Marine Protected Areas Federal Advisory Committee

White Paper and Recommendations on Managing Marine Resources Across the Land/Sea Interface

November 2011

TABLE OF CONTENTS

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Executive Summary

In recognition of the interwoven mosaic of habitats and lifecycles in the land/sea interface, the U.S. Departments of Commerce (DOC) and the Department of the Interior (DOI) charged the Marine Protected Areas Federal Advisory Committee (MPA FAC) to provide guidance on how to acknowledge the important interactions between marine protected areas (MPAs) and terrestrial protected areas to which they are ecologically or culturally linked.

Key questions in the MPA FAC charge on this issue were:

- How should the national system address important marine-related resources that are not currently considered within the boundaries of the marine environment as defined in the *Framework*[1] (e.g. turtle nesting beaches, islands with seabird nesting colonies, haul-out areas for pinnipeds, shore-based lighthouses)?

- How should the national system be coordinated with coastal protected areas outside the boundaries of the marine environment as defined in the *Framework*? This could include MPAs with a non-marine component as well as coastal protected areas without a marine component.

Since impacts to MPAs are often land-based, addressing these impacts requires a thorough understanding of ecological processes including human activities at the land/sea interface. The MPA FAC examined these processes and linkages by establishing a Land, Sea and Communities Subcommittee[2]. The Subcommittee worked with the National Marine Protected Areas Center (MPA Center) to understand existing information from the Marine Protected Areas Inventory (MPA Inventory) and then developed case studies of important focal resources at the land/sea interface. Through this work, the MPA FAC developed this white paper and recommendations to promote a more integrated management approach to marine and coastal resources.

Four discrete categories of recommendations emerged from this MPA FAC analysis: MPA Information and Tools; Science; Partnerships; and Outreach and Public Engagement. The over-

[1] *Framework for the National System of Marine Protected Areas of the United States of America*, National Marine Protected Areas Center, 2009.

[2]The Land, Sea, and Communities Subcommittee was assigned two charges to address, this land/sea charge and another charge which concerned MPAs and healthy communities (see *Marine Protected Areas and Healthy Coastal Communities*, MPA FAC 2011). For a list of Land, Sea, and Communities Subcommittee members, see Appendix 5.

arching theme of the recommendations contained within this white paper is that a rigorous application of Ecosystem-Based Management (EBM) combined with a Cultural Landscape Approach (CLA) will strengthen conservation of resources that cross the land/sea interface, promote sustainability of those resources and improve the socio-economic resilience of communities which depend upon them.

BACKGROUND

MPAs have been increasingly recognized as important tools for conserving, maintaining, and restoring healthy and sustainable marine ecosystems for the continued benefit of current and future generations. Executive Order 13158 (May 26, 2000), which authorized the National System of Marine Protected Areas (national system), recognized the benefit of creating a network of ecologically and/or culturally interconnected sites in U.S. waters. By acknowledging the inherent linkages within the marine environment, the diverse federal, state, territorial and tribal MPA management agencies participating in the national system could develop a common set of overarching conservation objectives and build a collaborative approach to marine stewardship.

The land/sea interface is a nexus of human activity, vital for transportation, production of energy, water storage, food resources, and many recreational activities. Over 50% of the U.S. population lives within 50 miles of the ocean or Great Lakes and 57% of our nation's Gross Domestic Product is generated in the 673 coastal and Great Lakes counties.[3] Consequently, coastal zones are sites of significant overuse and degradation. Sustainable management and conservation of ocean and coastal resources requires clear scientific understanding of the physical and ecological interactions between the land and sea.

MARINE PROTECTED AREAS AND THE NATIONAL SYSTEM OF MPAs

Executive Order 13158 defines a marine protected area as "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."

The *Framework* defines the marine environment as: *"(a) ocean or coastal waters (note: coastal waters may include intertidal areas, bays or estuaries); (b) an area of the Great Lakes or their connecting waters; (c) an area of submerged lands under ocean or coastal waters or the Great Lakes or their connecting waters; or (d) a combination of the above."*

As these documents make clear, under Executive Order 13158, the term "MPA" is used to refer only to the marine component of a protected area site that may include both terrestrial and

[3] NOAA State of the Coast website (stateofthecoast.noaa.gov).

marine components. Protected areas that include both marine and terrestrial components are referred to in this paper as "coastal/marine protected areas."

Of the 297 national system sites, 93% are coastal/marine protected areas that include both marine and terrestrial habitats. Land-sea linkages at these sites are fundamental to the protected area's stated purpose and management plan. Other MPAs without a terrestrial component may be adjacent to terrestrial protected areas that are managed by a different authority. This information is discussed in more detail under "MPA Inventory Analysis of the Land/Sea Interface" below.

IMPORTANCE OF ECOSYSTEM-BASED MANAGEMENT TO THE LAND/SEA INTERFACE

Traditional ocean and coastal resource management has often focused on individual species, resources, areas, or activities. This traditional management regime, which often neglects the importance of the land/sea interface, has resulted in degradation of natural resources and ecosystems, lost economic opportunities, and community hardships (e.g. habitat loss, degraded water quality, hypoxic zones, and harmful algal blooms). Recognizing the inherent interconnectedness of all living things to their environment, many U.S. federal agencies are now practicing an ecosystem approach to managing natural resources. This approach recognizes that plant and animal communities, the physical environment in which they live, the natural cycles that sustain them and human communities are all interdependent and must be managed holistically.

Ecosystem-based Management (EBM) is a three dimensional approach to natural resource management that builds on the ecosystem approach by including the human dimension. EBM requires early and frequent interaction with stakeholders, diverse perspectives, and recognition of human needs and goals. EBM also requires that we consider the health, function, and resilience of the ecosystem into the indefinite future. Lastly, it requires that we consider the connections with other adjacent ecosystems and the larger landscape.

One of the priority objectives of the U.S. National Ocean Policy is to: "Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes." Putting EBM into practice will conserve natural resources and protect biodiversity while optimizing social and economic benefits for current and future generations of Americans. Perhaps the most important aspect of implementing EBM in the U.S. will be for federal, state, local, and tribal agencies to coordinate and collaborate effectively, and for the public to be meaningfully engaged in the process. Establishing more effective management of marine resources across the land/sea interface is a key component of EBM.

MPA INVENTORY ANALYSIS OF THE LAND/SEA INTERFACE

The MPA Inventory is a comprehensive geospatial database designed to catalogue and classify MPAs within US waters.[4] The MPA Inventory was developed with extensive input from state and federal MPA programs, and drawn from other publicly available data. As of October 2011, it includes data for 1689 MPAs, and includes GIS boundaries from authoritative sources as well as information on conservation focus, level of protection, restricted activities, management agency and legal authority. Although, by definition, only the marine component of a site is characterized as an MPA, the MPA Center realized the importance of adjacent terrestrial components and has included critical information, including GIS data, for the terrestrial components within the MPA Inventory. This foresight will prove beneficial to DOC and DOI in their efforts to improve management of MPAs and coastal protected areas in the land/sea interface.

In 2010, the MPA Center conducted an analysis of 1,478 sites in the MPA Inventory with GIS boundary information to provide background to the MPA FAC on the characteristics of US MPAs with respect to the land/sea interface. Of all the MPAs nationwide, relatively few sites (13%) are completely "blue water" (offshore) sites that do not intersect land. The following categories were developed to characterize the composition of sites in the MPA Inventory with respect to land area (Figure 1):

Offshore – Does not come within 1 mile of land

Examples: Groundfish Essential Fish Habitat Area Closures (off West Coast); Oculina Bank Habitat of Particular Concern (off Florida's east coast).

Marine- Intersects the shoreline or crosses the interface but has negligible land area

Examples: Monterey Bay National Marine Sanctuary (West Coast), Southwest Michigan Great Lakes State Bottomland Preserve (Great Lakes); Cape Cod Ocean Sanctuary (Northeast); St. Matthews Island Habitat Conservation Area (Alaska)

Mostly Marine & Some Land – Crosses the interface, includes some land, but has greater than 50% marine area

Examples: Padre Island National Seashore (Gulf of Mexico); Jobos Bay National Estuarine Research Reserve (Caribbean); Isle Royale National Park (Great Lakes); San Juan County/Cypress Island Marine Biological Preserve (West Coast)

[4] http://www.mpa.gov/dataanalysis/mpainventory/

Mostly Land & Large Marine Area – Crosses the interface, has >50% land, but has significant marine area (>300 sq km or 15-49%)

Examples: Arctic National Wildlife Refuge (Alaska); Bird Island Coastal Reserve (Southeast); Virgin Islands National Park (Caribbean); Biloxi River Marshes Coastal Preserve (Gulf of Mexico); Protection Island National Wildlife Refuge (West Coast); Glacier Bay National Park (Alaska)

Mostly Land & Small Marine Area - Crosses the interface, has > 85% land and has relatively small marine area (< 300 sq km or <15%)

Examples: Guam National Wildlife Refuge (Pacific Islands); Illinois Beach Nature Preserve (Great Lakes); Montauk Point State Park (Northeast); Olympic National Park (West Coast)

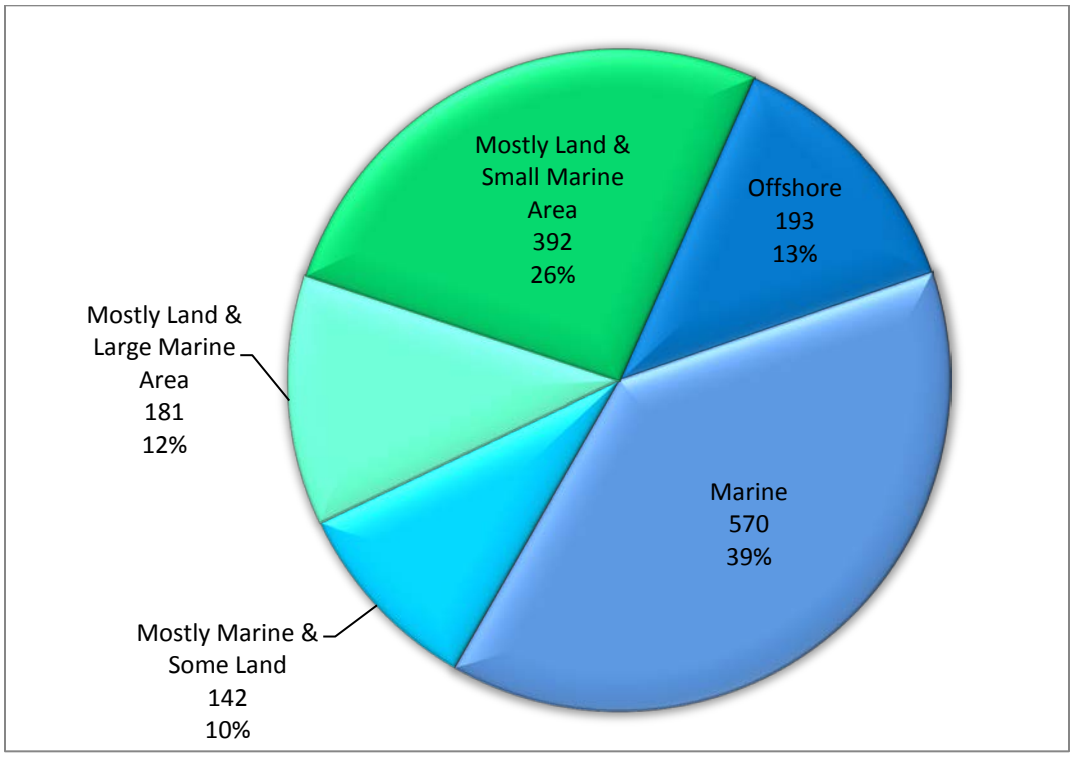

Figure 1: Number of U.S. MPAs (in MPA Inventory) in relation to the land/sea interface

The MPA Center also conducted an analysis of the land/sea classification of US MPAs by biogeographic region (Figure 2). It found that:

- The regions with the most sites that are primarily terrestrial are the Gulf of Mexico, Northeast Continental Shelf, and Southeast Continental Shelf.

- The regions with the most sites that are primarily offshore or mostly marine are in the Caribbean, East Bering Sea, Insular Pacific-Hawaiian, West Bering Sea and Western Pacific.
- For all regions, sites that are solely offshore are a minority, and therefore all regions have a need to address management issues across the land/seas interface.

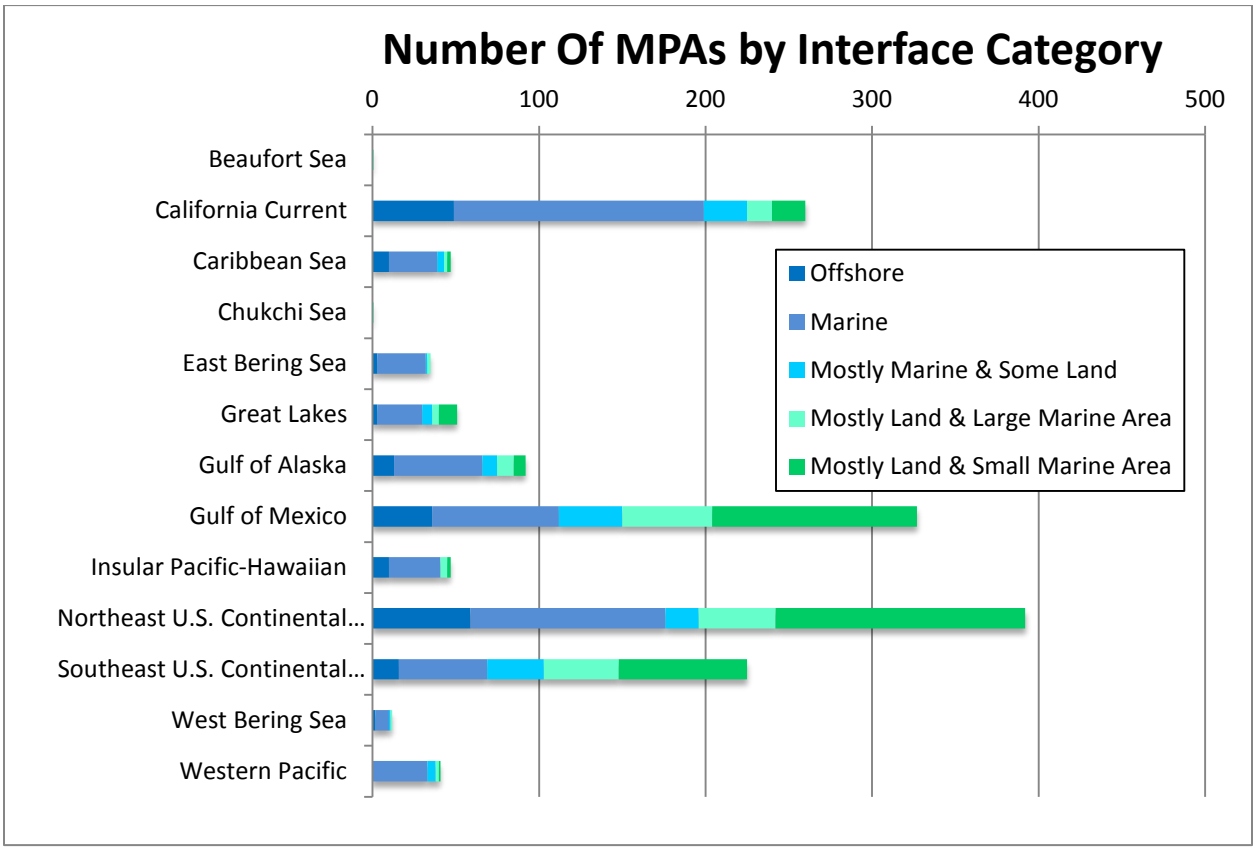

Figure 2: Distribution of U.S. MPAs (in MPA Inventory) by Large Marine Ecosystems (LMEs) and Land/Sea Interface Category

EXISTING CLASSIFICATION SYSTEM OF COASTAL AND MARINE ECOSYSTEMS

In August 2010, the Standards Working Group of the Federal Geographic Data Committee (FGDC) released a working draft of a coastal and marine ecological classification standard (CMECS). The purpose of the standard is to "classify ecological and habitat units in a simple standard format using a common terminology." This will aid marine resource managers in a variety of ways by providing:

- A uniform protocol for identifying and characterizing marine habitats;
- Support to monitoring and research programs; and
- A uniform way to share information across agencies and programs

This classification system is summarized here as a useful reference for the MPA FAC and others on coastal and marine habitats.

The CMECS encompasses the tidal splash zone, the deep ocean, all continental and ocean waters, areas downstream of the head of tide in estuarine rivers, deep waters of the Great Lakes, estuaries, tidal wetlands and rivers, shorelines, islands, the intertidal zone, the benthos and sub-benthos, and the associated water column and helps answer the question "what's out there?"

The CMECS is organized hierarchically by systems, subsystems, and five underlying components that describe in greater detail the different elements of the marine environment. The standard was designed to be applicable at different spatial and temporal scales and each component can be mapped independently of the others. The target users of the CMECS are marine resource managers, coastal zone managers, National Park and National Estuarine Research Reserve (NERR) managers, and coastal and marine spatial planners to characterize coastal and marine habitats and ecosystems.

A major goal of the CMECS was to integrate both existing and ongoing data collection efforts. The CMECS is compatible with a variety of other FGDC standards such as Classification of Wetlands and Deepwater Habitats, National Vegetation Classification Standard, Shoreline Metadata Profile of the Content Standards for Digital Geospatial Metadata, and Soil Geographic Data Standard. This standard classification offers an opportunity for a common approach to coastal and marine habitat classification that may facilitate shared science and management across the land/sea interface.

CASE STUDIES

Introduction

In addressing the charge, the MPA FAC developed five case studies to explore the ways in which key resources at the land/sea interface are managed by diverse types of MPAs. These case studies highlight examples of successful resource management as well as opportunities to enhance management. The focal resources selected in these case studies are only presented as examples and it is important to note that there are many other resources managed by these MPAs that have not been considered in these case studies. A more exhaustive analysis of MPA resources dependent upon the land/sea interface is warranted. The MPAs selected for our case studies include diverse management regimes, represent various Large Marine Ecosystems (LMEs), and have a wide geographic distribution. When examining these case studies, the MPA FAC gained insights into ways of enhancing integrated management approaches to marine and coastal resources. Note: See Appendix 1 for full case studies.

Olympic Coast National Marine Sanctuary Case Study Findings
Geographic Location: Washington State
Full case study: Appendix 1, pg. 15

This case study examined how salmon, an important natural and cultural resource, are managed within the Olympic Coast National Marine Sanctuary (Sanctuary). Findings reveal that, in fact, the Sanctuary does not have direct management responsibility for salmon. However, Sanctuary regulations help to conserve nearshore habitat for the resource, provide protection for other important resources at the land/sea interface and have some general prohibitions that benefit all Sanctuary resources. Within the ocean area of the Sanctuary, salmon are co-managed in federal and state waters by treaty tribes, the State of Washington and the Pacific Fishery Management Council, in cooperation with the National Oceanic and Atmospheric Administration (NOAA). River and stream habitat for salmon species is being conserved and restored by protected areas within the watershed, including the Olympic National Park and the Olympic National Forest. Salmon are highly migratory, and although they receive some benefit from management measures within the MPA, they are much more affected by broader environmental conditions in the ocean and in the watershed. Therefore habitat protection efforts by coastal management agencies and landowners are critical to the successful protection of Sanctuary resources. The complex life-cycle of salmon emphasizes the importance of the land/sea interface on the health of this resource and reinforces the need for a management regime which embraces ecosystem-based management and cultural landscape approaches.

Farallon National Wildlife Refuge Case Study Findings
Geographic Location: Central California
Full Case Study: Appendix 1, pg. 18

This case study explored the protection of seabirds and marine mammals in the Farallon National Wildlife Refuge. The refuge includes only the Farallon Islands, and does not have a marine component. However, it is surrounded by the Gulf of the Farallones National Marine Sanctuary, which includes only the marine component. Although the seals and sea lions breed on land at the Farallon Islands, primary management responsibility for these species, under the Endangered Species Act and Marine Mammal Protection Act, resides with NOAA's Fisheries Service. Furthermore, the nesting seabirds under the management jurisdiction of the U.S. Fish and Wildlife Service (USFWS) rely entirely on the marine environment for food. Effective protection for seabirds and marine mammals in this region necessitates that USFWS, NOAA's Office of National Marine Sanctuaries, and NOAA Fisheries Service collaborate in developing management plans for these species. Additionally, any visitors to the refuge pass through the Gulf of the Farallones National Marine Sanctuary, presenting an opportunity to combine interpretive signage and environmental education experiences to teach visitors about the linkages between these two protected areas. The criticality of the land/sea interface to seabirds and marine mammals in the Farallon Islands is an obvious finding from this case study and, due to the management regimes established there, spotlights the importance and value of effective cross-agency collaboration.

Everglades National Park Case Study Findings
Geographic Location: Southern Florida
Full Case Study: Appendix 1, pg. 21
The focal resource for this case study was sea turtles. In contrast to the Farallon National Wildlife Refuge's remote location, the Everglades National Park is adjacent to communities where light pollution, predators and beach impacts can have direct effects on turtle nesting areas. Marine resources are also affected by poor water quality from agriculture and development in the watershed. The major finding from this case study is how critical it is to integrate stewardship across the land/sea interface to improve the effectiveness of conservation measures and to reduce impacts to these threatened and endangered species.

Hawaiian Islands Humpback Whale National Marine Sanctuary
Geographic Location: Lanai Island, Hawaii
Full Case Study: Appendix 1, pg. 22
This case study focused on "Shipwreck Beach" located along Lanai's north shore. Shipwreck Beach provides an example of multiple cultural landscapes which cross the land/sea divide. At Shipwreck Beach, the ancient past (shoreline and near shore villages and fishponds) is overlaid by the historic past (shipwrecks and plantation-era landings); and both of these are subject to potential human impacts of increased island erosion and tourism. The Sanctuary was designated for the protection of humpback whales and their habitat and does not currently directly protect cultural or maritime heritage resources or the beach itself. The Sanctuary is co-managed with the State of Hawaii, which provides its own protections for species and environment beyond the sanctuary's focus on humpback whales. The Sanctuary is not currently engaged in the inventory, assessment, and outreach associated with cultural heritage, but is currently considering adding heritage resources to its management mandate. In this case study, we find that a Cultural Landscape Approach (CLA) will facilitate the integration of terrestrial and marine resource management. Analogous to ecosystem-based management, CLA also examines the relationships among living and non-living resources, and their environment.

Grand Bay National Estuarine Research Reserve
Geographic Location: Southeastern Mississippi
Full Case Study: Appendix 1, pg. 25
Wetlands were the focal resource for the Grand Bay National Estuarine Research Reserve (Reserve) Case Study. Wetlands within the Reserve are conserved by legal protection, but are threatened by larger regional factors such as coastal erosion, water quality and water quantity. These broader impacts indicate the importance of coordination with land-based agencies and landowners at a regional scale, both within the watershed, and by linking small, local MPAs with other protected areas in coastal and marine protected area networks.

Case Studies Conclusion
Analysis of the focal resources within the MPA case studies demonstrates the need for using an ecosystem based management approach across the land/sea interface. Agencies and

regulations across all levels of authority affect these resources, indicating the need to strengthen coordination and partnerships. Similar themes across these resources and MPAs within the case studies point toward ways to improve management and protection of resources across the land/sea interface.

RECOMMENDATIONS

Through an analysis of the MPA Inventory, which informed our choice of case studies, the MPA FAC examined various focal resources (both natural and cultural) across the land/sea interface. From this analysis, four discrete categories of recommendations emerged: MPA Information and Tools; Science; Partnerships; and Outreach and Public Engagement. These recommendations will strengthen conservation of resources that cross the land/sea interface. Through a rigorous application of Ecosystem-Based Management, the specific recommendations below will naturally promote sustainability of resources that span land and sea and improve the socio-economic resilience of communities that depend upon them.

The MPA FAC recommends that DOC and DOI work with MPA managing agency partners to:

MPA Information and Tools

1. Use the newly developed Coastal and Marine Ecological Classification Standard (CMECS)[5] to help classify coastal and marine habitats in a way that is compatible across MPA programs and federal agencies.
2. Enhance the capacity to gather, display and analyze data on coastal protected areas and related resources in order to provide a more comprehensive database (e.g. National Information Management System, MPA Inventory) of coastal and marine protected areas to support EBM.
3. Adopt a Cultural Landscape Approach (CLA)[6] to facilitate the integration of terrestrial and marine resource management[7].

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[5] http://www.csc.noaa.gov/benthic/cmecs/

[6] An MPA may involve multiple ecosystems and resources, both natural and cultural, which span the land/sea boundary. A cultural landscape may extend far beyond the boundaries of an individual MPA, and may help identify ecological and cultural connections both within and between MPAs. CLA uses cultural landscapes as an analytical framework to understand places and their associate resources. The approach emphasizes cultural relationships to the environment, and highlights connections between human behavior and the condition of marine ecosystems over time. CLA has a particular benefit for the integration of cultural heritage resource management across the land/sea boundary.

[7] Mather, I.R. and Jensen, John O. *Investigations into Block Island's Submerged Cultural Sites and Landscape for the Rhode Island Ocean Special Area Management Plan 2010*. Technical Report #5 in *Rhode Island Ocean SAMP Volume 2*. Adopted by the Rhode Island Coastal Resources Council October 19, 2010. Retrieved September 1, 2011 from: http://seagrant.gso.uri.edu/oceansamp/documents.html

Science

4. Conduct research[8] to assess the benefits of adjacent coastal and marine protected areas:
    a. as networks of protected areas across the land/sea interface.
    b. to better understand how coastal terrestrial protected areas may influence MPA effectiveness.
    c. to understand and document coastal and marine water quality issues as called for in the National Ocean Policy's Strategic Action Plans[9].
5. Examine current and potential land-based impacts on MPAs contained in the national system and investigate cooperative management opportunities to address these impacts.
6. Consider physical and chemical interactions (e.g. water quality and quantity, sediment transport, chemical contamination, nutrient loading) as well as ecological connectivity when planning and evaluating MPAs and MPA networks.

Partnerships

7. Foster interagency and state/tribal/federal collaboration across the land/sea interface to enhance the conservation and management of marine resources, including:
    a. learning from successful examples of coastal/marine protected areas that include both marine and terrestrial components and effectively manage marine resources across the land/sea interface;
    b. reaching out to land-based protected areas programs such as the US Forest Service and Bureau of Land Management to identify areas of potential collaboration; and
    c. identifying and promoting successful mechanisms for partnerships across the land/sea interface and sharing these with national system partners.
8. Support the formation and coordination of regional MPA networks, including the diverse management agencies within a region to improve resource management at the land/sea interface and facilitate information and resource sharing.

Outreach and Public Engagement

9. For MPAs that are offshore or marine:

    a. promote partnerships with coastal protected areas to reach visitors and communities.

[8] Engaging with established research collaborations such as Landscape Conservation Cooperatives and National Estuarine Research Reserves can promote research activities across the land/sea interface.
[9] Basic hydrology features and water quality factors added to the MPA Inventory would facilitate MPA management.

b. look for opportunities to co-locate interpretive signs and outreach materials;
c. develop and share outreach materials and narratives that communicate the importance of the land/sea interface and terrestrially-based marine resources.
d. understand and articulate the long-term benefits and connections between MPAs and specific groups or communities that can create meaningful connections between people and places.

APPENDIX 1
CASE STUDIES

OLYMPIC COAST NATIONAL MARINE SANCTUARY (SALMON)

Land/Sea Focal Resource: Salmon

Large Marine Ecosystem: California Current

Type of Resource (natural, cultural, both): Both

Brief Description/Status of Resource at the MPA:

- 5 species of salmonids: Chinook, Coho, Sockeye, Chum and Steelhead (anadromous rainbow trout)
- Vitally important cultural resource to tribes; co-managed by tribes, State of Washington and federal agencies.
- Returning salmon spawn and young rear in natal streams and rivers on Olympic Peninsula; Olympic Coast National Marine Sanctuary (OCNMS) area migratory pathway for juvenile and adult salmon for the entire California Current LME.
- The condition of salmon stocks is mixed. Each genetic run (chinook, coho, sockeye, chum, summer chinook, etc.) has its own set of challenges based on the fidelity of its natal watershed and the water quality of the nearshore ocean areas. Some runs are doing well historically while others are at some of the lowest numbers in recorded history. Sockeye salmon, which need a lake to complete their life history requirements and are also zooplankton consumers in the ocean, and summer-run chinook (king salmon) are in poor condition with historically low run sizes.
- Tribal villages historically built at mouths of rivers to take advantage of returning salmon runs.

Location on Land/Sea Interface: OCNMS is 3,310 square miles located off the Olympic Peninsula in Washington State. It is adjacent to portions of the Olympic National Park which includes 922,651 acres on the Olympic Peninsula (95% of which are designated Wilderness areas). The Park also includes 73 miles of ocean shoreline that overlaps with the OCNMS. The OCNMS also includes usual and accustomed fishing areas for the Makah, Hoh, Quiluete and Quinault tribes.

Purpose of Protection: OCNMS was established and is managed under the National Marine Sanctuaries Act. The goal of the OCNMS is to protect the marine environment, resources and qualities of the Sanctuary. Relevant objectives include 1) Ensuring that the water quality of the coastal and ocean waters off the Olympic Peninsula is maintained at a level consonant with Sanctuary designation; and 2) Reducing threats to Sanctuary resources and qualities.

Level of Protection/Restrictions: The following activities are generally prohibited: oil and gas exploration and development; discharge of primary treated sewage; disposal of dredge materials; bombing; removal of historical resources; disturbance of the seabed; taking of marine mammals, sea turtles or seabirds; and flying motorized aircraft less than 2,000 feet. The management plan is currently being updated.

Land/Sea Issues related to Management of this Resource: Land and sea are equally important in the life cycle of Pacific Salmon and Steelhead. Water quality, food sources and refugia are key to salmon survival when in-river or at-sea. Water quality of Olympic Peninsula rivers and the nearshore are dependent upon stable, mature ecosystems to limit and mitigate for extreme climatic events such as flooding often accompanied by siltation and channel migration. Glaciers that feed Olympic rivers, critical for maintaining cool temperatures and adequate flow during summer, are steadily eroding as a result of global warming trends. Young salmon are reared in-river for months, to over a year, depending on species. Prior to entering salt water, juvenile salmon must "smolt" or change the physiology that supported them in their fresh-water existence. During this particularly vulnerable time young salmon are tested physically while being dependent upon small marine organisms such as copepods, coccolithophores and pteropods for their critical first months at sea. The connectivity of land, river and sea are a continuum within the life cycle of salmon that depend upon the OCNMS and its adjacent terrestrial component.

Primary Threats to the Resource: There are many threats to salmon that use the OCNMS. Historic spawning channels have been degraded by logging and other land-use issues such as roads and development. Receding glaciers are leading to river and stream flows not adequate in the summer months to cool and aerate fish, eggs and young, especially a problem for the summer-run species. In nearshore marine areas, conditions have recently been productive. There has been a marked switch to a cooler, more productive ocean climate on the northwest coast that follows previous noted decadal scale patterns. In particular, the last four years have produced markedly stronger run returns of salmon in coastal rivers and streams and help mitigate some of the habitat degradation effects noted earlier. However, once marine patterns switch back to warmer, less productive waters, the salmon will suffer from both land and sea conditions and those stocks currently in trouble may be lost if habitat is not restored before that occurs. Though included in "anthropogenic impacts" one that is critical is ocean acidification. The coccolithophores and pteropods mentioned earlier are extremely vulnerable to lowering pH in the ocean.

Other major impacts at Land/Sea Interface: Other impacts include riverine inputs, coastal erosion, anthropogenic inputs and development.

MPA Resource Protection Measures and Effects: OCNMS is not involved directly in salmon or other fisheries management. The MPA helps protect fishery resources by prohibiting oil and gas development in the Sanctuary, minimizing the chances of a catastrophic spill. Ship pollution is also minimized by re-directing large ship traffic from the area. Bottom disturbance

prohibition protects benthic habitat and refugia. Monitoring programs provide information on resource conditions and trends. Salmon in this area also benefit from land-based protection within Olympic Coast National Park and the Olympic National Forest, which are adjacent to the Sanctuary. Protective measures within the Park and Forest include conservation of river habitats and maintenance of forest cover for shade and water quality.

Tribal, state, federal and local agencies are all working to restore salmon habitat but the work is slow and expensive. Restoration will require forests to regrow in floodplains and watersheds to better hold water and establish long-term channels that are not scoured and changed with every snow melt or large rain event. In the ocean, the Pacific Fisheries Management Council (PFMC) works with NOAA Fisheries to maintain salmon stocks by limiting specific ocean fisheries to protect severely impacted species. Various fishery agreements have been established with Alaska, Canada, the states and tribes to maintain viable fisheries while protecting threatened runs. Even so, some fish runs are not responding and need further assistance.

OCNMS has recently conducted a management plan review that calls for more influence and support of land management issues that directly affect OCNMS water quality and marine resources. This particular MPA has a long coastline adjacent to a large land mass (the Olympic peninsula including the Olympic mountain range). Inputs into the MPA are many including river, stream and shoreline runoff which can include sediments and anthropogenic products. Additional impacts can come from users on the water. The MPA works to limit impacts from on-the-water users with discharge regulations, bottom impact regulations some species harassment regulations (other than fisheries). Though some would like to see the MPA take more of a fisheries management role, other agencies (including tribes, state and other federal authorities) do not support this.

Findings: The OCNMS is not directly responsible for management of salmon or land-based habitat restoration. However, its regulations help conserve nearshore habitat as well as providing protection for other important resources at the land/sea interface (e.g. noise prohibitions for seabirds and seals) as well as some general prohibitions that benefit all Sanctuary resources.

The OCNMS has a unique relationship with Coastal Treaty Tribes of Washington State as the only ocean sanctuary contained within the treaty areas of recognized tribes. The area is of paramount cultural importance to these tribes, and the marine area and its resources are intrinsic to cultural identity and welfare of tribes. Tribes share management authority for salmon with the State of Washington, indicating the ways in which management of key resources often is shared among several resource agencies, and must be coordinated, as well as the distinct but overlapping interests of different management agencies.

Salmon are an important natural and cultural resource at this MPA, and receive some benefit from the MPA, but as highly migratory species are more affected by broader environmental

conditions in the ocean and in the watershed. Therefore habitat protection efforts by coastal management agencies and landowners are critical to the successful protection of Sanctuary resources. This suggests the need for outreach and collaboration with coastal managers and communities.

FARALLON NATIONAL WILDLIFE REFUGE (SEABIRDS and MARINE MAMMALS)

Land/Sea Focal Resource: Seabirds and Marine Mammals

Large Marine Ecosystem: California Current

Type of Resource (natural, cultural, both): Natural

Description/Status of Resource at the MPA:

- Protects the largest seabird nesting colony in the contiguous United States, more than 250,000 birds of 13 species nest annually
- Over 400 species of breeding and migrant birds have been identified at the refuge
- Six species of marine mammals use the refuge to breed, haul out or use the local waters
- Protects critical habitat for the threatened Steller's sea lion
- Protects habitat of the endangered California brown pelican
- Most of the refuge is congressionally designated as wilderness

Location on Land/Sea Interface: The Farallon National Wildlife Refuge (Refuge) includes 211 acres of emerged lands in the Farallon Islands, known as California's Galapagos. Located 28 miles west of the Golden Gate Bridge, it is surrounded by the Gulf of Farallones National Marine Sanctuary. The ecosystem and climate of the Farallon Islands is primarily marine-influenced. The Refuge's marine component is negligible.

Purpose of Protection: The goal of the Refuge is to preserve and enhance habitat for nesting seabirds and marine mammal breeding and haul out.

Level of Protection/Restrictions: Most of the Refuge is a congressionally-designated Wilderness Area (141 of 211 acres). It is unlawful for any person to hunt, trap, capture, willfully disturb, kill any, or take the eggs of any birds within the limits of the refuge. Much of the Refuge is closed to visitation for most of the year. Disturbing wildlife at any time is a citable violation. Between March 15 and August 15, vessel traffic is prohibited within 300 feet of most shorelines. Boat speed limit is 5 nm/hr within 1000 ft of all islands. All aircraft must maintain an altitude that will prevent disturbance of wildlife (~2000 ft).

Land/Sea Issues related to Management of this Resource: The seabirds and marine mammals that use the Refuge are entirely dependent on the surrounding waters for their food. Because of the sensitivity of the breeding animals to human disturbance, boaters are required to keep a minimum distance from the islands. While feeding, the animals are at risk of entanglements in fishing gear or collisions with boats.

Successful management efforts have included eradication of non-native species to eliminate predators and improve habitat quality. By 1975, cats and rabbits were eliminated from the island to protect seabird nesting areas. The Refuge staff is developing plans to increase habitat restoration efforts with the help of partners. The goal is to reduce or eliminate nonnative wildlife species and "specialist" individual animals (e.g., house mice, individual burrowing owls, western gulls) that threaten the viability of seabird and marine mammal species so that less than one percent of native populations are adversely affected by nonnative wildlife.

Managers are working to further protect these resources by creating artificial habitat sculptures to create habitat for crevice nesting seabirds. Boardwalks have been built at several locations across the islands to prevent field staff from crushing burrowing nesters. Density of burrows along the boardwalks was higher than natural areas after only three years. Other artificial habitat improvement projects include the creation of a murre nesting ledge from concrete rubble, removal of debris from past human activities, and reconstruction of visitor trails to be more bird friendly.

The Refuge field station is nearly self-sufficient relying on the mainland only for food and propane for cooking. This greatly reduces the environmental impact from more frequent visits of resupply vessels. The noise and emissions from the electrical generators has been replaced by solar panels. The refuge managers continually consider new alternatives for reducing or eliminating the human disturbance to the wildlife.

Primary Threats to the Resource: The seabird colony has continued to face anthropogenic threats well into the twentieth century. Accidental releases of oil from passing vessels and old shipwrecks have killed thousands of seabirds. Illegal or poorly regulated commercial fishing is a constant threat to refuge resources. Tens of thousands of murres in central California were drowned in gill nets between the late 1970s and late 1990s. In 2003, island personnel documented the emergence of squid fishing close to the island and its potential effects on nocturnal seabirds such as ashy storm-petrels and Cassin's auklets. Following presentations by Refuge staff and partners at PRBO Conservation Science to the California Fish and Game Commission, the waters surrounding the Refuge were closed to night squid fishing.

Invasive plant species on the island compete with natives and degrade habitat available to burrow-nesting seabirds such as Cassin's and Rhinoceros Auklets. Dense stands of annual grasses and mat-forming New Zealand spinach make areas unavailable to potential nesters by blocking access to the soil. Habitat improvements, such as controlling invasive species and

removing the debris that has accumulated due to decades of human occupation, are an ongoing process.

The breeding seals and sea lions are threatened by boaters and unauthorized access, derelict fishing gear, and sharks.

Climate change and variability have also affected seabird nesting patterns. In certain years, warming ocean temperatures in the local area can contribute to reduced food supplies for seabirds affecting their productivity.

Other major impacts at Land/Sea Interface: The enormous seabird colonies are responsible for a significant input of nutrients into one of the most diverse and bountiful marine environments in the world.

MPA Resource Protection Measures and Effects: To restore nesting habitat of native seabirds, the refuge staff conducts widespread removal of invasive vegetation through application of herbicide and manual removal. They also remove invasive house mice and western gulls that adversely impact the native wildlife. The Refuge has expanded research and monitoring of the habitat and wildlife to improve long-term understanding of wildlife impacts and needs. None of the management activities are expected to adversely impact protected resources

Findings: The Refuge staff is seeking to increase collaboration with the Gulf of Farallones National Marine Sanctuary (Sanctuary), U.S. Coast Guard, and the California Department of Fish and Game to further reduce disturbance to sensitive wildlife. Although the six species of seals and sea lions nest exclusively on land including at the Farallon Islands, primary management responsibility of these species under the Endangered Species Act and Marine Mammal Protection Act resides with the National Marine Fisheries Service (NMFS). Furthermore, the nesting seabirds under the management jurisdiction of the USFWS rely entirely on the marine environment, particularly the surrounding Sanctuary, for food for themselves and their chicks. This necessitates that the USFWS, NOAA's Office of National Marine Sanctuaries, and NMFS work closely to develop management plans for these species. Because of these and other overlapping responsibilities, the federal and state agencies can work together to achieve significant cost savings, avoid redundancies, and strengthen research and improve management results. All visitors to the Refuge must pass through the Sanctuary while the Refuge presents ideal vantages for viewing the Sanctuary. This presents great opportunities to combine interpretive signage and environmental education experiences to teach visitors about the intrinsic linkages between these two protected areas.

EVERGLADES NATIONAL PARK (SEA TURTLES)

Land/Sea Focal Resource: Sea Turtles

Large Marine Ecosystem: Gulf of Mexico

Type of Resource (natural, cultural, both): Natural

Brief Description/Status of Resource at the MPA: Five threatened or endangered species of sea turtles are known to use the park: loggerhead, Caretta caretta (threatened sp.), green turtle, Chelonia mydas (endangered sp.), Atlantic leatherback, Dermochelys coriacea (endangered sp.), Atlantic hawksbill, Eretmochelys imbricata (endangered sp.), and Atlantic ridley, Lepidochelys kempii (endangered sp.).

Location on Land/Sea Interface: Everglades National Park is a 2,358 sq. mi. protected area on the coast at the southern tip of Florida. Roughly half of the park is estuarine or marine waters and submerged lands, with the watershed habitats distributed among freshwater marsh, wet prairies, and cypress, sub-tropical pine and tropical hardwood forests. The park's mainland shoreline exceeds 155 miles in length, not including the shores of hundreds of mangrove, shell, limestone, and sand islands in park waters. Most of the park (86%) and all of the submerged lands in Florida Bay are designated wilderness. The importance and uniqueness of the Everglades ecosystem have been recognized by its designation as an International Biosphere Reserve and a World Heritage Site.

Purpose of Protection: The park is managed as a unit of the National Park System "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Everglades National Park enabling legislation of 1934 also provided clear guidance on its purpose and management regime, indicating that "The said area or areas shall be permanently reserved as a wilderness, and no development of the project or plan for the entertainment of visitors shall be undertaken which will interfere with the preservation intact of the unique flora and fauna and the essential primitive natural conditions now prevailing in the area."

Level of Protection/Restrictions: Everglades National Park is a public park for the benefit of the people. It is set aside as a permanent wilderness, preserving essentially primitive conditions including the natural abundance, diversity, behavior, and ecological integrity of the unique flora and fauna. Commercial fishing is prohibited, while recreational fishing is allowed. Sea turtle and American crocodile nesting beaches are closed to visitation during the summer nesting season.

Primary Threats to the Resource: Physical impacts to sea turtles on nesting beaches include invasive alien plants, such as Australian pine, Casuarina spp., that dominate nesting sites with dense networks of roots that inhibit turtle nesting, and egg predation from raccoons, and

humans. Ecological integrity impacts cascade from altered predator-prey populations, including American alligator, American crocodile, and great horned owls that control raccoon populations, and thence egg predation. Disrupted and contaminated freshwater flows from the Everglades watershed also impair sea turtle populations at the land/sea interface as the timing, water flows & levels, and reproductive dynamics of wildlife are altered and production of the entire system shifts. Disturbance to other sea turtle nesting beaches in the region also impact park beaches and turtles as urban turtles abandon beaches near cities and move to undisturbed park beaches. High speed boat traffic in shallow waters near sea turtle nesting beaches and seagrass foraging areas also impact turtles at the land/sea interface.

MPA Resource Protection Measures and Effects: Watershed protection in the park mitigates water quality, and seasonal freshwater flow disruptions. Protection of park beaches during nesting seasons reduces egg poaching, and nesting abandonment. Monitoring nest counts by species, distribution of nests, nest crawl outcome (nest, no nest), egg counts/nest, nesting outcome, hatching success provide information on status and trends to evaluate stewardship efficacy.

Findings: Land (nesting beaches) and nearby sea grass and other ocean habitats for foraging, are essential for sea turtle population persistence. Protection of turtles from human disturbance on nesting beaches and incidental mortality in fishing gear while foraging are both critical. Integrating stewardship across the land/sea interface improves conservation efficacy, and reduces impacts to threatened and endangered species. Protection of adjacent nesting beaches and foraging areas reduces stress on sea turtles and may improve the health (integrity, stability, resilience, and capacity for self-renewal) of sea grass and coral reef communities.

HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY (SHIPWRECK BEACH)

Land/Sea Focal Resource: Shipwreck Beach, Lanai Island

Large Marine Ecosystem: Pacific Islands

Type of Resource (natural, cultural, both): Both

Brief Description/Status of Resource at the MPA:

- Approximately one dozen shipwrecks along the eight mile stretch of Shipwreck Beach, Lanai
- Near shore invertebrate, fish and limu species providing sustenance to local Lanai residents

- Several ancient Native Hawaiian village sites located at Shipwreck Beach, petroglyphs and other archaeological remains
- Camping and fishing sites built from the local resources for the local Lanai residents
- Represents a mixture of natural shoreline resources (fishing), Native Hawaiian cultural resources (ancient village sites), and historic-period cultural heritage resources (remnants of sailing and steam vessels of Hawaii's plantation period) that can be integrated through a cultural landscape approach.
- Many of the Native Hawaiian and historic period resource sites span the interface from reef and back reef areas to shore and beach. Many resources (stone, shipwreck parts) see re-use in the construction of fishing and camping shelters.

Location on Land/Sea Interface: Shipwreck Beach is an eight mile stretch of coastline, along the north shore of Lanai Island, within the main Hawaiian Islands. Lanai Island is surrounded by the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS).

Purpose of Protection: Hawaiian Islands Humpback Whale National Marine Sanctuary was established and is managed under the National Marine Sanctuaries Act, which has broad authority to protect natural and cultural resources in the marine environment. The HIHWNMS was created by Congress in 1992 to protect humpback whales and their habitat in Hawai`i. The sanctuary, which lies within the shallow (less than 600 feet), warm waters surrounding the main Hawaiian Islands, constitutes one of the world's most important humpback whale habitats. The sanctuary is co-managed with the State of Hawaii, which provides its own protections for species and environment beyond the sanctuary's focus on humpback whales.

HIHWNMS is currently undergoing its management plan review process. As part of that process, public working groups have been formed to consider the addition of other resources (beyond whales) within the sanctuary's management mandates. Cultural heritage resources are being considered for inclusion. The HIHWNMS was designated for the protection of humpback whales and their habitat ("single-species" sanctuary) and does not currently directly protect cultural heritage resources or the beach itself (see State of Hawaii above).

Level of Protection/Restrictions: Sanctuary regulations prohibit taking, possessing, or approaching (within 100 yards for vessels, 1,000 feet for aircraft) humpback whales within the sanctuary. Additionally, discharging into sanctuary waters or altering the seabed in a manner injurious to humpback whales or their habitat is prohibited. Additional restrictions for all federal waters are included in the Endangered Species Act (1990) and the Marine Mammal Act (1994). Enforcement of these regulations is coordinated by the NOAA Office of Law Enforcement (OLE) with the U.S. Coast Guard (USCG), State of Hawai`i Department of Land and Natural Resources Division of Conservation and Resource Enforcement (DOCARE) and the NOAA Office of General Counsel.

Land/Sea Issues related to Management of this Resource: Hawai`i has a long history of continuous maritime activity, and therefore possesses many submerged archaeological sites,

sacred sites and historic wrecks. A 1989 state-wide survey documented the diversity of cultural heritage resources within the sanctuary including 62 ancient fishponds, 30 historic shipwrecks (documents record at least 185 historic vessels and aircraft lost in those waters (two dozen of which have been located). Collectively, these cultural heritage sites are referred to by the Sanctuary as *maritime heritage resources*, significant properties which reflect key periods such as Native Hawaiian fishing and aquaculture, 19th century sail and steam navigation, and the events of World War II. Many of these resources, such as fishponds or coastal shipwrecks, span the near shore and beach interface. Shipwrecks can be affected by terrestrial (beachcombing) activities. To date there has been no overall inventory or assessment of most of the maritime heritage resources in the main Hawaiian Islands. The educational and socio-economic potential for these resources have not been realized.

Primary Threats to the Resource: The physical remains of shipwrecks on Lanai's north shore are subject to slow deterioration over time, due to the mechanical and biological/chemical processes of site deterioration. That is to be expected. However, shoreline and near shore collection ("treasure hunting") can negatively affect the resource. Human impacts on this resource throughout the sanctuary include the intentional damage and removal of historic artifacts from shipwreck and aircraft sites. Unfortunately, despite existing state and federal laws to the contrary, there have been a number of known incidents of this sort elsewhere within the sanctuary. Specific impacts to shoreline archaeological sites or historic properties at Shipwreck Beach have not been determined, as the sanctuary does not currently manage these resources.

Other major impacts at Land/Sea Interface: Shipwreck Beach on Lanai is, due to former land use impacts on the plantation island, experiencing a high level of sedimentation and erosion. Shipwreck Beach is also a destination for tourism, visitors coming to the shore to observe the historic shipwrecks and collect flotsam. Fishermen also frequent the shore here.

MPA Resource Protection Measures and Effects: Currently, there is no additional protection for cultural or maritime heritage resources added by the HIHWNMS MPA.

Findings: To date, an overall inventory or assessment of the maritime heritage resources in the main Hawaiian Islands, and specifically within the HIHWNMS, has not been completed. Preliminary efforts indicate that approximately 185 ship and aircraft losses have occurred within the sanctuary prior to 1960 (two dozen of these have already been located and identified). As the sanctuary is not currently engaged in the inventory, assessment, and outreach associated with maritime heritage, the educational and socio-economic potential for these resources has not been realized.

Necessary recommendations include: sanctuary adoption of cultural heritage resources as a management mandate; inventory and assessment of heritage resources; sanctuary support for the existing state and federal preservation mandates; active engagement of partner agency and

public groups in survey and protection efforts; coordination with sanctuary and public Native Hawaiian groups; and sanctuary support for education and outreach activities.

The status of cultural heritage resources must be understood in the context of two important determinations. Not only is the sanctuary currently considering adding heritage resources to its management mandate, but our understanding of heritage resources is also being redefined. Lanai's north shore provides an example of multiple cultural landscapes which cross the land/sea divide. At Shipwreck Beach, the ancient past (shoreline and near shore villages and fishponds) is over-lain by the historic past (shipwrecks and plantation-era landings); and both of these are subject to the potential human impacts of increased island erosion and tourism. New tools, such as the Cultural Landscape Approach (CLA, familiar to terrestrial anthropologists) are needed to better understand layers of cultural values and resources. In contrast to previous cultural resource management paradigms, which approached resources individually for study and preservation, CLA instead uses cultural landscapes as an analytical tool to understand places and their associate resources. Analogous to ecosystem-based management, CLA also examines the relationships among living and non-living resources, and their environment.

Grand Bay National Estuarine Research Reserve (Wetlands)

Land/Sea Focal Resource: Wetlands

Large Marine Ecosystem: Gulf of Mexico

Type of Resource (natural, cultural, both): Natural

Description/Status of Resource at the MPA:

- The wetlands within the Grand Bay National Estuarine Research Reserve (Reserve) serve a as nursery and foraging ground for a variety of species, including wildlife and commercially valuable fish.
- Although wetlands within the Reserve are remote and have had less adjacent development than other locations, the wetlands still are impacted by erosion, loss of sediments and degradation of water quality.

Location on Land/Sea Interface: The Reserve is located in southeastern Mississippi in Jackson County near the small community of Pecan. It is comprised of approximately 18,000 acres, much of which is found within the Grand Bay National Wildlife Refuge and the Grand Bay Savanna Coastal Preserve. This Reserve contains a variety of wetland habitats, both tidal and non-tidal, such as pine savannas, salt marshes, saltpans, bays and bayous as well as terrestrial habitats that are unique to the coastal zone such as maritime forests. Seventy-five percent of the property located within the Reserve's boundaries is owned by public agencies.

Purpose of Protection: National Estuarine Research Reserves are established by NOAA, under the authority of Section 315 of the Coastal Zone Management Act. The Grand Bay National Estuarine Research Reserve was established in 1999. It is managed through a unique local, state and federal partnership designed to promote estuarine research and education within Mississippi's Coastal Zone and its adjacent ecosystems. The state partner is the Mississippi Department of Marine Resources and the federal partner is NOAA.

Level of Protection/Restrictions: The Reserve has no law enforcement capability and is not the entity that makes or enforces rules on the open water areas or adjacent private lands. Issues must be dealt with through coordination and interagency agreements. The Reserve is currently drafting a new management plan.

Land/Sea Issues related to Management of this Resource: Wetlands are a link between inland terrestrial landscapes and the neashore marine environment and therefore are subject to degradation from both land and sea inputs.

Primary Threats to the Resource: Threats to the wetlands include nutrient loading from river flow, local runoff, tidal interactions and fluxes from benthic sediments. Wetlands may be impacted by discharges from the industrial complex to the immediate west. Micronutrients can become contaminants through runoff of agricultural fertilizers or from residential and industrial wastes. Rapid urbanization and industrial expansion along the north-central Gulf of Mexico have resulted in the degradation of coastal ecosystems due to multiple environmental stressors: anthropogenic inputs from point and nonpoint sources, habitat alterations, low oxygen concentrations, high turbidity, physical disturbances from recreational and commercial uses, contaminated sediments, and eutrophication. Wetlands within the Reserve are impacted by erosion as well as loss of loss of sediments due to tropical wind and wave activity and shoreline losses related to sea level rise.

MPA Resource Protection Measures and Effects*:* The Reserve's monitoring programs, research activities and education/outreach efforts aid in the protection of the resource and provide valuable information on resource condition. The Reserve also provides logistical and technical support in addressing water quality impacts.

Findings: Wetlands within this region are invaluable, both economically and environmentally. Although the Reserve's goal is protection of the resource, it does not have authority to enforce current regulations set in place to address water quality issues. Instead, it must rely on coordination and agreements among the multiple-agencies at various levels to enforce the regulations. Wetlands are conserved by the legal protection of the protected area, but are threatened by larger regional factors such as coastal erosion, water quality and water quantity. These broader impacts indicate the importance of coordination with land-based agencies and landowners within the watershed, as well as the benefits of linking small, local MPAs with other protected areas in coastal and marine protected area networks.

Appendix 2

List of Members of the
Land, Sea and Communities Subcommittee,
Marine Protected Areas Federal Advisory Committee

Rick Gaffney, Pacific Boats and Yachts (Chair)
Dr. Sarah Robinson, Critical Inquiries Research (Vice Chair, communities)
Capt. Phil Renaud, Living Oceans Foundation (Vice Chair, land/sea issues)

Dr. Felicia Coleman, Florida State University
Dr. Gary Davis, National Park Service (ret); GEDavis & Associates
John Frampton, South Carolina Department of Natural Resources
George Geiger, recreational fishing
Melissa Miller-Henson, California Resources Agency
Dr. Robert Pomeroy, Connecticut Sea Grant
David Wallace, Wallace & Associates (commercial fishing)

* Victor T. Mastone (FAC), Massachusetts Board of Underwater Archaeological Resources
*Alvin Osterback (FAC) Port of Dutch Harbor
*Jesús Ruiz (FAC), California Divers
*Dr. Della Scott-Ireton (FAC), Florida Public Archeology Network
*Bonnie Newsom, Penobscot Indian Nation
* Dr. Valerie Grussing, Cultural Resources Coordinator, MPA Center

Federal Agency staff and MPA Center staff:
Bret Wolfe, Department of the Interior, USFWS
Rick Swanson, US Forest Service
Dr. Mimi D'Iorio, National Marine Protected Areas Center
Denise Ellis-Hibbett, National Marine Protected Areas Center

*Liaisons from Cultural Heritage Resources Workgroup