). NMFS Operational Guidelines: Fishery Management Process.

Taylor, C. N., C. H. Bryan, et al. 2004. *Social Assessment: Theory, Process and Techniques*. Christchurch, New Zealand: Taylor Baines & Associates.

### Web Sites

#### [Guidelines and Principles for Social Impact Assessment](#)

In this monograph, NOAA's National Marine Fisheries Service provides a basic model, steps, and principles of social impact assessment.

#### [Fact Sheet: Social Impact Assessment](#)

This National Environmental Policy Act fact sheet provides a framework for understanding the laws, components, and steps for conducting a social impact assessment.

[A Human Dimensions Framework: Guidelines for Conducting Social Assessments](#)

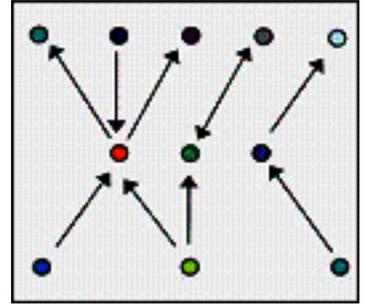
This reference site from Glasgow Caledonian University highlights some types of sources and uses for secondary data research.

## Social Network Analysis

### What Is a Social Network Analysis?

Social network analysis is a method that is used to collect, analyze, and graphically represent data that describe the relationships within and between groups of people or organizations. It can also be used to represent how people interact with specific resources.

A typical social network map includes nodes, which represent individuals, organizations, or resources. These nodes are connected with flow indicators, which may represent the flow of information, energy, or money. The strength or importance of particular relationships is often depicted by varying thickness of lines and arrows.



*A simplified social network map. The nodes (circles) on the map represent individuals or organizations. The arrows show how these individuals or organizations are connected.*

### MPA Application

Social network analysis can be used at many different levels. In small groups it can be used to determine who people consult if they have questions or concerns, thus identifying those individuals in leadership roles. Knowing this information can help managers target education and outreach messages.

Social network analysis can also be used to examine the role of organizations in resource-related issues. It can help determine which organizations are involved in resource use, whom the key individuals are, which organizations are the most influential, and which organizations are the most likely to work together. This knowledge may help managers in securing assistance to implement regulations or to identify where relationships could be improved.

### Expertise Needed

This technique requires assistance from skilled experts. Specialized software may also be required.

### Advantages

- Can help target public outreach resources to key individuals
- Helps visualize flows of individuals, energy, materials, nutrients, information, and money through the established groups
- Provides an image of community dynamics
- May reveal otherwise unobservable connections
- May alleviate disparities between managers, and stakeholders, perceived relationships

### Limitations

- May require large amounts of time and money to perform the analysis, depending on the problem, the type of information desired, and the level of expertise needed
- Often requires a computer, specialized software, and trained users
- May be highly sensitive to missing data
- Requires a basic understanding of social network mapping theory (see Additional Resources for more details)

## Case Studies



### [Identifying Communication Networks among Fishermen in North Carolina](#)

Determining who are the most influential individuals within a community of king mackerel fishermen.

## Additional Resources

### Articles and Books

Hanneman, R.A. 2001. [An Introduction to Social Network Methods](#). Department of Sociology. University of California, Riverside.

Scott, J. 1991. *Social Network Analysis: A Handbook*. London; Newbury Park, California: SAGE Publications.

Wasserman, S. 1994. *Social Network Analysis: Methods and Applications*. Cambridge; New York: Cambridge University Press.

### Web Sites

#### [An Introduction to Social Network Analysis](#)

An example of a social network and a description of the different components of a social network.

#### [International Network for Social Network Analysis](#)

A nonprofit professional association for researchers interested in social network analysis.

## Surveys

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### What Is a Survey?

A standardized list of questions that may be administered formally or informally by mail, telephone, Internet, or in person to collect specific information from multiple individuals.

### MPA Application

The application of a survey or use of survey techniques in an MPA may target a specific type of information that a manager may need to know when making program and policy decisions. It also can be a general way to get a better understanding of a community's attitudes, perceptions, and beliefs.

For example, some managers want to understand the distribution of use in an area in order to make decisions regarding resource management. A survey can be used in gathering the data needed to justify and explain resource decisions.

Another survey may want to find out how the public perceives the institutions that govern resource use. The information obtained from this type of survey can assist in the overall strategic goals and direction of an organization.

### Expertise Needed

Technical assistance from a skilled survey designer is essential and will improve the usefulness of the responses. More informal surveys may not require the highest level of expertise; however, some skill is needed to enter and analyze data.

An expert should also be consulted to help determine the most appropriate survey type and sample methods based on the goals and resources available.

### Advantages

- Can reach moderate to large populations
- Useful for collecting representative data
- Has widespread credibility
- Makes it possible to derive accurate generalizations about large populations from small samples, if administered properly

### Limitations

- Moderately time-consuming

- Expensive
- Impersonal
- Response rates can be low due to technique and population
- Does not always capture all elements

## Case Studies



[The Importance of Communication in the Olympic Coast National Marine Sanctuary, Washington](#)  
Improving compliance through observation and communication.



[Identifying and Understanding Users in Coiba National Park, Panama](#)  
Conducting a survey to identify fishermen's behaviors and practices.



[MPA Perceptions by Small-Scale Fishermen in Sicily, Italy](#)  
Using questionnaires to assess the perceptions of small-scale fishers toward marine reserves.



[Entrance Fees for Marine Sanctuaries in the Philippines](#)  
Determining how many tourists are willing to pay to dive in areas where fishing is prohibited.

## Additional Resources

### Articles and Books

Rea, L. M. and R. A. Parker. 1997. *Designing and Conducting Survey Research*. San Francisco: Jossey-Bass.

### Web Sites

#### [Survey Research](#)

A discussion of types of surveys, methodology, and key terms related to survey research from Colorado State University. An in-depth bibliography is also included.

#### [Brochures about Survey Research](#)

A series of brochures developed by The American Statistical Association for the general public designed to promote a better understanding of what is involved in conducting surveys.

## Case Studies

The following list contains a collection of case studies for which social science tools were used to address issues or answer questions related to Marine Protected Areas (MPAs) and marine environments.

[United States](#) | [Barbados](#) | [Fiji](#) | [Indonesia](#) | [Italy](#) | [Panama](#) | [Philippines](#)

### United States



#### [Willingness to Pay in Rocky Intertidal Ecosystems in Orange County, California](#)

Estimating how much visitors would be willing to pay to prevent further degradation to the rocky intertidal zone.



#### [Paying for Seagrass Restoration in the Florida Keys](#)

Using habitat equivalency analysis to determine the value of habitat lost.



#### [Combining Science and Technology in the Tortugas Ecological Reserve, Florida](#)

Using GIS to analyze socioeconomic data associated with the placement of a reserve.



#### [Identifying Communication Networks Among Fishermen in North Carolina](#)

Determining who are the most influential individuals within a community of king mackerel fishermen.



#### [Rapid Evaluation of Proposed Marine Conservation District in St. John, U.S. Virgin Islands](#)

Assessing the perceptions of user groups through content analysis and observation.



#### [The Importance of Communication in the Olympic Coast National Marine Sanctuary, Washington](#)

Improving compliance through observation and communication.

### Barbados



[Involving the Community in Decision Making in Folkestone Marine Reserve, Barbados](#)  
Identifying stakeholders and providing them with a forum to voice their views and opinions.

## Fiji



[Using Ethnography to Document Traditional Practices in Kadavu, Fiji](#)  
Understanding the history and culture of Fijians and integrating these into current MPA management.

## Indonesia



[Analyzing the Costs and Benefits of Human Activities for Indonesian Coral Reefs](#)  
Using cost-benefit analysis and predictive modeling to show others the need to protect coral reefs.

## Italy



[MPA Perceptions by Small-Scale Fishermen in Sicily, Italy](#)  
Using questionnaires to assess the perceptions of small-scale fishermen toward marine reserves.

## Panama



[Identifying and Understanding Users in Coiba National Park, Panama](#)  
Conducting a survey to identify fishermen's behaviors and practices.

## Philippines



[Entrance Fees for Marine Sanctuaries in the Philippines](#)  
Determining how many tourists are willing to pay to dive in areas where fishing is prohibited.

## Willingness to Pay in Rocky Intertidal Ecosystems in Orange County, California

### Purpose of Study

Southern California has many rocky intertidal marine reserves; most of these reserves have been in existence for over 30 years. Although removal of organisms is prohibited in such reserve areas, researchers have shown that a lack of signage and enforcement has led to very low levels of compliance. The result is a deterioration of the rocky intertidal zone.

To prevent further deterioration of the rocky intertidal ecosystems, enforcement of the regulations prohibiting organism removal would be necessary. Such implementation would have associated costs.

To determine if the value to users is greater than or at least as much as it might cost to protect the resource from further damage, researchers in Orange County, California, asked users how much they would be willing to pay to protect the resource, a method called contingent valuation.



### Tools Used

#### Comparative Research

Users were surveyed to determine the estimated "willingness to pay" to protect the rocky intertidal zone in Orange County. These results were then compared with the research regarding other beaches both in California and in other states. In the comparison research, the season, the overall condition of the beach, and the types of activities that take place on the beach were considered.

These data helped determine the validity of the results obtained in Orange County by demonstrating that willingness to pay for results in Orange County was consistent with travel-demand results at other California beaches that shared many characteristics.

#### NonMarket Valuation

Researchers had to determine how much more users believed a visit to the beach was worth in monetary terms if the tide pools were protected. Because visits to the beach are not bought or sold, market data on the value of such visits do not exist. For this reason, researchers used a nonmarket valuation technique to estimate the value of visits to the beach. They interviewed 220 people from April 1998 to April 2000 in nine different rocky intertidal zones in Orange County.

Interviewers began by asking participants if they would be willing to pay a predetermined value between \$2 and \$100 to visit the resource. If participants answered yes to the proposed value (for example, \$2), the amount would be doubled (i.e., \$4) and they would be asked again. If participants answered no to the original value (\$2), the amount would be halved (\$1) and participants would be asked the question again. Each participant was only asked twice; the starting value differed across participants. The willingness to pay for visits to the beach, as stated by

participants, was used to estimate the value of such visits.

## Outcomes

Researchers estimated that visitors are willing to pay \$6 more per visit per day to access the beach if the tide pools were protected. This number compares to prior studies in the same area which estimated the value of a visit to be between \$9.94 and \$10.58 per visit per day.

However, applying the estimated fee (\$6 per visit per day) to the total estimated number of visitors (1.57 million per year) results in an estimated value of \$3.6 to \$4.8 million per mile of coastline per year.

## Additional Resources

This project was conducted by Darwin Hall, Jane Hall, and Steven Murray. They can be contacted by e-mail: Steven Murray, [smurray@fullerton](mailto:smurray@fullerton); Darwin Hall, [dhall@csulb.edu](mailto:dhall@csulb.edu); Jane Hall, [jhall@fullerton.edu](mailto:jhall@fullerton.edu)

Hall, Darwin C., Hall, Jane V., and Steven N. Murray. 2002. "Contingent Valuation of Marine Protected Areas: Southern California Rocky Intertidal Ecosystems." *Natural Resource Modeling*. Volume 15, Number 3, Pages 335 to 368; Available at [www.csulb.edu/~dhall/](http://www.csulb.edu/~dhall/).

Legislative Council of California. [\*California Fish and Game Code Section 8500\*](#). Regulations related to removal of organisms from tide pools.

Murray, Steven N., Teri Gibson Denis, Janine S. Kido, and Jayson R. Smith. 1999. "Human Visitation and the Frequency and Potential Effects of Collecting on Rocky Intertidal Populations in Southern California Marine Reserves." *California Oceanic Cooperative Fisheries Investigations (CalCOFI) Reports*. Volume 40. Pages 100 to 106.

NOAA Coastal Services Center. "[Drop that Crab! Deputies Patrol Tide Pools in California](#)." *Coastal Services*. September/October 2001.

## Paying for Seagrass Restoration in the Florida Keys

### Purpose of Study

Healthy ecosystems provide a wide range of valuable services, such as purifying water and providing habitat for fish and other wildlife that support commercial and recreational activities. When healthy ecosystems are damaged, society loses some or all of the "ecosystem services" that they would have provided, even when the damaged site will recover over time. In *U.S. vs. Melvin A. Fisher* (1997), the courts ruled that habitat restoration should be used to compensate the public for ecosystem services that were lost in the interim.



In 1992 a group of treasure hunters destroyed a total of 1.63 acres of sea grass within Florida Keys National Marine Sanctuary (FKNMS) while looking for gold and artifacts. The FKNMS brought the treasure hunters to court in 1997 seeking reparations for damages to the environment.

### Tools Used

#### [Non Market Valuation](#)

[Habitat Equivalency Analysis \(HEA\)](#) was used to determine how much habitat needed to be restored in order to compensate the public for the ecosystem services lost while the damaged site recovered. The magnitude of the compensatory restoration is based on the extent of the damages, the time required for the damaged site to recover, and the time required to restore the compensatory site.

Strong currents, coupled with nocturnal grazing of seagrasses prevented the restoration of the actual seagrass beds which were damaged. An alternative set of locations within the sanctuary, locations damaged by boat propeller scars, were identified as suitable potential areas for restoration.

### Outcomes

The HEA indicated that a total of 44.08 acre years of seagrass were lost due to damage by the treasure hunters. Based on these findings, they were required to compensate with 1.55 acres of seagrass at specific locations determined by sanctuary staff.

The court record indicated the cost of restoring 1.55 acres at \$351,648. The cost of responding to and assessing the damage was \$211,130, with interest this came to \$237,663. The total cost to the treasure hunters to compensate for the damaged seagrass was \$589,311.

### Additional Resources

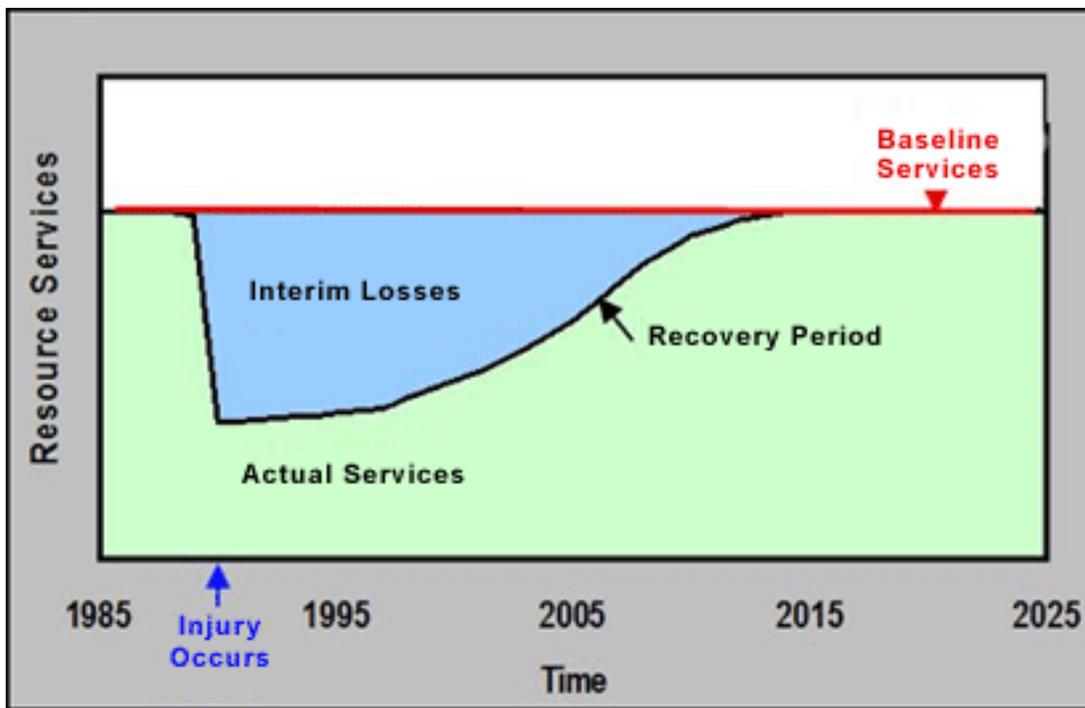
#### **Florida Keys Case Study**

## Paying for Seagrass Restoration in the Florida Keys

### What is HEA?

Habitats contribute environmental services to the public, such as providing shelter to organisms, filtering of substances, stabilization of habitat, supplying a food source, and more. When habitat or resources are damaged, the quality of the services is also impacted. HEA is used to estimate compensation that is equivalent to the loss of services that occur.

The chart below demonstrates how HEA is calculated.



Based on diagram from [Habitat Equivalency Analysis: An Overview](#).

The "Baseline Services" (red line) are the services that would have been provided if the damage or injury had not occurred. The "Actual Services" (green) are the services that did take place (or are predicted to take place). The difference between the "Baseline Services" and the "Actual Services" are the "Interim Losses" (blue). The "Interim Losses" represent the services that have been lost from the time of the injury until the damaged resources have fully recovered and used to calculate compensation. "Interim Losses" is a function of magnitude of damage and duration of recovery period.

HEA is a tool that uses the economic principles of interest and discounting to estimate the magnitude of compensatory restoration that is equivalent to the present value of the ecosystem services.

Fonseca, M.S., B.E. Julius, and W.J. Kenworthy. 2000. "Integrating Biology and Economics in Seagrass Restoration: How Much Is Enough and Why?" *Ecological Engineering*. Volume 15. Pages 227 to 236.

## Habitat Equivalency Analysis

### [Habitat Equivalency Analysis: An Overview](#)

A summary of habitat equivalency analysis from NOAA's Damage Assessment and Restoration Program (DARP).

### [U.S. v. Melvin A. Fisher et al.](#)

Technical papers from NOAA's Damage Assessment and Restoration Program (DARP) related to the U.S. vs. Melvin A. Fisher et al. case. General information and other examples of habitat equivalency analysis are also included.

## Restoration

### Articles and Books

Fonseca, Mark S., W. Judson Kenworthy, and Gordon W. Thayer. November 1998. *Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters*. NOAA's Coastal Ocean Program. Decision Analysis Series Number 12.

NOAA Coastal Services Center. 2001. "[Careless Drivers Damaging Marine Habitats in Florida Sanctuary](#)." *Coastal Services*. September/October 2001.

### Web Sites

#### [National Park Service Habitat Restoration](#)

An explanation of the restoration cycle and links to information on restoration efforts in the National Park Service.

#### [NOAA Damage Assessment and Restoration Program \(DARP\)](#)

The DARP is responsible for assessing and restoring coastal and marine resources. Its Web site provides information on current a restoration efforts of coastal resources and a detailed library which includes sections on legislation, outreach, and restoration.

#### [NOAA Fisheries, NOAA Restoration Center](#)

A description of restoration as well as an indication of the impacts of restoring marine resource habitats. This page also links to examples of restoration and funding opportunities.

## Combining Science and Technology in the Tortugas Ecological Reserve, Florida

### Purpose of Study

The increase in population and tourism in the Florida Keys over the past few decades has caused degradation of the marine environment.

To protect the reef from further degradation, the Florida Keys National Marine Sanctuary oversaw a three-year collaborative process, dubbed "Tortugas 2000." Sanctuary advisory members, stakeholders, and government agency members were represented throughout the process. "Tortugas 2000" resulted in the implementation of the Tortugas Ecological Reserve, a fully protected marine reserve within the Florida Keys National Marine Sanctuary.



The purpose of this study was to collect and analyze socioeconomic data of users in the Tortugas area, particularly use patterns of commercial fishermen.

### Tools Used

#### Social Impact Assessment

A system of surveys and informal conversation was used to determine the socioeconomic impact of a closure on fishermen within the sanctuary. Fishermen, charter boat captains, marina operators, and scientists were consulted to determine what areas are fished, which fish are found in those areas, and how much the fish are worth. Demographics of the fishermen were also recorded. This information was used to minimize the impact of potential no-take zones on the fishing community.

#### GIS

A grid map of the Tortugas Ecological Reserve was developed and segmented by one-minute lines of longitude and latitude, creating one-square-nautical-mile cells. The grid map contained 1,020 of these cells. Fishermen were given copies of this map and asked to outline where they landed their catch. This information was entered into a geographic information system (GIS), allowing researchers to visually determine the intensity of use of each area.

### Outcomes

The studies at the Tortugas Ecological Reserve allowed researchers to determine where fishing was taking place, so that they could reduce the impacts of the establishment of the no-take zone. The results also helped scientists have a better idea of spawning grounds and fish aggregation areas.

Using the data in a GIS helped researchers effectively present the information to decision makers.

Involving fishermen in the decision-making process built trust among project partners and helped enlist their support for long-term resource management.

## Additional Resources

### Articles and Books

Cowie-Haskell, B.D and J.M. Delaney. 2003. "Integrating Science into the Design of the Tortugas Ecological Reserve." *MTS Journal*. Volume 37, Number 1. Pages 1 to 14.

NOAA Office of National Marine Sanctuaries. 2000. [\*Final Supplemental Environmental Impact Statement for the Tortugas Ecological Reserve\*](#). Florida Keys National Marine Sanctuary.

### Web Sites

#### [Tortugas 2000 Project](#)

Located on the Florida Keys National Marine Sanctuary Web site, the Tortugas 2000 component describes the project region, how the ecological reserve will be established, and how to get involved in the process. Also included is detailed information and reports on all phases of the project.

#### [Florida Keys National Marine Sanctuary](#)

Information on research, education, regulation, and volunteering at the sanctuary.

## Identifying Communication Networks among Fishermen in North Carolina

### Purpose of Study

Following the adoption of the Magnuson Fishery Conservation and Management Act (1976), both fishermen and managers realized the importance of working together.

The South Atlantic Fishery Management Council (SAFMC) recognized the importance of maintaining strong ties with the fishing community. To determine ways to establish such ties, the SAFMC sponsored preliminary research through East Carolina University that would identify ways to improve communication between fishermen and the council.



The goal of this research was to identify the most influential or key individuals within the fishing community. Knowledge of these individuals could help identify who should be invited to participate in advisory panels and be involved in the planning of potential regulatory schemes.

Interviews were conducted with king mackerel fishermen in North Carolina to determine with whom they talked about the fishery. Charter, commercial, and recreational fishermen were included. Data about each fisherman's contacts were compiled to generate a social network map that demonstrated the connections the fishermen had to one another.

### Tools Used

#### Social Network Analysis

The snowball sampling technique was used to identify survey participants. This technique involved asking the participants for the three individuals with whom they "talked to the most about the mackerel fishery." The individuals identified were asked the same question, and so on, until no new names were identified. Several smaller individual networks were identified within the larger network.

Cluster analysis, a statistical sorting tool, was used to understand the subgroupings of fishermen and based on their patterns of relationships. Centrality measures, notably degree centrality, were used to identify important fishermen in the networks.

#### Interviewing

Fishermen were interviewed over the telephone and on-site both at home and at work. Interviews were administered by locals trained in interview administration and supervised by experienced interviewers from East Carolina University. In addition to gathering the names of individuals with whom they talked about the king mackerel fishery, the fishermen were asked about their age, experience, number of years in the community, education, membership in organizations, periodicals they subscribed to, and income generated through fishing.

### Outcomes

The social network map of 238 king mackerel fishermen revealed 10 individuals who have primary importance in the larger communication network. Two individuals were identified for recreational and commercial fisheries and the remaining were charter boat fishermen.

When resource managers were asked by researchers whom they thought were most influential in the communication network, only one of the ten individuals identified by the fishermen was mentioned. None of these individuals were on the SAFMC King Mackerel Advisory Panel.

Researchers attempted to profile the more influential individuals in each of the fishing categories. Commercial fishermen were characterized by the high number of periodical subscriptions, high level of education, and membership in many organizations. The more influential recreational fishermen had higher percent income from king mackerel, much experience, and membership in many organizations.

Researchers found that the ten individuals identified by participants as most influential also had a high level of influence on each other.

## Lessons Learned

Telephone interviews were as effective as on-site interviews and cost significantly less.

Research revealed that in the area studied that individuals with the most influence usually had a high number of periodical subscriptions and were members of many organizations. If cost were prohibitive, these factors could be used to identify influential individuals in the future.

Further research revealed that some areas are far more dependent on social networks than others.

## Additional Resources

### Articles and Books

Maiolo, John R., and Jeffery Johnson. 1988. "Determining and Utilizing Communication Networks in Marine Fisheries: A Management Tool." Proceedings of the *41st Annual Gulf and Caribbean Fisheries Institute*. St. Thomas, U.S.V.I.

Maiolo, John R., and Jeffery Johnson. 1989. "Discovering Communication Networks in Marine Fisheries: Implications for Management." From *Marine Resource Utilization: A Conference on Social Science Issues*, Mobile, Alabama: University of S. Alabama Publication Services. Pages 69 to 80.

Maiolo, John R., Jeffery Johnson, and David Griffith. 1992. "Applications of Social Science Theory to Fisheries Management: Three Examples." *Society and Natural Resources*. Volume 5. Pages 391 to 407.

### Web Sites

[Magnuson-Stevens Fishery Conservation and Management Act](#)

Public Law 94-265, Amended through October 11, 1996.

[South Atlantic Fishery Management Council](#)

The South Atlantic Fishery Management Council is responsible for the conservation and management of fish stocks within the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West. This Web site includes information on local habitats and ecosystems, socioeconomic studies, regulations, and a searchable database.

[International Network for Social Network Analysis](#)

A nonprofit professional association for researchers interested in social network analysis.

## Rapid Evaluation of Proposed Marine Conservation District in St. John, US Virgin Islands

### Purpose of Study

This study was conducted to assess the possibility of establishing a marine conservation district (MCD) south of St. John Island in the U. S. Virgin Islands (USVI). Much of this research was preliminary and will be used to direct future social science research.

Researchers evaluated perspectives of user groups in the proposed conservation district using a variety of social science techniques, including both direct and indirect approaches.

This initial phase of study generated a description of the organization and composition of MCD users.



### Tools Used

#### [Rapid Socioeconomic Evaluation](#)

The evaluation was used to identify potential MCD users, identify and analyze user concerns, characterize use patterns, develop user group sector profiles, and identify information gaps. It served to gain background information for future, more in-depth research.

#### [Content Analysis](#)

Transcripts from Caribbean Fishery Management Council meetings, workshops, and discussion groups were analyzed. The purpose of this analysis was to identify stakeholder groups, determine major issues, and select individuals for follow-up interviews.

#### [Observation](#)

By participating in activities organized by user groups, such as scuba diving, commercial fishing, and sports fishing, researchers gained an insider's perspective on the issues these groups face.

#### [Secondary Data Analysis](#)

Demographic and economic data were extracted from reports by the Bureau of Economic Research. Fishing data were obtained from the USVI Department of Fish and Wildlife. Census data were also reviewed.

### Outcomes

Commercial fishermen presented evidence that the proposed MCD, contrary to other studies, is used as a harvest area. Closing the area would force fishermen to go to areas which are already heavily fished. Fishermen did, however, express support for the idea of protecting the resources.

Recreational dive organizations indicated that the area was not suitable for sports diving because of its physical characteristics. This contradicted the prior belief that the MCD could help attract tourists.

Based on the research, many recommendations relating to each stakeholder were generated.

## **Additional Resources**

This project was conducted by Michael A. Downs, currently of EDAW Inc. He can be contacted at [downsm@edaw.com](mailto:downsm@edaw.com).

### **Articles and Books**

Downs, M. 1997. *Rapid Socioeconomic Evaluation, Proposed Marine Conservation District, St. John, U.S. Virgin Islands*. Technical Report prepared for the Caribbean Fishery Management Council, San Juan, Puerto Rico.

### **Web site**

#### [Marine Conservation District Planning in the United States Virgin Islands](#)

Additional information, including maps, related to the establishment of the Marine Conservation District (MCD) in waters off the United States Virgin Islands. This information was prepared by the author and published on the Environmental Systems Research Institute, Inc. (ESRI) Web site.

#### [Island of St. John](#)

Details concerning the island of St. John from the U.S. Virgin Islands Department of Tourism.

## The Importance of Communication in the Olympic Coast National Marine Sanctuary, Washington

### Summary of Project

The Olympic Coast National Marine Sanctuary (OCNMS) was established to protect natural and cultural resources from the danger of large vessel oil spills.

Members from the sanctuary shared results of the oil spill risk studies and discussed an "Area to Be Avoided" (ATBA) proposal with representatives of all stakeholders. Compliance was voluntary.

Interviews were held with representatives and stakeholders with the purpose of creating educational materials.



### Tools Used

#### Survey Research

Sanctuary staff members conducted 28 personal interviews with representatives from U.S. federal, state, local, and tribal governments, as well as the shipping industry, ports, mariners, environmental groups, and the general public.

#### Observation

The sanctuary tracked vessel routes using radar data and geographic information systems (GIS) both within and around the area of the sanctuary. Vessels that did not comply with the ATBA were contacted and provided with educational materials.

### Outcomes

With the help of stakeholder interviews, educational flyers were generated describing why vessels should avoid the area (i.e., avoiding risk of groundings and oil spills), as well as the natural and cultural characteristics of the sanctuary.

Vessels and shipping companies responded favorably to communications from the sanctuary staff. Voluntary compliance has been very high.

Educational efforts and "friendly reminders" have increased the effectiveness of the ATBA and the levels of compliance. There is currently a 90 to 95 percent compliance rate.

### Additional Resources

#### Articles and Books

NOAA Coastal Services Center. 2001. "[Maritime Safety a Priority in Washington Sanctuary.](#)" Coastal Services. July/August 2001.

### **Web Sites**

#### [Map of the "Area To Be Avoided" at the OCNMS](#)

Map for pilots and ship captains of an area to be avoided off the Washington coast.

#### [NOAA and Coast Guard Gain Approval for Greater Ship Safety Along Olympic Coast](#)

Press release from July 2001 describing the justification for enlarging the "Area to be Avoided."

#### [Olympic Coast National Marine Sanctuary](#)

Home page for the Olympic Coast National Marine Sanctuary. Covers research, education, and outreach at the sanctuary. Comprehensive maps, photos, and species lists are also provided.

## Involving the Community in Decision Making in Folkestone Marine Reserve, Barbados

### Purpose of Study

The Folkestone Park and Marine Reserve (FPMR) is 2.2 kilometers long and is located on the west coast of Barbados. It is a no-take reserve comprised of four zones: two water sports zones, a recreational zone, and a scientific research zone.

When the FPMR was first established in 1981, many of the major stakeholders were not consulted. Fishermen in particular had no input, and their issues were not taken into consideration. This neglect generated a lack of compliance with the no-take regulations.

The study was conducted to revise the zoning and management system within the marine reserve. Stakeholder representatives were involved in a series of meetings and roundtable discussions.



### Tools Used

#### Focus Groups

Stakeholders were identified through discussions with local managers and a literature review of the area's other marine parks. Local newspapers, flyers, and meetings promoted the discussions and encouraged participation. Once identified, the stakeholders were brought together to discuss their perspectives as well as determine the best options for management of the marine reserve. These sessions took place in the form of public and roundtable meetings.

#### Case Study Research

Initial research revealed that many of the problems the reserve was having were a result of the initial lack of communication between fishermen and the decision makers. The lessons learned from this case study helped the researchers organize a review process that might ultimately lead to a higher level of stakeholder involvement and compliance.

### Outcomes

- At least 20 stakeholder groups were identified through the process.
- Two public meetings and seven roundtable meetings were held to discuss the future of the marine park.
- Roundtable meetings were found to be more effective than public meetings.
- The reserve developed a report to capture these discussions. The final report is currently under review by the government of Barbados.

## Lessons Learned

- The participatory process is a long and work-intensive process. It can also be expensive so compromises need to be made.
- All stakeholder concerns should be aired even if they seem irrelevant. This helps gain the confidence of the stakeholders.
- Nonorganized groups (e.g., jet-skiers) are hard to engage. It is often difficult to find single acceptable representatives.
- Some stakeholders will not always be represented, and this must be accepted as a fact.
- The stakeholders who will be the most active are those who have something to gain, such as fishermen. Groups that have nothing to gain or much to lose are often not willing to make the time investment.
- Participants need to be aware of the technical constraints on MPA design and operation in their area.

## Additional Resources

### Articles and Books

Cumberbatch, J. 2001. *Case Study of the Folkestone Park and Marine Reserve, Barbados*. Caribbean Natural Resources Institute (CANARI) Technical Report. Number 281.

Mahon, R. and Mascia, M.B. 2003. "The Barbados (alias Folkestone) Marine Reserve, Barbados: A Late Bloomer?" *Gulf and Caribbean Research*. Volume 14. Number 2. Pages 171 to 180.

### Web Sites

#### [Folkestone Marine Park](#)

Information about the park, including a brief description of the area, directions, and contact information.

## Using Ethnography to Document Traditional Practices in Kadavu, Fiji

### Purpose of Study

Fisheries in many islands in the Pacific have been managed for centuries through traditional ownership of inshore marine waters, also known as customary marine tenure. In this process, traditional ecological knowledge is passed down through generations. Many of these practices have suffered from commercial fishing pressures, increases in efficiency of fishing gear, and increases in human populations.

Ethnographic research was conducted on the island of Kadavu, Fiji, in an attempt to document customary marine tenure practices and traditional ecological knowledge.

Researchers evaluated the effectiveness of the management practices, the sustainability of tourism, and the applicability of modern conservation strategies in customary marine tenure.



### Tools Used

#### Ethnography

The principal researcher spent over a year living with the native Fijians, conducting interviews and focus groups, administering surveys, documenting genealogy, and recording observations. Oral histories and marine lore were also recorded. This background information was used to better understand the native culture's attitudes, perceptions, and beliefs, particularly as they relate to tourism, MPAs, and relationships between government and nongovernmental organizations (NGOs).

#### Historical Research and Demographic Analysis

To better understand the people of Kadavu, the researcher did historical research on the island. This included information on the economics, religion, trade, colonization, changes in government and regulations, and population demographics. Information was obtained through archival research, literature review, and interviews with researchers and residents.

### Outcomes

Research in Fiji revealed the importance placed on cultural fisheries management among native Fijians. It revealed that while native cultures may not be highly receptive to a decentralized government-based approach to managing fisheries, they respond well to small-scale community-based management.

Conservation NGOs have played an important role in assisting in the management of community-based MPAs.

Currently there is talk of incorporating many traditional management practices into regulations that could be used for future management of community-based MPAs.

## Additional Resources

This project was conducted by Mark Calamia from the University of Colorado, Boulder. He can be contacted at [markcalamia@hotmail.com](mailto:markcalamia@hotmail.com).

Calamia, M. 2003. *Expressions of Customary Marine Tenure and Environmental Entitlements: A Case Study Involving Common Property Regimes in a Fijian Outer Island Group*. PhD Thesis. University of Colorado, Boulder.

## Analyzing the Cost and Benefits of Human Activities for Indonesian Coral Reefs

### Purpose of Study

Coral reefs in Indonesia have been depleting rapidly because of destructive fishing processes, coral mining, marine pollution, and sedimentation. Aspects such as weak legislation, poor enforcement, and strong incentives have intensified the problem.

The Coral Reef Rehabilitation and Management Project (COREMAP) was created to maintain the coral reef ecosystems and habitats, and this study was conducted to identify and quantify the threat these practices pose to the ecosystem.



### Tools Used

#### Cost-Benefit Analysis

This analysis was used to estimate economic benefit to individuals and loss to society. Calculations were dependent on coastal construction, fisheries, and tourism potential. The cost was the loss to society in terms of reductions in tourism, fisheries, and coastal protection due to the depletion of the reef. The benefit was the total amount of net earning by individuals over the time period. Comparisons of values between reefs and activities were facilitated by using cost or value per square kilometer.

#### Predictive Modeling

This tool was used to determine the impact of current destructive activities over a 25 year period. The assumption was made that the level of activity, e.g. cyanide fishing or coral harvesting, would remain constant over that time period. Researchers then calculated the level of the depletion of the reefs over time based on the depletion rate. These calculations were used to determine the long-term costs to society of the destructive activities.

### Outcomes

- Each of the five activities researched (poison fishing, blast fishing, coral mining, sedimentation/pollution, and overfishing) showed a negative net benefit to society over the projected time span.
- In some cases, the costs to society were 50 times higher than the total benefits.
- Foreigners and foreign demand were largely responsible for reef decline from cyanide fishing.
- Domestic demand was mostly responsible for reef decline from coral mining, blast fishing, and overfishing.
- These results indicate an immediate need for government action.
- Depending on the issue, management needs to be a community-based initiative, an integrated coastal zone management (ICZM) scheme, or a form of centralized national governance.

## Additional Resources

This project was conducted by Herman Cesar of Cesar Environmental Economics Consulting (CEEC) and the Institute for Environmental Studies (IVM), Free University, Amsterdam. He can be contacted at [herman.cesar@ivm.vu.nl](mailto:herman.cesar@ivm.vu.nl).

### Articles and Books

Cesar, H. 1996. [Economic Analysis of Indonesian Coral Reefs](#). International Coral Reef Initiative. Work in Progress.

Cesar, H., C.G. Lundin, S. Bettencourt, and J. Dixon. 1997. "Indonesian Coral Reefs: An Economic Analysis of a Precious but Threatened Resource." *Ambio*. Volume 26, Number 6. Pages 345 to 350.

### Web Sites

#### [Indonesia's Coral Reefs](#)

A brief summary of key points related to Indonesian coral reefs. Included are descriptions of human interactions with the reef, anthropogenic threats, and coral reef management. From the Terangi Indonesian Coral Reef Foundation.

#### [Reefs at Risk in Southeast Asia – Indonesia](#)

This World Resources Institute article reviews the impact of both human and nonhuman factors on Indonesian coral reefs.

## MPA Perceptions by Small-Scale Fishermen in Sicily, Italy

### Purpose of Study

The study focused on determining the effectiveness of management practices and regulations in two marine reserves in northwestern Sicily (Italy).

Reserves included the Egadi Islands Marine Reserve and the Gulf of Castellammare Fishery Reserve.

Research was conducted by interviewing fishermen in the communities to determine their perceptions of the local reserves, the impacts the reserves have had on their lives, and how management can be improved.



### Tools Used

#### [Survey Research](#) and [Demographic Analysis](#)

Two questionnaire surveys were conducted. First, all fishing boat captains were interviewed and helped complete questionnaires. The interviews focused on knowledge of management practices, efficiency of enforcement practices and regulations, demographics (age, years fishing, education, other occupations undertaken, sex), fishing activities (fishing grounds used, gear, species caught, catch distribution), opinions of the marine reserve, suggestions for improvements in management and concerns.

The second questionnaire focused on the opinions of local residents and tourism operators who are dependent on the ability of the reserves to attract tourists. Many of the same questions were used so that some comparisons could be made between the opinions of the fishing community and local residents. Questions included knowledge of the reserves' regulations, opinions of current management, suggestions for improving management, and overall demographics.

#### [Secondary Data Analysis](#)

An extensive literature review of articles and reports relating to the effectiveness of MPAs and marine reserves was conducted. Data were also retrieved from biological studies in the Egadi Islands conducted by the University of Palermo so that the overall biological success of the reserves could be assessed.

### Outcomes

Results of the research revealed that better management practices would be needed for more effective reserves. The study concluded that the following changes should be made to management:

- Management must communicate better with fishermen and local residents, particularly related to boundary locations and why the reserves are needed.

- Enforcement of regulations must be heavily increased.
- New performance measurement techniques should be established by using stakeholder knowledge and opinions, most importantly those of fishermen.
- Locals should be involved in decision making.

## Lessons Learned

- Locals should be used as much as possible in the collection of data for any research activity.
- The purpose of the study must be made very clear to research assistants so that the proper information is collected from questionnaire and interview respondents.
- Language can pose a strong barrier in data collection. Interviewers that speak the local language as their mother tongue should be used as much as possible.

## Additional Resources

This study was conducted by Amber Himes at the Laboratorio di Ecologia della Fascia Costiera (Istituto dell'Ambiente Marina e Costiera), Castellammare del Golfo, Sicily, Italy. She can be contacted at [amber\\_himes@hotmail.com](mailto:amber_himes@hotmail.com).

Himes, Amber H. (2003). "Small-Scale Sicilian Fisheries: Opinions of Artisanal Fishers and Sociocultural Effects in Two MPA Case Studies." *Coastal Management*. Volume 31, Number 4. Pages 389 to 408.

## Identifying and Understanding Users in Coiba National Park, Panama



### Purpose of Study

The Coiba National Park is one of the most important ecological resources in Panama. Despite current regulations, Coiba National Park is vulnerable to high levels of illegal fishing.

The purpose of this study was to determine the extent and impact of illegal fishing practices in Panama's Coiba National Park and better understand why it is taking place.

Current management practices were also reviewed to generate recommendations that might help alleviate the problem.

### Tools Used

#### Focus Groups

Focus group communities were identified by experts and local residents most knowledgeable about the area. Initial participants were asked to identify other communities that fished in the area. This led to additional focus groups assembled from a total of ten communities. The focus groups discussed current fishing practices and helped researchers identify survey participants and areas of concern.

#### Survey

The final survey was administered to 170 fishermen. It covered demographics, fishing practices, fishing regulations, tourism, governmental organizations, and perceptions in the area. Fishermen were also given a map to indicate where they fished.

### Outcomes

The surveys determined that between 86 and 100 percent of all fishermen from the different fishing villages fish within the boundaries of the Coiba National Park.

A large amount of the illegal fishing was determined to be not intentional. Some other conclusions reached through this study included the following:

- Fishing boundaries are not clearly marked.
- Outreach and education attempts have failed to effectively inform all of the user groups of these limits.
- The majority of fishermen were supportive of the concept of a national park.

Based on the research, management goals were suggested, including the following:

- Continue research.
- Increase stakeholder involvement and outreach.
- Add buoys around park perimeter.
- Increase public awareness of Cobia National Park.

## Lessons Learned

\*Lessons learned information will be gathered through telephone interviews with researchers.

## Additional Resources

This project was conducted by Greg Moretti with the assistance of scientists from Duke University and the Smithsonian Tropical Research Institute. He can be contacted at [Greg.Moretti@noaa.gov](mailto:Greg.Moretti@noaa.gov).

### Articles and Books

Moretti, G.S. 2002. *Identifying and Understanding Resource Users of Panama's Coiba National Park*. Master's Project. Duke University Nicholas School of the Environment and Earth Sciences.

### Web Sites

#### [Coiba National Park - General Information](#)

Details on geography, history, climate, and wildlife associated with Cobia National Park, Panama.

#### [Coiba National Park - Diving](#)

Information on the park from the Panama Institute of Tourism. This describes some of the organisms found in the aquatic realm.

#### [Coiba National Park - Terrestrial](#)

Map and information about the island.

## Entrance Fees for Marine Sanctuaries in the Philippines

### Purpose of Study

Tourism is an important source of revenue for the Philippines, and dive tourism is one of the more popular types of activities. However, dive tourism is dependent on high water quality and high abundance and diversity of organisms, both of which are threatened by overfishing, coral mining, sedimentation, and pollution.

One method of preserving the natural environment is through the designation of marine reserves, areas where fishing and coral mining are prohibited.



Researchers investigated the use of user fees to fund the enforcement of marine reserves at three locations: Anilo, Mactan Island, and Alona Beach. Dive tourists at each of these locations were asked how much they would be willing to pay (above regular dive prices) to dive in areas where fishing was prohibited.

### Tools Used

#### Survey

Divers were approached in dive shops, cafes, and hotel lobbies and asked how much they would be willing to pay to enter sanctuaries where fishing was prohibited. They were asked to select from choices of 0, 1, 3, 5, or 10 US dollars.

Other data collected included the type of organizations to which the users would prefer to make the payment and socioeconomic information (income, gender, length of trip, cost of trip, age, and country of residence).

#### Comparative Research

Information from divers at three locations in the Philippines were compared: Anilo, close to Manila where the majority of divers were from; Mactan Island, an upscale spot used by tourists from Southeast and East Asia; and Alona Beach, a popular area for backpackers and bargain seekers. Most tourists in Alona Beach were from Europe.

Socioeconomic information and willingness to pay were compared to determine if any trends existed.

### Outcomes

The survey was administered to an overall total of 129 tourists.

Average willingness to pay in Anilo was \$3.70 per visit to the sanctuary, which would be between \$95,000 and \$116,000 per year, depending on the number of visitors. Mactan visitors were willing to pay on average \$5.50, or \$855,643 to \$1,014,000 per year. At Alona beach the average was \$3.40, which would be \$3,540 to \$5,310 per

year.

When asked whom they would prefer to administer the funds, the majority of users, particularly those in Anilo, considered an environmental nongovernmental organization to be the best option. Other less popular options included a tourism association and the fishing community.

### **Additional Resources**

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## References

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[General Social Science Resources](#) | [General MPA Resources](#) | [Theme-Related Resources](#)

### General Social Science Resources

#### Articles and Books

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Bailey, K.D. 1982. *Methods of Social Research*. New York: The Free Press.

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Mascia, M.B. 2003. "The Human Dimension of Coral Reef Marine Protected Areas: Recent Social Science Research and Its Policy Implications." *Conservation Biology*. Volume 12, Number 2. Pages 630 to 632.

#### Web sites

##### [A National Human Dimensions Framework and Database for Conducting Social Assessments](#)

Hosted by the USDA Forest Service, this Web site provides on-line access to human dimensions information useful in conducting social assessments. The human dimensions site is a question-based tool that connects social assessment questions, social information, and methods of collecting data about the social information.

##### [Fisheries Economics Data Center - Social Science Resources](#)

This social research bibliography was pulled together by [Oregon State University Sea Grant](#) and includes research on subjects related to fisheries as well as articles on methods and theory.

##### [Research Resources for the Social Sciences](#)

By Craig McKie in association with McGraw-Hill Ryerson, this Web site provides links to resources in eighteen categories of social science. An accompanying book, *Using the Web for Social Research*, has been published by the same author.

##### [Social Science in Minerals Management Service](#)

This site provides resources from the Minerals Management Service (MMS) environmental program related to social science.

##### [Social Science Research Strategy for Marine Protected Areas](#)

From the National Marine Protected Areas Center, this strategy provides information on social science and how it applies to marine protected areas. Much of the structure of this Web site is derived from this strategy document.

### [Web Center for Social Research Methods](#)

Developed for those involved in applied social research and evaluation, this Web site provides resources and links to locations on the Web that deal in applied social research methods. Also included are an on-line hypertext textbook, an on-line statistical advisor, and a book of manual (i.e., dice-rolling) and computer simulation exercises of common research designs for students and researchers to learn how to do simple simulations.

## Social Science Journals

### [Human Dimensions of Wildlife](#)

*Human Dimensions of Wildlife* is a quarterly, peer-reviewed journal devoted to the study of social considerations in fisheries and wildlife management.

### [Human Ecology Review](#)

*Human Ecology Review* is published twice a year by the Society for Human Ecology. The journal publishes peer-reviewed research and theory on the interaction between humans and the environment and other links between culture and nature.

### [Human Organization](#)

This is a journal of the Society for Applied Anthropology, which promotes interdisciplinary scientific investigation of the principles controlling the relations of human beings to one another, and encourages the wide application of these principles to practical problems.

### [Journal of Leisure Research](#)

The *Journal of Leisure Research* is devoted to original investigations that contribute new knowledge and understanding to the field of leisure studies.

### [Leisure Sciences](#)

Leisure Sciences is an interdisciplinary journal that presents scientific inquiries into the study of leisure, recreation, parks, travel, and tourism from a social science perspective. Information on methodologies, notes, and both philosophical and policy treatises are also included.

### [Society and Natural Resources](#)

Bringing together social science research on present and emerging environmental and natural resource issues, *Society and Natural Resources* provides a forum for scientific, refereed research that underlies management decisions on natural resource development from multidisciplinary and interdisciplinary social science.

## General MPA Resources

### Articles and Books

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Agardy, T. 1999. "[Creating Havens for Marine Life](#)." *Issues in Science and Technology*. Volume 16. Number 1. Pages 37 to 44.

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Fishes?" *Bulletin of Marine Science*. Volume 66, Pages 853 to873.

## Web sites

### [MPA Library](#)

A searchable database covering electronic, print, and Internet resources, including publications (print and online), websites, photos, video, and projects.

### [MPA Technology Needs Assessment](#)

This assessment published in December 2003 by the NOAA Coastal Services Center gauges technical capacity within the marine management community and documents MPA-related applications of technology.

### [What Is a Marine Protected Area?](#)

From the National Marine Protected Areas Center, this site provides various definitions of MPAs, describes different types and characteristics of MPAs, and provides a list of references.

### [Marine Protected Areas of the United States](#)

The National Marine Protected Areas (MPA) Center's mission is to facilitate the effective use of science, technology, training, and information in the planning, management, and evaluation of the nation's system of marine protected areas.

### [Marine Protected Area Executive Order 13158](#)

Executive order providing a working definition of marine protected areas.

### [Social Science Research Strategy](#)

From the National Marine Protected Areas Center, this strategy provides information on social science and how it applies to marine protected areas. Much of the structure of this Web site is derived from this strategy document.

## Theme-Related Resources

- [Attitudes, Perceptions, and Beliefs](#)
- [Use Patterns](#)
- [Communities](#)
- [Economics](#)
- [Submerged Cultural Resources](#)
- [Governments, Institutions, and Processes](#)

## Attitudes, Perceptions, and Beliefs

### Articles and Books

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## Use Patterns

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## Web sites

### [Our Sea, Our Future](#)

The Web site explains the major findings of the State of the Marine Environment Report for Australia. Developed by the Great Barrier Reef Marine Park Authority, Townsville, Queensland, and the Department of the Environment, this site covers both the social value of the coastal and marine environment to Australians as well as the major uses of the marine environment and their impacts.

## Communities

### Articles and Books

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Sanchirico, J.N., K.N. Cochran, and P.M. Emerson. 2002. [Marine Protected Areas: Economic and Social Implications](#). New York: Environmental Defense Fund.

## Web sites

### [Fisheries Economics Data Center - Social Science Resources](#)

This social research bibliography was pulled together by [Oregon State University Sea Grant](#) and includes research on subjects related to fisheries as well as articles on methods and theory.

### [The National Ocean Economics Project](#)

As part of its Oceans 2000 Initiative, NOAA budgeted funds to launch and partly sustain a four-year effort entitled "The National Ocean Economics Project: The Contribution of the Ocean Sector to the U.S. Economy." This site includes an extensive references section as well as market and nonmarket value databases.

### [Techniques to Value Environmental Resources: An Introductory Handbook](#)

This guide complements the existing literature by introducing the techniques of valuation, illustrating them with a wide range of Australian examples, and indicating how to use the techniques and the values to make informed decisions. The goal of this book is to assist practitioners and nonpractitioners who need to appraise resource use decisions and to aid effective policy formulation.

### [NOAA Coastal and Ocean Resource Economics](#)

The Coastal and Ocean Resource Economics (CORE) Program conducts marine-related socioeconomic research for a wide variety of applications and geographic areas.

## Submerged Cultural Resources

### Articles and Books

Center for Applied Biodiversity Science. 2003. [Protected Areas: Their Role in the Maintenance of Biological and Cultural Diversity](#). Proceedings from the Defying Ocean's End organization's conference in Los Cabos, Mexico, May 29 to June 3, 2003.

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## Web sites

### [Cultural Resource Legislation](#)

Selected legislation related to the preservation of cultural and historical resources from the National Park Service.

## Governments, Institutions, and Processes

### Articles and Books

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### Web sites

#### [State Policies and Programs Related to Marine Managed Areas: Issues and Recommendations for a National System](#)

This site was developed to foster an understanding of existing state, commonwealth, and territory marine managed area systems, to clarify the implications of a national system of marine protected areas for coastal states, territories, and commonwealths, and to provide recommendations to state and federal officials for developing, coordinating, and improving state, regional, and national systems of marine protected areas.

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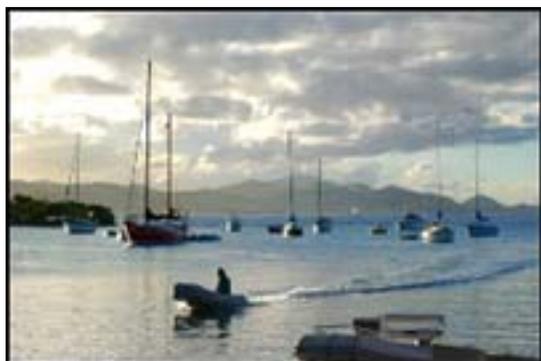


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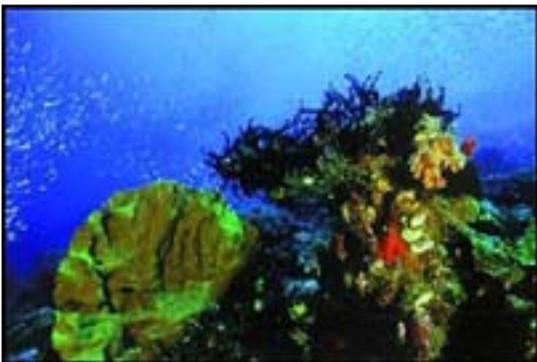
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