



Marine Protected Areas

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Threats to Marine Biodiversity

Reduction of Biological Diversity

Coral Reefs –

- 20% have been destroyed.
- 24% of remaining reefs are under imminent risk of collapse.



Threats to Marine Biodiversity

Degradation of Habitats

Mangroves –

- Annual losses of 1.1%.
- Mangrove deforestation rates are 3 to 5 times greater than global deforestation rates.
- The estimate of global mangrove area in 1980 was 19.8 million ha.
- Some 5 million ha of mangrove forests were lost during this 20 year period amounting to about 25% of the 1980 mangrove area.

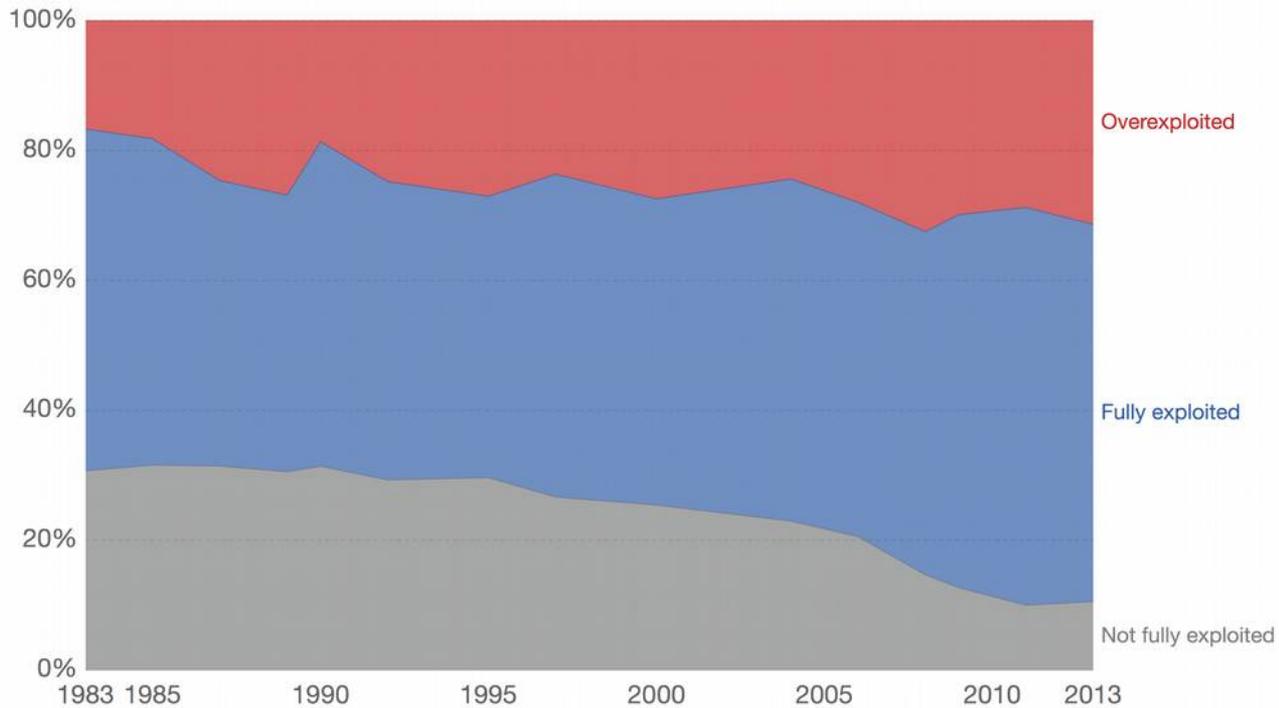


Global Decline in Fisheries

Proportion of fish stocks within biologically sustainable levels, World

Our World
in Data

The proportion of fish stocks within biologically sustainable levels measures the sustainability of the world's marine capture fisheries by their abundance. A fish stock with abundance equal to or above the maximum sustainable yield (MSY) is classified as biologically sustainable. When abundance falls below the MSY level, the stock is considered biologically unsustainable.



Source: FAO Fisheries and Aquaculture (FAOfish)

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Fishing Down the Food Web

- Pauly calculated the mean trophic level of global fisheries since 1950 using FAO data.
- The tendency is a gradual shift to lower trophic levels - that is from long-lived, high trophic level bottom fish to short-lived, low trophic level invertebrates and planktivorous pelagic fish.
- Initially, fishing down the food web leads to increasing catches. However, this is followed by stagnant or decreased catches due to ecosystem disturbances.

Fishing Down the Food Web

- The global decline in trophic level has been about 0.1 per decade without a substantial increase in landings.
- The declines have been greatest in the Northern Hemisphere where industrial fisheries have worked for the longest time. Fishery managers must rebuild fish populations within large no-take MPAs (marine reserves).

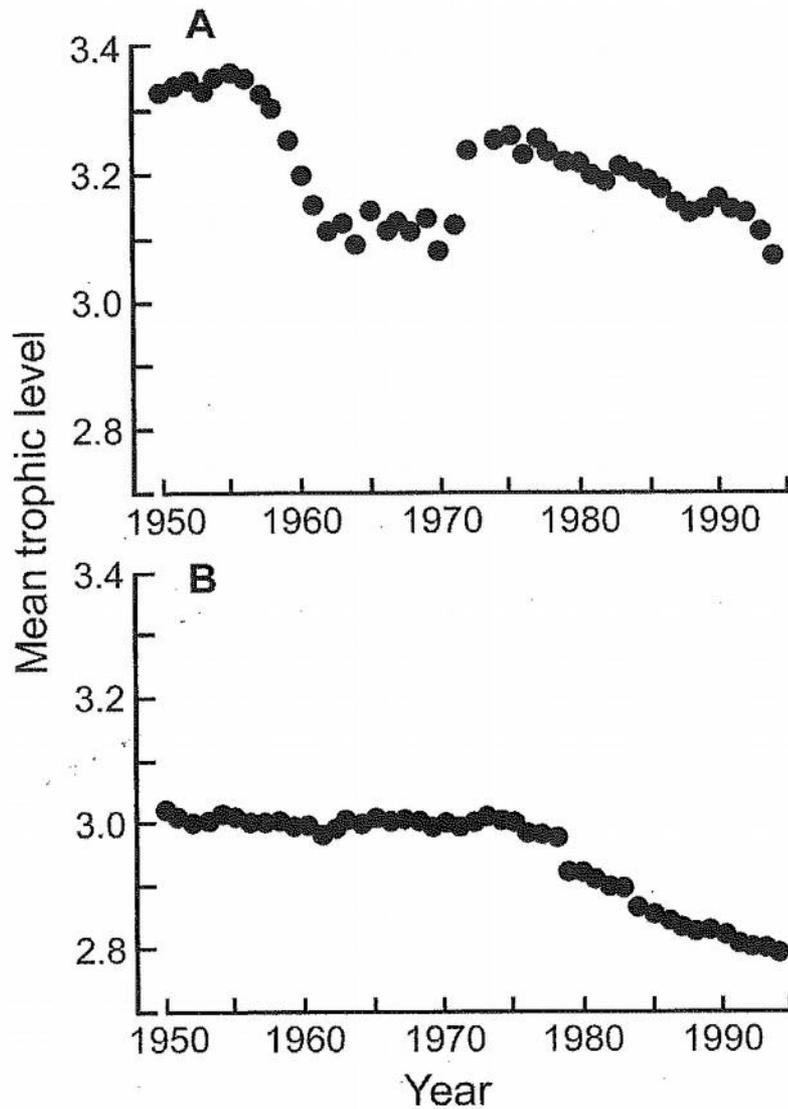


Figure 2.2. Global trends of mean trophic level of fisheries landings, 1950–1994. (A) Marine areas; (B) inland areas.

from Sobel and Dahlgren,
Marine Reserves (2004)

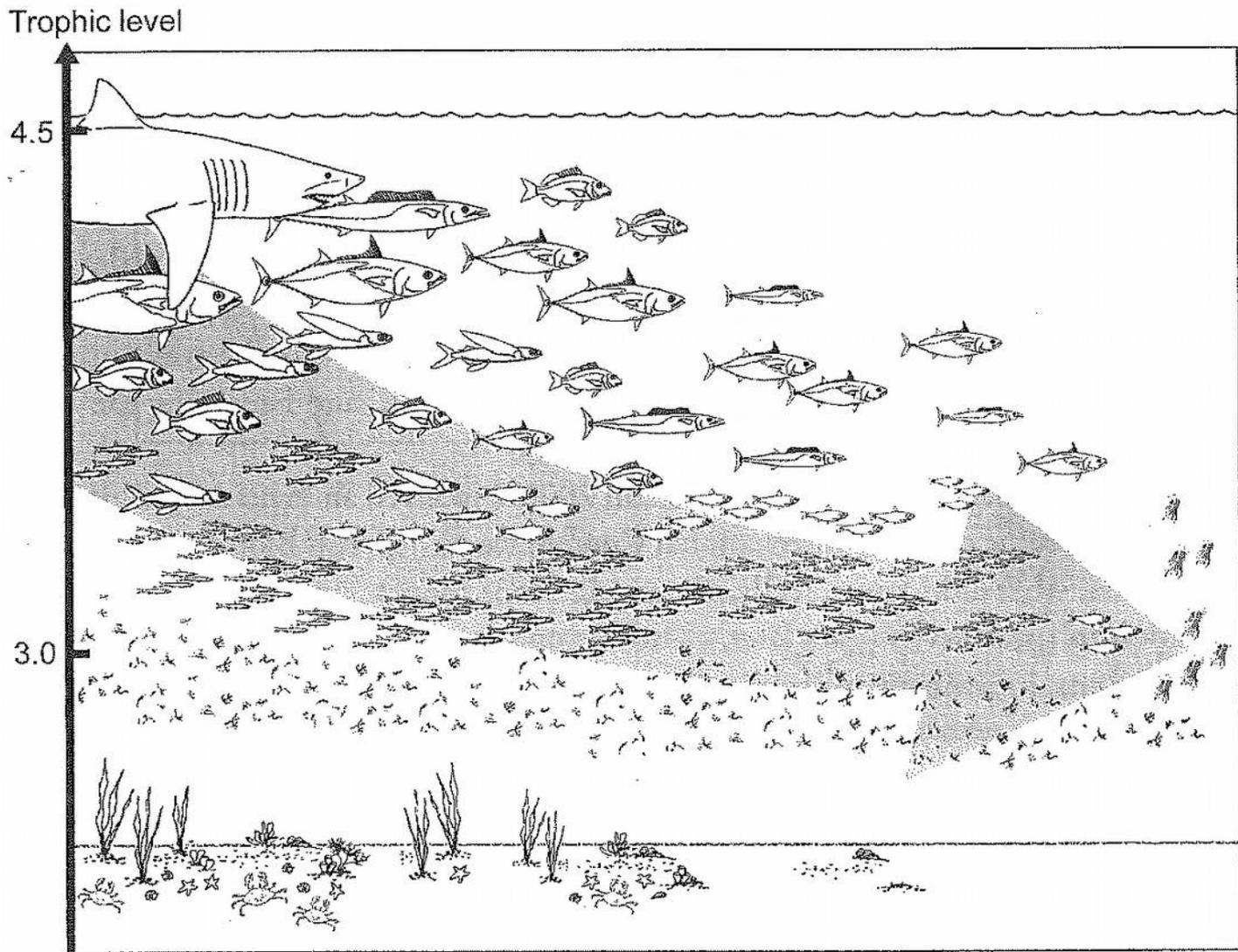


Figure 2.12. Schematic representation of the fishing down process. Fisheries usually start in

from Sobel and Dahlgren, *Marine Reserves* (2004)

Sustainability

- Fisheries have not been managed sustainably despite the rhetoric (MSY = Maximum Sustainable Yield).
- The fishing industry with its improved technologies has caused serial depletions, expansion of range (further offshore and into the Southern Hemisphere, as well as deeper waters), and targeting of lower level species.
- These factors often mask overfishing to casual observers.

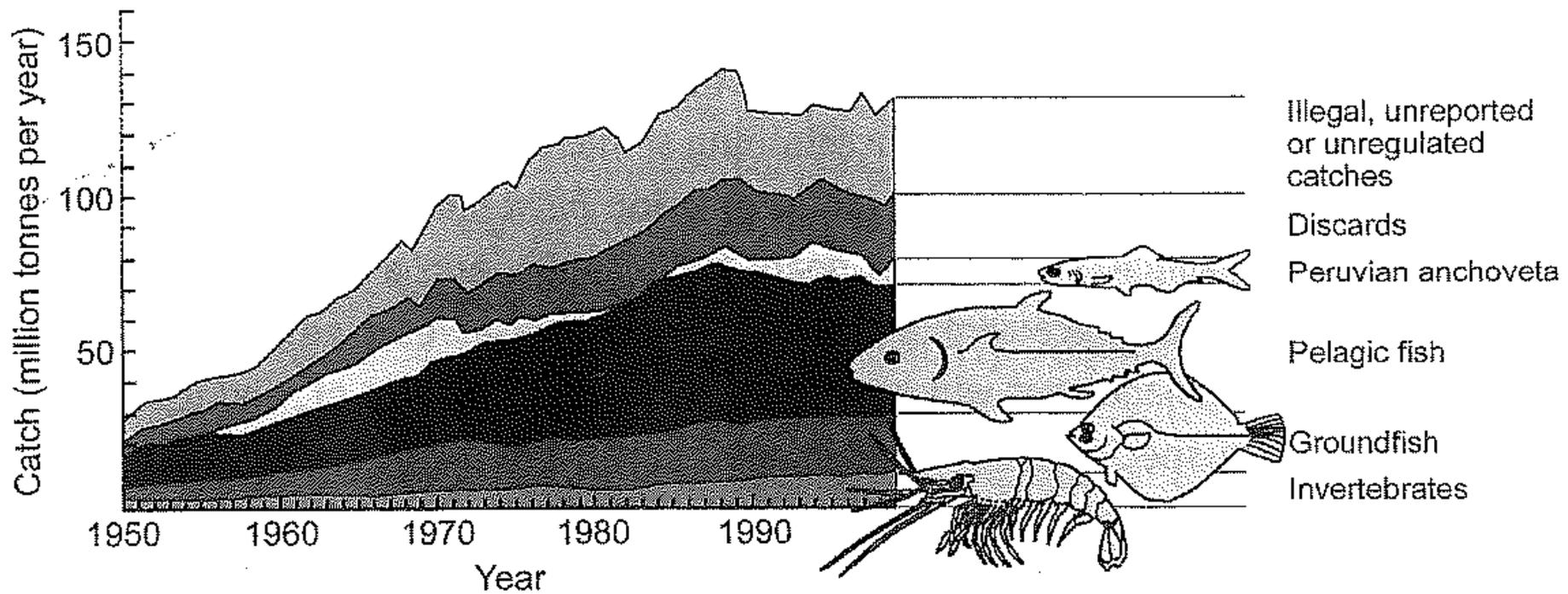
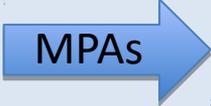


Figure 4.1. Estimated global fish landings 1950–1999. Figures for invertebrates, groundfish,

from Sobel and Dahlgren, *Marine Reserves* (2004)

Marine Protected Areas (MPAs) may offer a solution to these problems.

- Fisheries Collapses  Fisheries Benefits
- Biodiversity Losses  Conservation Benefits

What are Marine Protected Areas (MPAs)?

- **Protected Areas (IUCN)** – a geographical space, recognize, dedicated, and managed through legal and other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
- **MPA** – any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features which has been reserved by law or other effective means to protect part or all of the enclosed environment.

What is a Marine Reserve?

- A *MARINE RESERVE* is an delimited area of the ocean where extractive activities are prohibited. It is a NO TAKE area.
- *MARINE RESERVES* are a subset of *MARINE PROTECTED AREAS* (MPAs) that are delimited areas of the ocean with conservation goals (but not necessarily “No Take”).
- Great confusion exists about MPA nomenclature.

IUCN Classifications

- Category Ia – Strict Nature Reserve; 1b – Wilderness Area
- Category II – National Park
- Category III – Natural Monument or Feature
- Category IV – Habitat/Species Management Area - sites with positive intervention, such as restoration
- Category V – Protected Landscape/Seascape – Extractive activities may be part of the seascape.
- Category VI – Protected Area with Sustainable Use of Natural Resources

- Categories I, II, and III correspond to No-Take Marine Reserves.

UN Millennium Development Goals

- Goal 7 – Ensure Environmental Sustainability
- Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss
- Protected ecosystems covered 15.2% of land and 8.4% of *coastal* marine areas worldwide by 2014.
- The UN Millennium Development Goals called for 10% of the Global Ocean to be classified as an MPA by 2010. **We did not meet this goal.**

Aichi Biodiversity Target 11

- The COP-10 (Nagoya, Japan, 2010) of the Convention on Biological Diversity (CDB) adopted the Aichi Biodiversity Targets.
- By 2020, at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

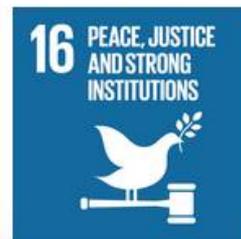
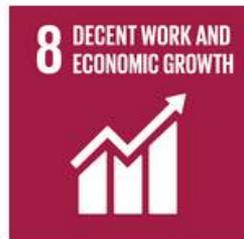
UN Sustainable Development Goals

- At the United Nations General Assembly on 25 September 2015, 193 Nations unanimously adopted the **2030 Agenda for Sustainable Development** and its 17 Sustainable Development Goals (SDGs).
- The aim of the 17 goals is to end poverty, protect the Earth, address Climate Change, and ensure prosperity for everyone.
- Each goal has specific targets to be achieved over the next 15 years (2016-2030).

UN Sustainable Development Goals

- Implementation involves International Organizations, as well as the public and private sectors of all countries (poor, middle-income, and rich).
- Although the SDGs are not legally binding, all governments are expected to establish national frameworks to achieve the 17 Goals.

UN Sustainable Development Goals



Sustainable Development Goal 14

- *By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information.*
- By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

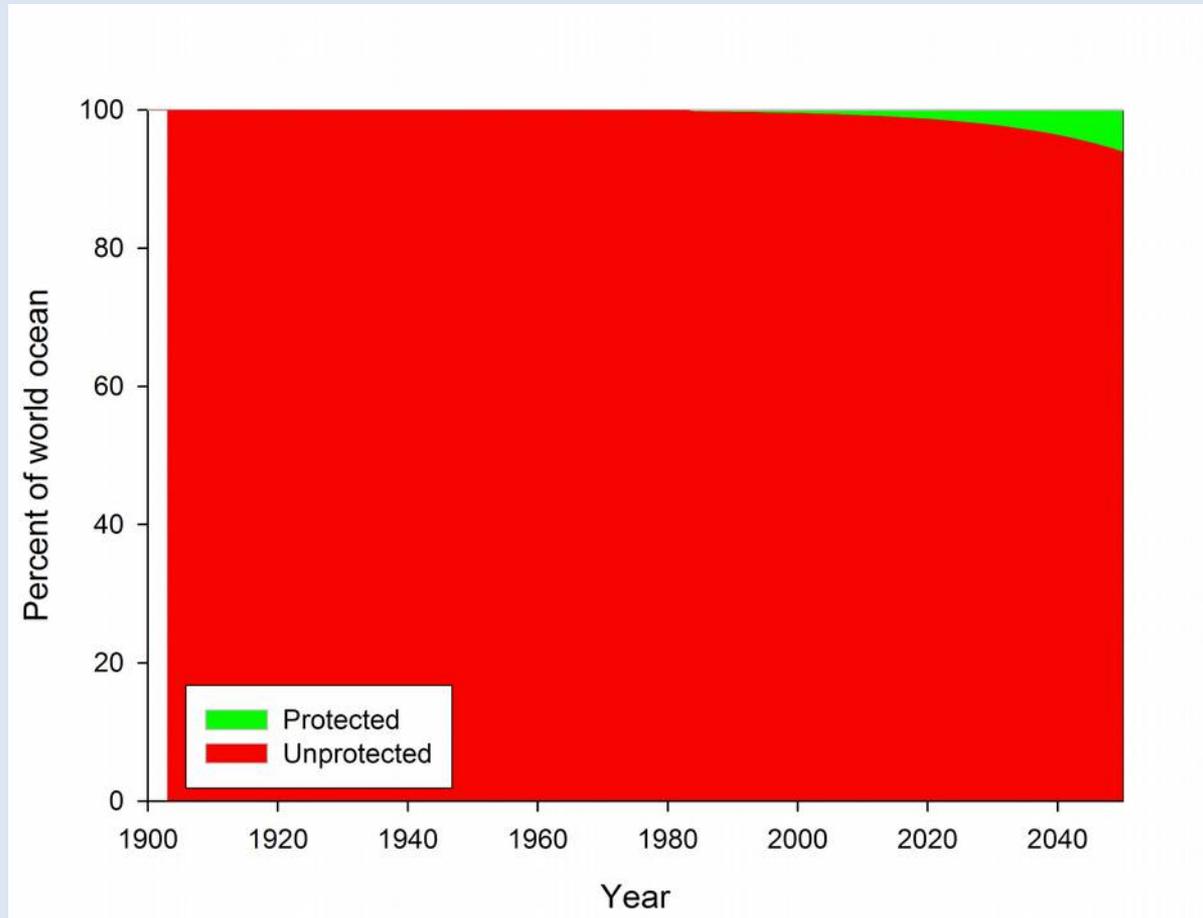
Sustainable Development Goal 14

- The 10% spatial conservation target has a broad scope of protection. Lubchenco and Grorud-Colvert divide these areas into those:
 - Lightly protected – significant extractive activities occur
 - Strongly protected – no commercial activity but some artisanal and recreational fishing
 - Fully protected – no extractive activities (**Marine Reserves**)

Sustainable Development Goal 14

- MPAs – 3.5% of the Ocean
- Strongly protected or fully protected MPAs – 1.6% of the Ocean. In 2000, only 0.1% of the ocean was strongly or fully protected.
- Existing MPAs are largely within marine areas under national jurisdiction (Territorial Seas and EEZ) – even though the High Sea accounts for 58% of the Ocean.

MPAs compared to Global Ocean

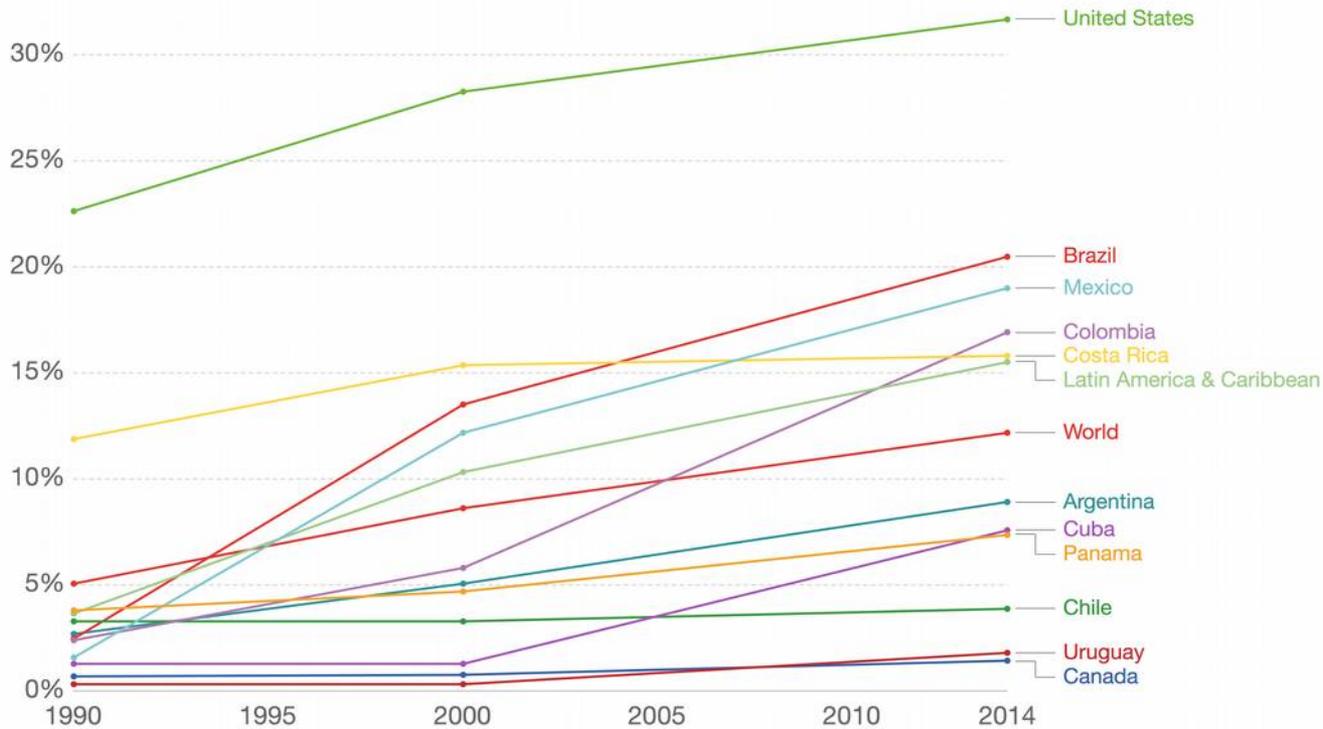


from *Protect Planet Ocean*

How are We doing?

Marine protected areas (% of territorial waters)

Marine protected areas are areas of intertidal or subtidal terrain - and overlying water and associated flora and fauna and historical and cultural features - that have been reserved by law or other effective means to protect part or all of the enclosed environment.



Source: World Bank - WDI

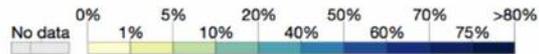
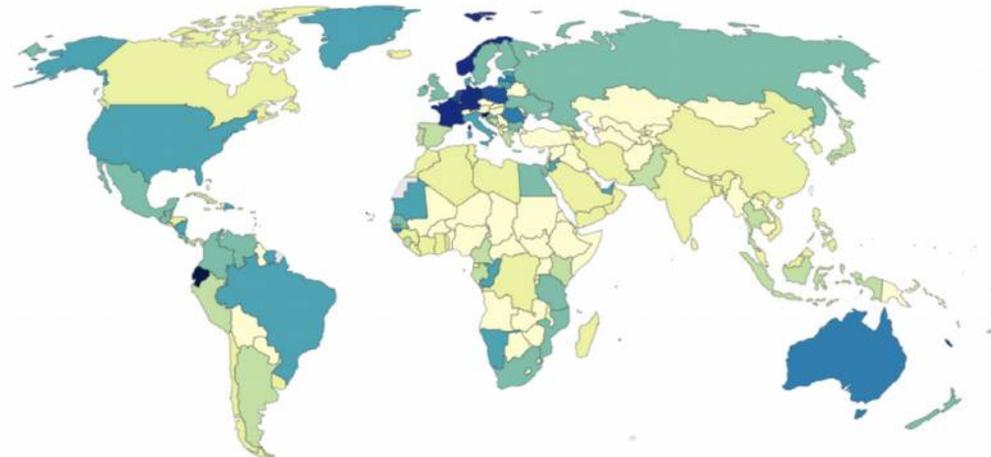
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MPAs as Percentage of Territorial Waters

Marine protected areas (% of territorial waters), 2014

Marine protected areas are areas of intertidal or subtidal terrain - and overlying water and associated flora and fauna and historical and cultural features - that have been reserved by law or other effective means to protect part or all of the enclosed environment.

Our World
in Data



Source: World Bank - WDI

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How are We Doing?

- Over 10,000 MPAs have been designated.
- Most MPAs are located in areas under national jurisdiction.
- Many countries have made significant progress in recent years.
- However, it is unlikely that we will meet the 10% goal by 2020.

However . . .

- These targets provide measurable indicators for progress.
- Nevertheless, they may provide a false sense of process because many designated MPAs are only “paper MPAs” with little or no management.

Land vs. Marine

- Between 10% and 15% of global terrestrial areas have protection.
- At most, about 3% of the global ocean has some protection. However, if the MPAs offer effective protection, the area is lowered to about 1%.
- Why is there a difference?

Differences between Terrestrial and Marine Protected Areas

Features	Terrestrial Ecosystems	Marine Ecosystems
Dimensions	2-D	3-D
Scale of Material Transport	smaller	greater
Openness	less	more
Sensitivity to Habitat Fragmentation	greater	less
Rate of Response to Environmental Variability	lower	faster
Reliance on External Sources of Recruitment	lower	higher

Differences between Terrestrial and Marine Protected Areas

Features	Terrestrial Ecosystems	Marine Ecosystems
Per Capita Fecundity of Invertebrates	lower	higher
Importance of Connectivity	less	greater
Ownership	Private land ownership	Public
Access	closed	open
Habitat Destruction	great	locally-focused

Biological Issues of Marine Reserves

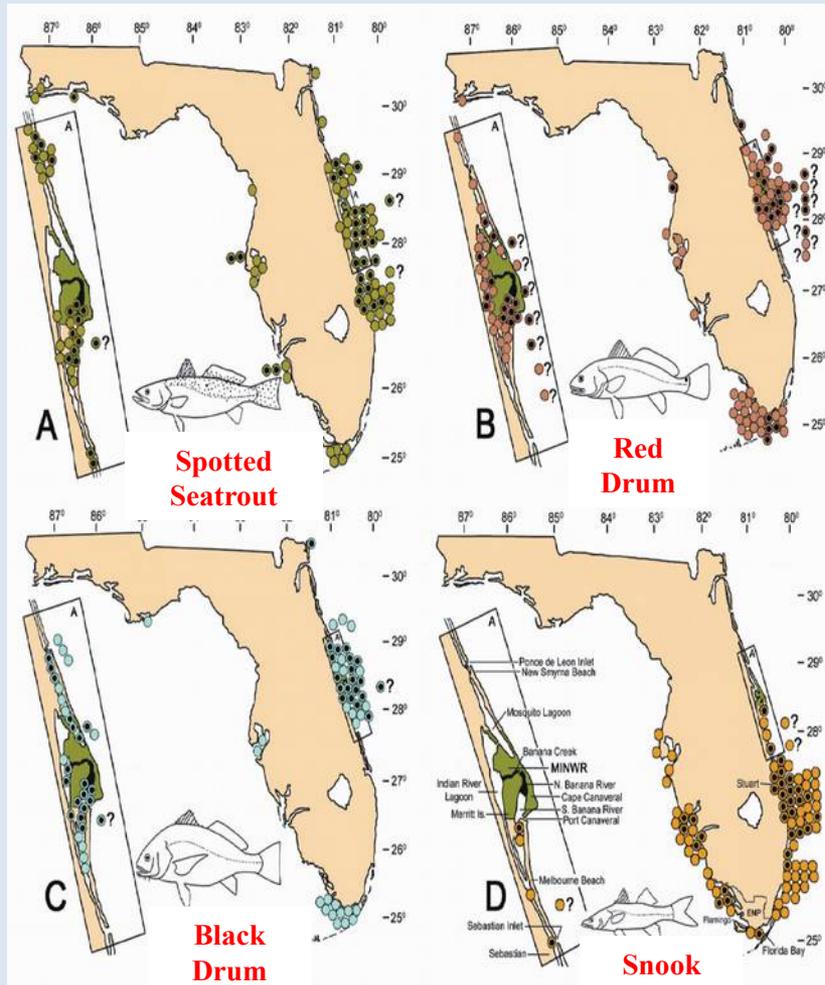
Benefits for Fisheries – Larval Dispersal

- Larval export is the mechanism by which Marine Reserves can enhance fisheries.
- Pelagic larval dispersal distance varies by species.
- Dispersal drives replenishment.
- Important factor – surface ocean currents
- Reef fish – generally between 10 and 100 km
- Larger female fish have more eggs, and they tend to be of higher quality with higher fat content.

Fisheries Benefits - Spillover

- Density-dependent spillover into adjacent areas
- Florida – Estuarine area closed to public access for security around Kennedy Space Center. Marine Reserves in the Merritt Island National Wildlife Refuge (oldest Marine Reserve in USA) have supplied increasing numbers of world record-size game fish in adjacent waters
- St. Lucia (Soufrière Marine Management Area) – Network of 5 Marine Reserves (35% of coral reef area) has increased artisanal catch between 46 and 90%

Merritt Island National Wildlife Refuge



IGFA:

Record captures of “trophy species” are concentrated around Cape Canaveral and Everglades National Park – both areas where fishing is prohibited or highly restricted.

Fishing has been prohibited in a 39 km² zone of Merritt Island NWR since 1963.

Benefits for Fisheries - Insurance

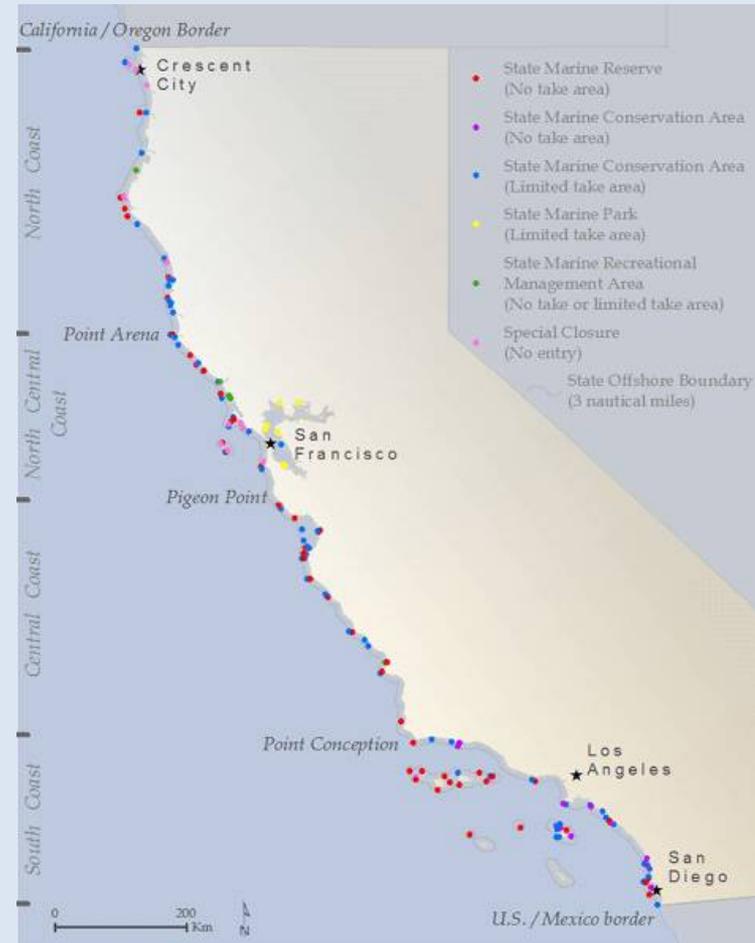
- Enhance spawning stocks of exploited species
- Provide insurance policy against failure of traditional fishery management techniques outside Marine Reserves
- Marine Reserves can increase resilience to environmental changes and biological crashes.

Networks of Marine Reserves

- Networks may span political boundaries.
- Networks can extend from coastal habitats out to deeper waters.
- Network connectivity occurs through movement of larvae, juveniles, or adults.
- Benefits can be greater than those from unconnected reserves.
- Networks can allow fishing between reserves.
- Larval dispersal – replenishment within a reserve or outside a Marine Reserve (upstream areas to downstream areas)
- Areas with large upstream reef areas may be more resilient to recruitment overfishing because there is a supply of larvae or juveniles from elsewhere.

Networks of Marine Reserves

- Marine Reserves with large downstream reef areas may be very important in supporting fisheries elsewhere.
- To be effective Marine Reserves need to be placed close enough so that the upstream site can replenish the downstream site.
Considerations – surface ocean currents and lifetime of larvae. Roberts et al. (1997) suggest a 1-month envelop of larval transport.



California Network of Marine Reserves

Protection of Biological Diversity

- Protect marine habitats and biodiversity from the impacts of fishing gear
- No-Take Marine Reserves conserve and recover Biodiversity (species richness, community complexity, species density and biomass) inside their boundaries.
 - Greater number of species
 - Greater biomass/abundance
 - Larger sizes of individuals
- New evidence that Marine Reserves enhance Biodiversity beyond their boundaries.
 - Spillover of species richness and community complexity
 - Density-dependent fluxes and relocation to non-reserves sites

Benefits of Marine Reserves

- Aesthetics
- Enhance scientific understanding
 - Marine Reserves serve as control areas for scientific research that studies human impacts on the marine environment.
- Environmental Education
- Reduce User Conflicts
- Income Generation from Ecotourism
- Marine Reserves are simple management tools that can simplify enforcement.

Criteria for Selecting Marine Reserves

- Representation of Habitats – Protection of all biogeographical regions and transition zones
- Ensure that all major habitats are protected within the regions (Habitat Heterogeneity)
- Centers of Endemism (cover 16% of world's coral reefs)
- Marine Biodiversity Hotspots (especially coral reefs) – areas of high species richness (Coral Triangle in SE Asia)
- Sites having a significant proportion of a species population

Criteria for Selecting Marine Reserves

- Sites that offer important export functions
- Sites important for critical life stages – vulnerable life stages, spawning aggregation or breeding sites, migration bottlenecks
- Sites having globally endangered species (critically endangered or threatened)
- Important areas that are particularly susceptible to anthropogenic threats – highly vulnerable sites
- Sites that connect marine and terrestrial biodiversity hotspots

Criteria for Selection

- Connectivity – Siting reserves to allow for replenishment within the reserve and with other reserves or unprotected areas
- Important to select important sites with a biological basis and propose alternatives before considering biases from stakeholder input. (Note: Some Marine Reserve biologists suggest this.)
Often MPAs are designated in sites of low conservation value.
- Sites that are important for the ecosystem services they provide
- Political opportunism
- Management capacity – Many small reserves may be harder to manage and enforce than a larger reserve

Social and Political Issues

Socio-Political Themes

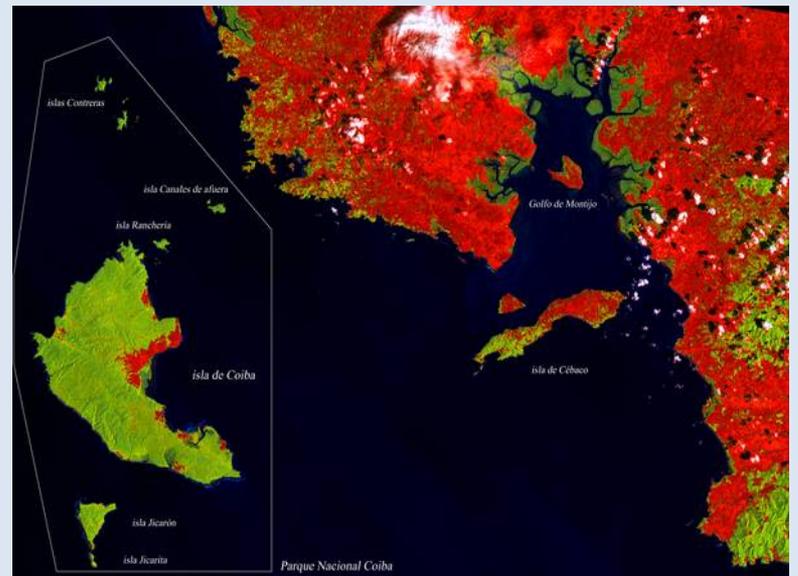
- **Governance** – Coiba National Park (Panamá)
- **Institutional Fragmentation and Lack of Political Will** – Panama Bay Ramsar Site
- **Community Involvement** – Florida Keys National Marine Sanctuary
- **Opposition from Users** – Biscayne National Park
- **Financing**
- **Enforcement** – East Tropical Pacific Marine Corridor
- **Monitoring and Research**

Governance

Challenges to Governance of MPAs

- Need to Integrate Land and Sea
- Off-Site impacts can be accentuated by the aquatic medium.
- Difficulties of Institutional Coordination by the Competent Authorities
- Need to Determine the Degree and Type of Social Inclusion of Users, Local Communities, and the General Public
- Governance of Marine Space – typically viewed as an “open access” property regime.

The Case of Governance in Coiba National Park, Panama



Coiba National Park (Panama)



Coiba National Park (PNC)

- Coiba Island is the largest island in the Pacific Ocean of Central America.
- No permanent residents since the penal colony was closed in 2004.
- PNC created in 1991. Law no. 44 (“Coiba Law”) passed in 2004.
- PNC includes 537 km² of islands and 2,165 km² of marine space.
- PNC has 17 km² of coral reefs – most extensive reef system in the Eastern Tropical Pacific.

Coiba National Park (PNC)

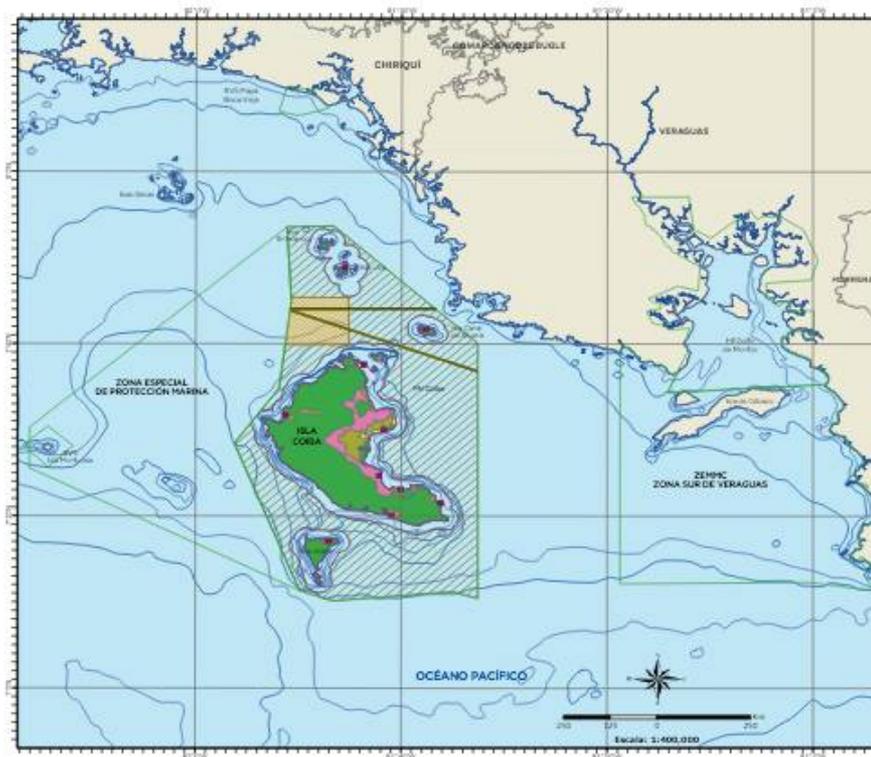
- Home to many marine mammals and threatened/endangered species.
- UNESCO World Heritage Site – 2005
- PNC Management Plan approved - 2009



Zoning in Coiba National Park

ZONIFICACIÓN DEL PARQUE NACIONAL COIBA

ZONIFICACIÓN DEL PARQUE NACIONAL COIBA



ZONIFICACIÓN DEL PARQUE NACIONAL COIBA

- SIMBOLOGÍA**
- Área Protegida y Zona Especial
 - Límite de Reserva
- Zonificación PNC**
- Área de Trabajo de Pesca Artesanal
 - Zona de Manejo de Recursos
 - Subzona de Pesca de Dorado con Palangos
 - Zona de Reserva Marina
 - Zona de Uso Especial
 - Zona de Protección Absoluta
 - Zona de Recuperación Natural
 - Zona de Uso Científico
 - Zona de Uso Interactivo
 - Zona de Uso Cultural

Nota: Este es una carta náutica, por lo tanto no se puede utilizar para navegación.

Sistema de Coordenadas Geográficas
Datum WGS-84, Zona 7N

Fuente: Límite de Área Protegida y Zonificación del PNC - (MARN) Atlas Geográfico Nacional 2021.
Fuentes Base: Datos Proporcionados por MarViva
Elaborado por: Fundación MarViva Panamá.

Proyecto: "DESARROLLO DE ALTERNATIVAS ECONÓMICAS SOSTENIBLES Y ESTRATÉGIAS DE CONSERVACIÓN EN ÁREAS DE PROTECCIÓN MARINA DEL GOLFO DE CHIRIQUÍ"



LOCALIZACIÓN REGIONAL



{06}

{07}

Governance

- Rules of the game in the administration of Marine Protected Areas
- Control of access to the resources
- Assignment of user rights
- Determination of limits of use and extraction
- Who decides?
- How are decisions reached?
- What is the object of the decisions?
- What outside forces exert pressure on decision-making?

Governance – Participation in the Decision-Making Process

- Representativeness – Social Inclusion
- Transparency
- Access to the Information
- Public participation of the users, interested groups, and affected groups

Characterization of Decision-Making in the PNC



Management Council

- Management Council - a new model of governance in Panama's protected areas
 - new experience with “co-management”
 - Promotes inter-agency coordination
 - The model of the “Management Council”, as “maximum authority”, replaced the absolute authority of the National Environmental Authority (ANAM) in the management of this protected area. The role of ANAM focuses on the operational level.

Management Council - Functions

- Establish conservation policies
- Approve the Management Plan
- Oversee the implementation of the Management Plan
- Evaluate and approve the regulations concerning the Special Zone of Marine Protection (ZEPM)
- Evaluate the Scientific Research Plan
- Promote the necessary investments
- Coordinate the work of the commissions



Management Council - Membership

- ANAM (presides)
- MGJ
- IPAT
- SENACYT
- AMP [ARAP]
- Municipality of Montijo
- Municipality of Soná
- Additional Municipal Representative
- Representative of the Fishery Sector
- Chamber of Commerce of Veraguas
- UP-CRV [University of Panama]
- Environmental NGO [MarViva]
- Environmental NGO [ANCON]
- Scientific Research Institution [STRI]
- International Cooperation Organization
- Governor of Chiriquí Province

Management Council – Functioning

- Ordinary sessions every 3 months & Extraordinary Sessions
- The Management Council has held over 40 meetings.
- ANAM presides at meetings.
- Secretariat – MarViva
- Quorum - 7



Scientific Committee

Functions – Support the Management Council with advice on scientific research

- Offer scientific advice
- Evaluate research conducted in the Park
- Contribute to the elaboration of research proposals
- Propose a Five-Year Research Plan for the Park Management Plan

Scientific Committee

Composition

- SENACYT (presides)
- ANAM
- AMP (DGRMC) - ARAP
- UP-CRV [University of Panama]
- STRI
- NGOs designated by the Management Council

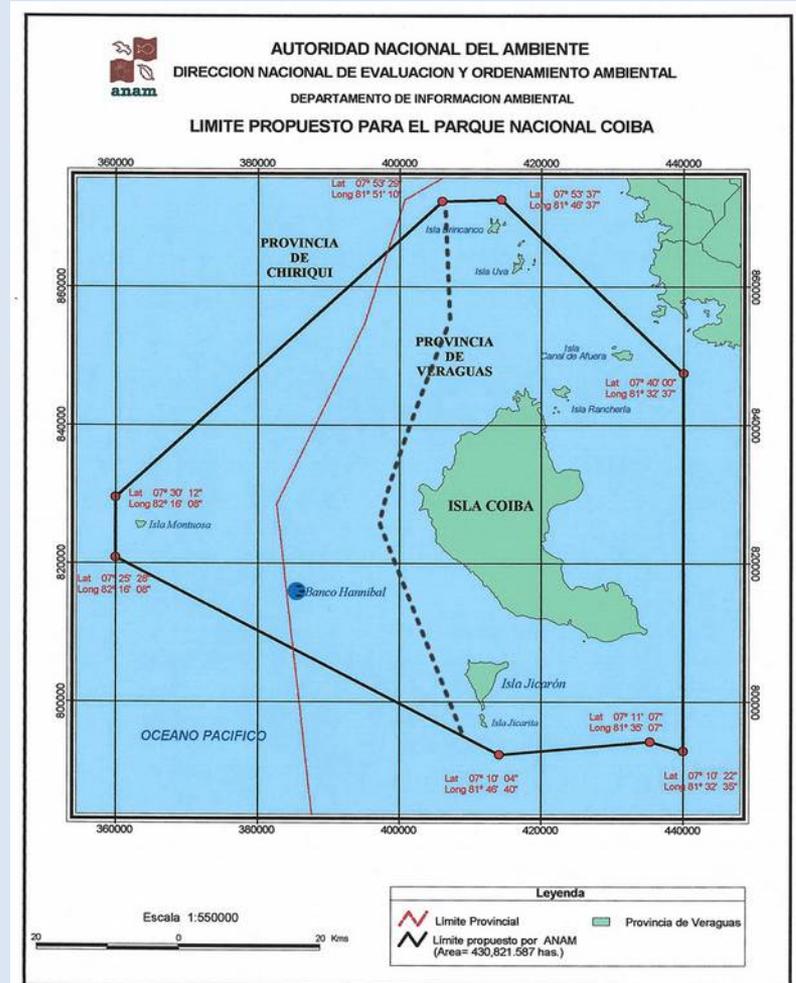
Commission for the Sustainable Management of Fisheries in the Special Zone of Marine Protection



- Functions
 - Prepare fishery regulations for the Special Zone of Marine Protection
 - Evaluate the results of the implementation of the regulation

Fishery Commission

- Composition
 - AMP (DGRMC) [ARAP] (presides)
 - ANAM
 - University of Panama
 - Sportfishing Sector
 - Industrial Fishing Sector
 - Artisanal Fishing Sector (2)
 - Fishery Exporter
 - Environmental NGO
 - STRI
 - SENACYT

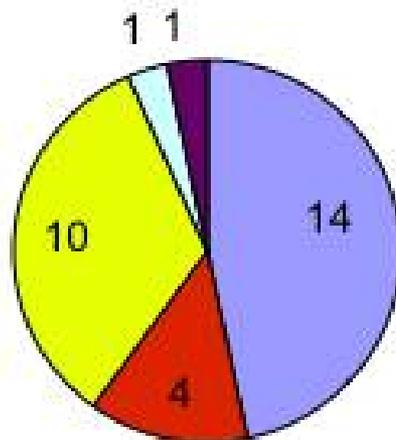


Governance Indicators

- We recommended the following Governance Indicators and they were included in the Management Plan:
 - Level of Attendance at Meetings
 - Frequency of Meetings of the Management Council
 - Consistency of Attendance of Members
 - Compliance with the Agenda
 - Preparation and Distribution of Minutes
 - Themes discussed
 - Number of Decisions Adopted
 - Level of Compliance with Decisions and Actions

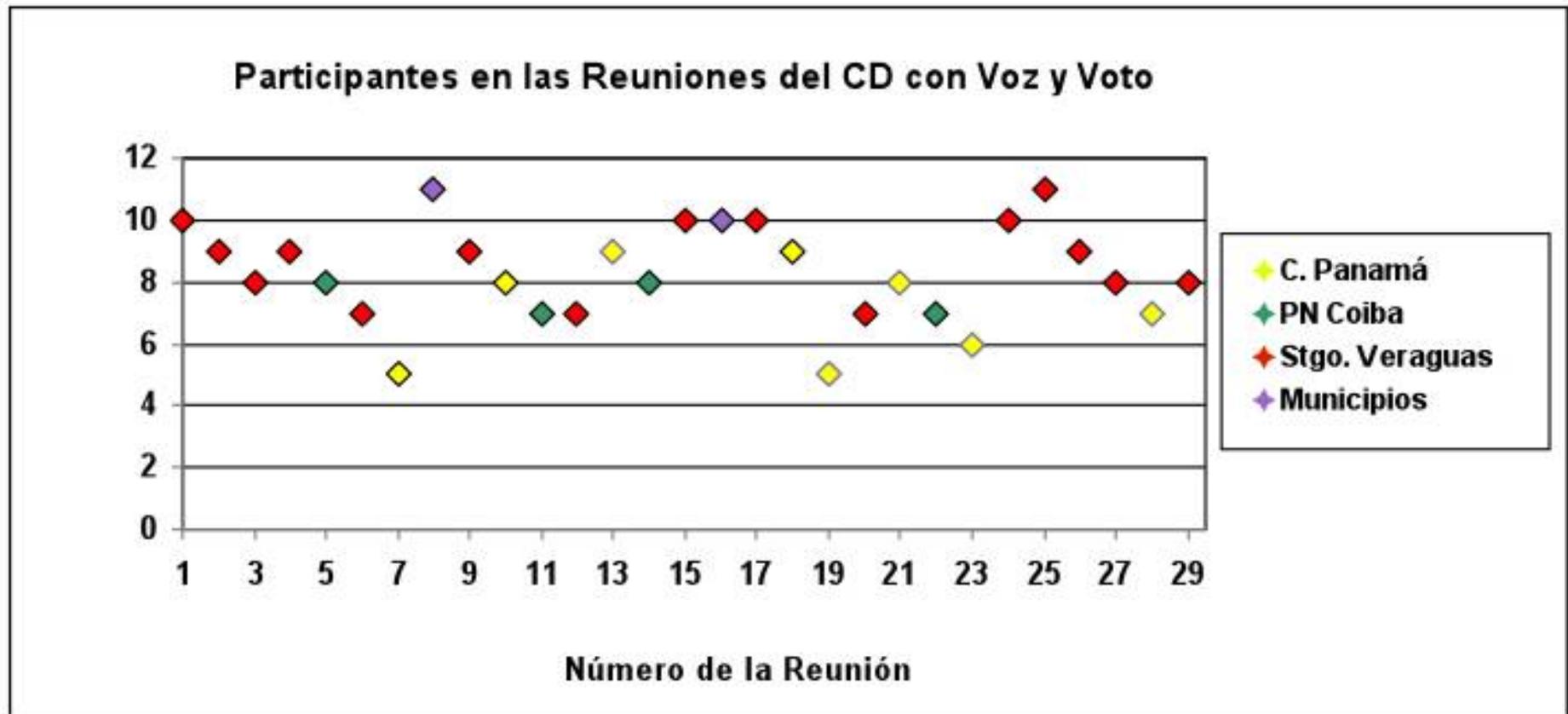
Location of Meetings

Ubicación de las Reuniones del Consejo Directivo



- Stgo de Veraguas
- Isla Coiba
- C. de Panamá
- Mun. Soná
- Río de Jesús

Attendance at Meetings of the Management Council

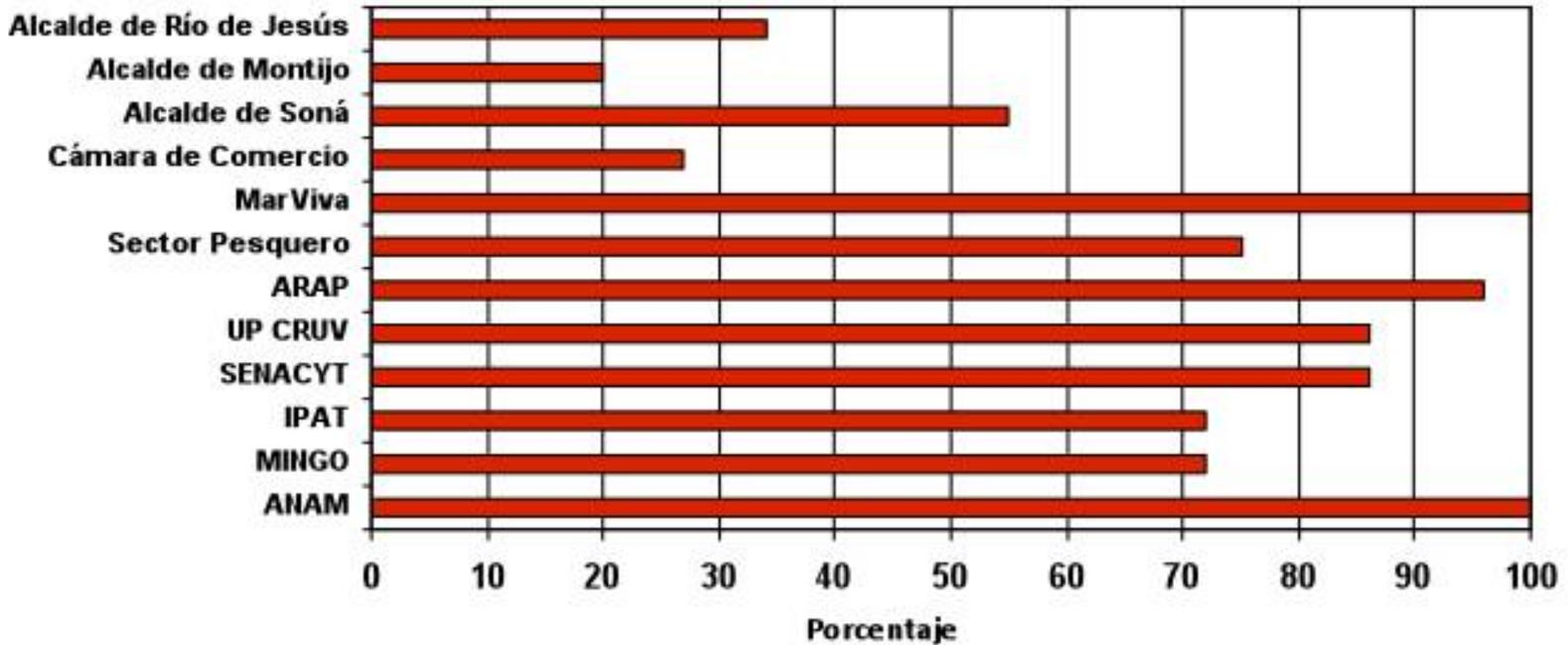


Attendance of the Represented Group

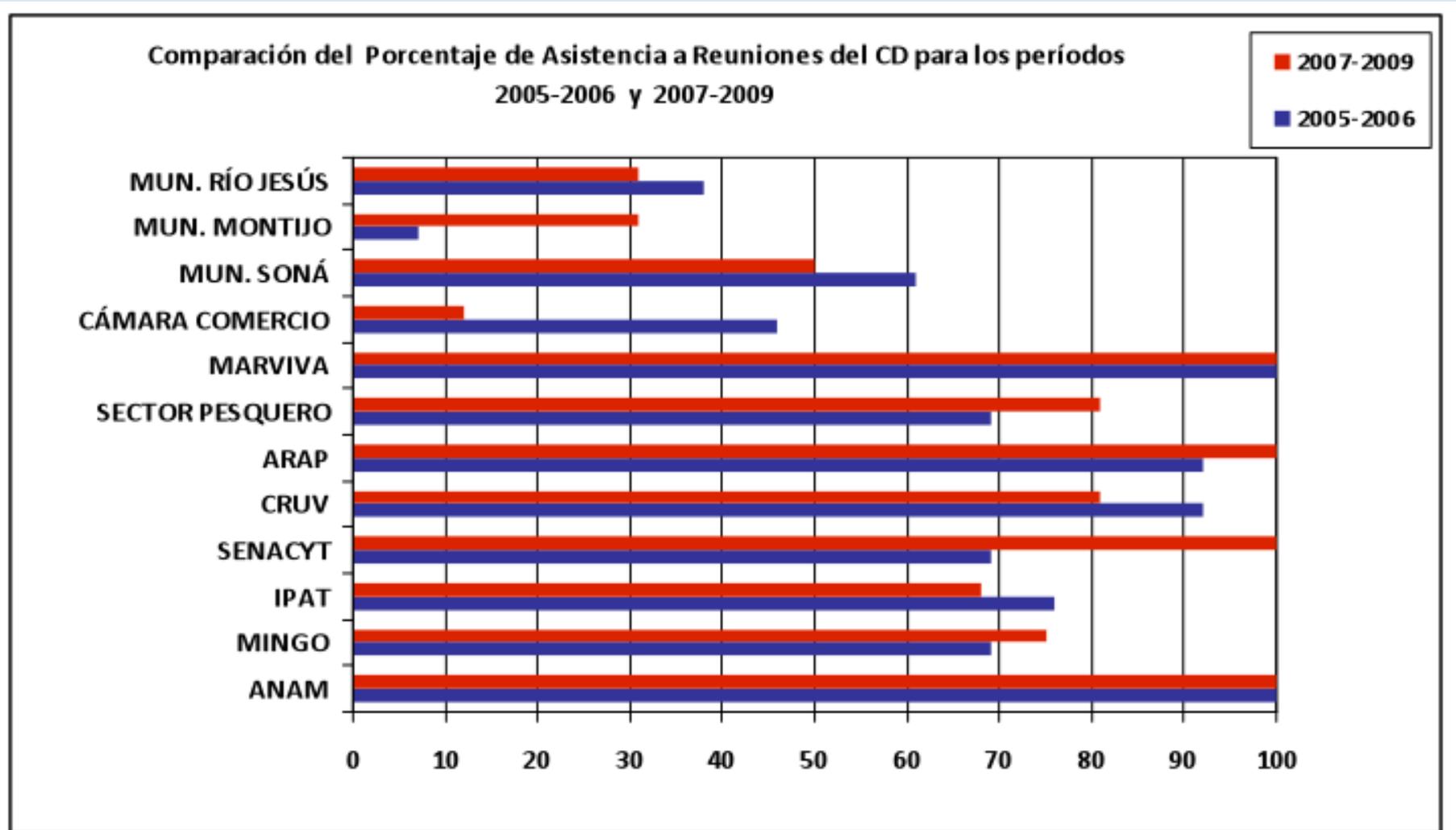
Porcentaje de Asistencia a las Reuniones del CD 2005-2009

Miembros con Voz y Voto

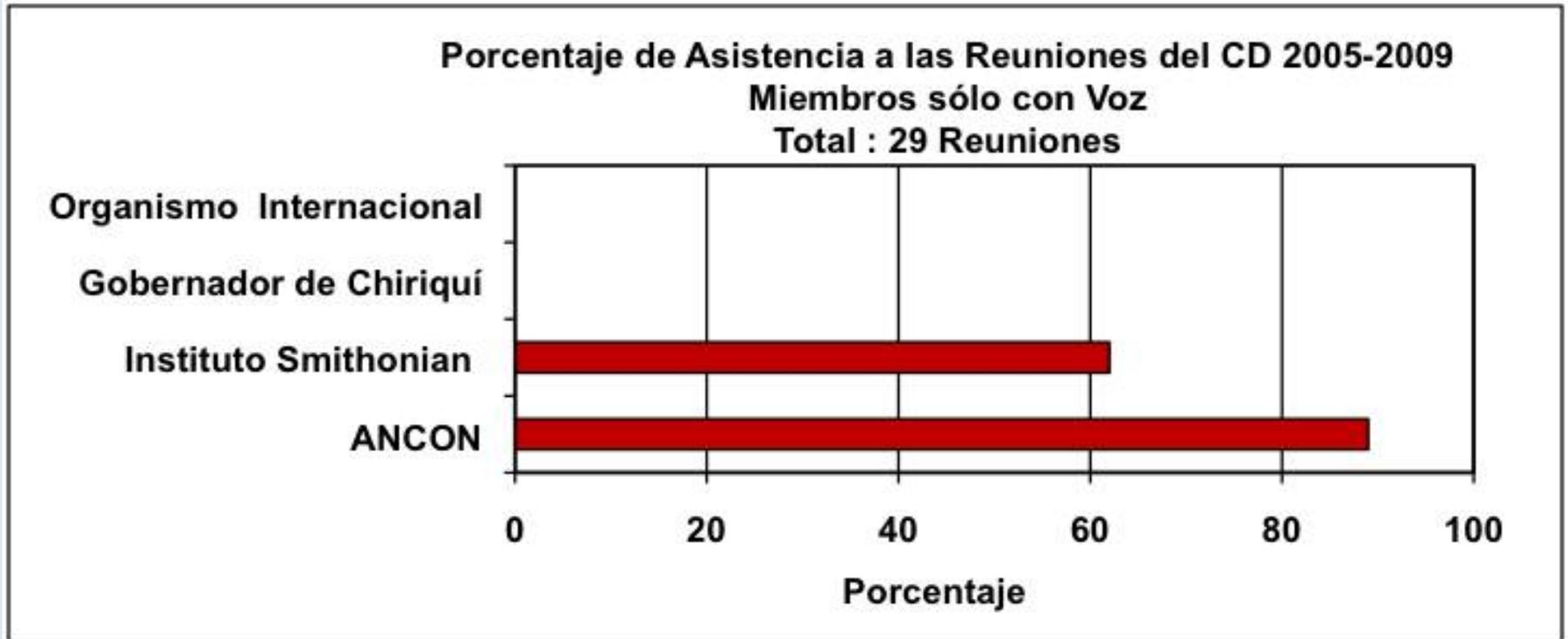
Total: 29 Reuniones



Trends in Attendance with Time

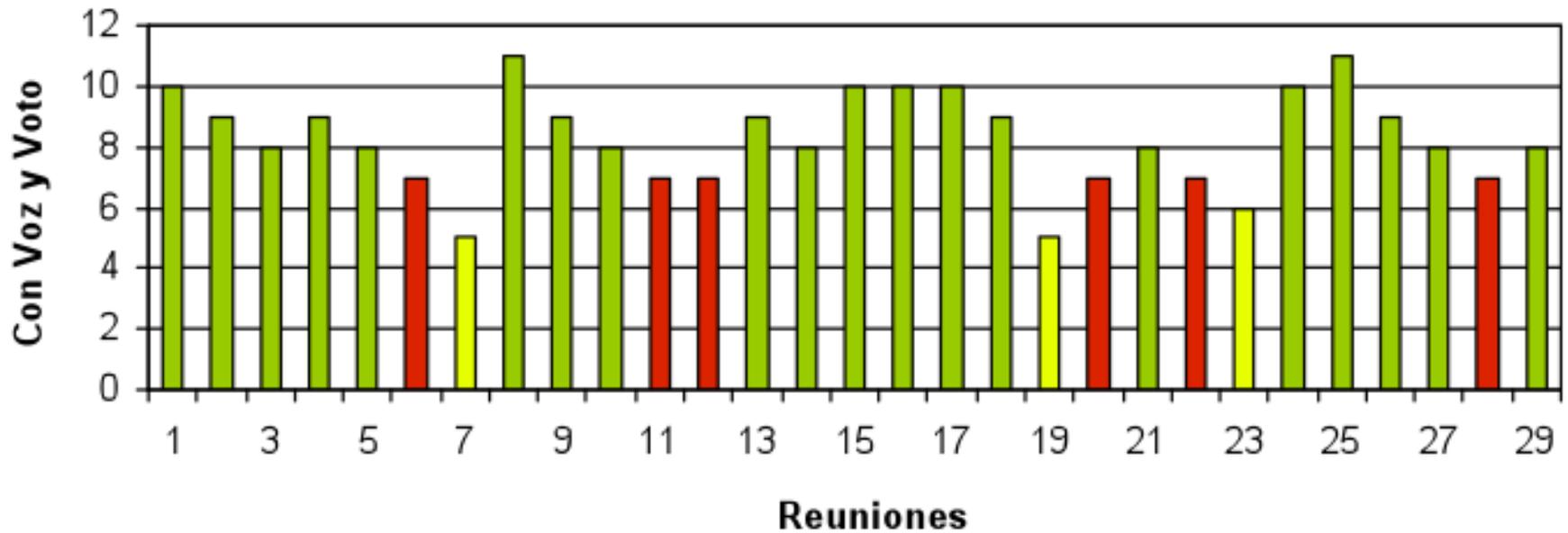


Trends in Attendance with Time (Non-Voting Members)



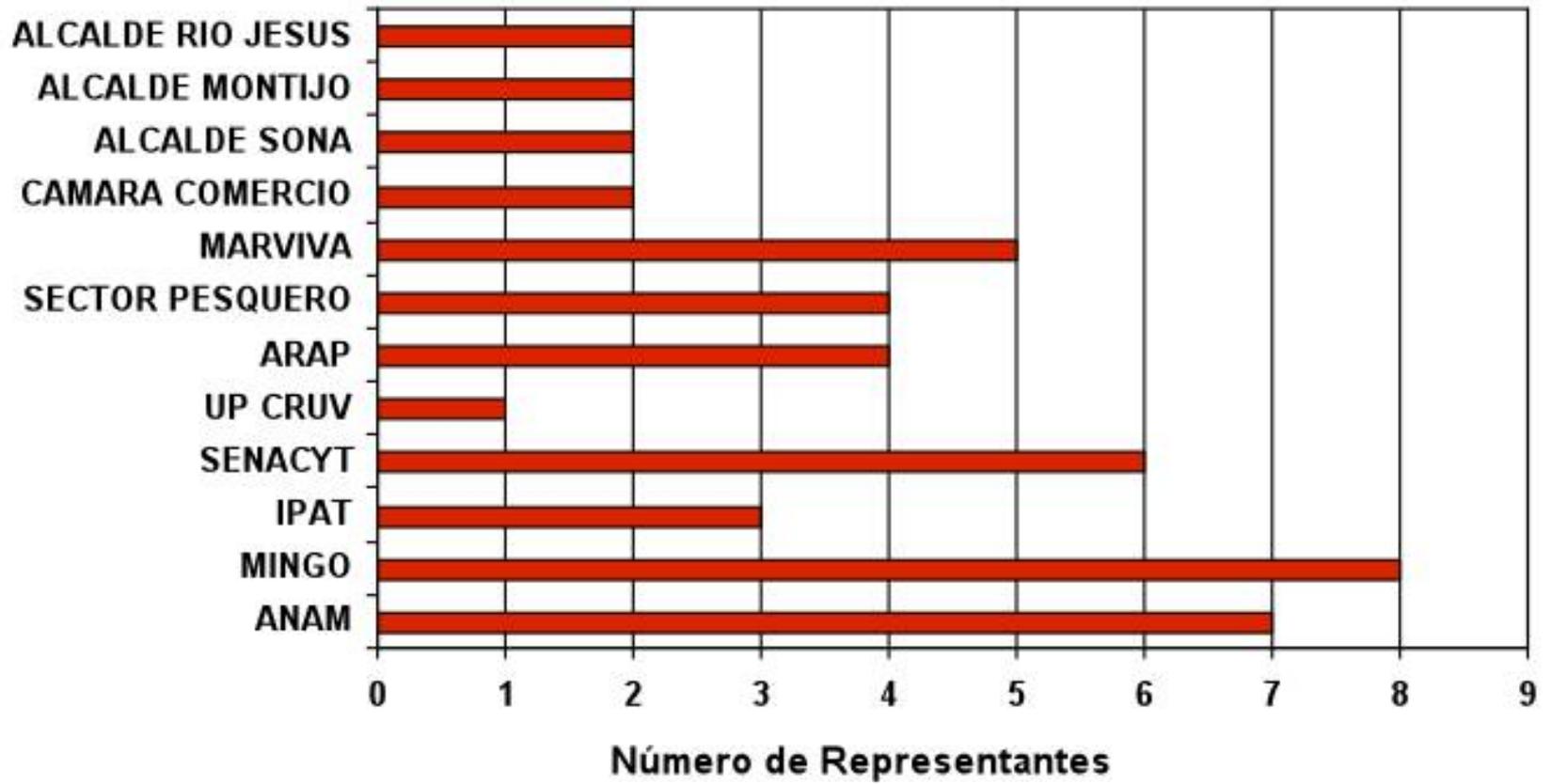
Quora at Meetings

Quórum de las Reuniones del CD



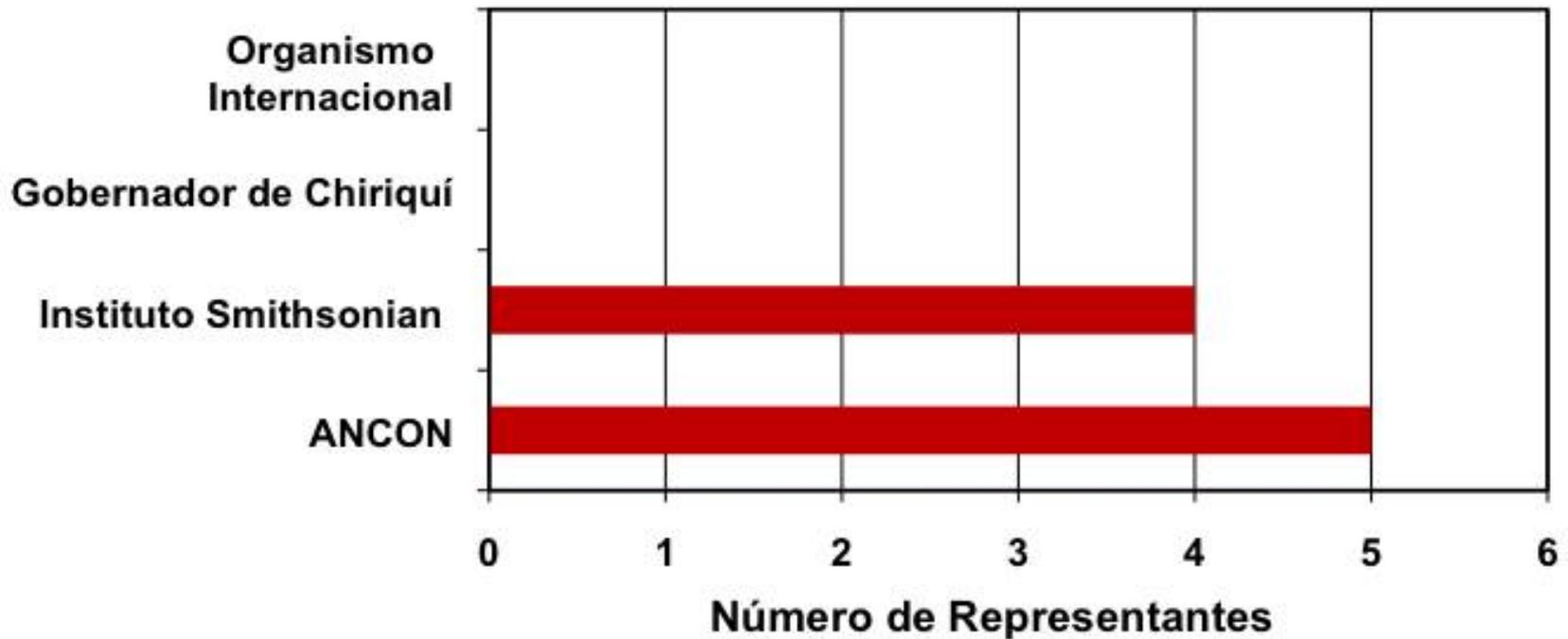
Representation Index

Índice de Representación



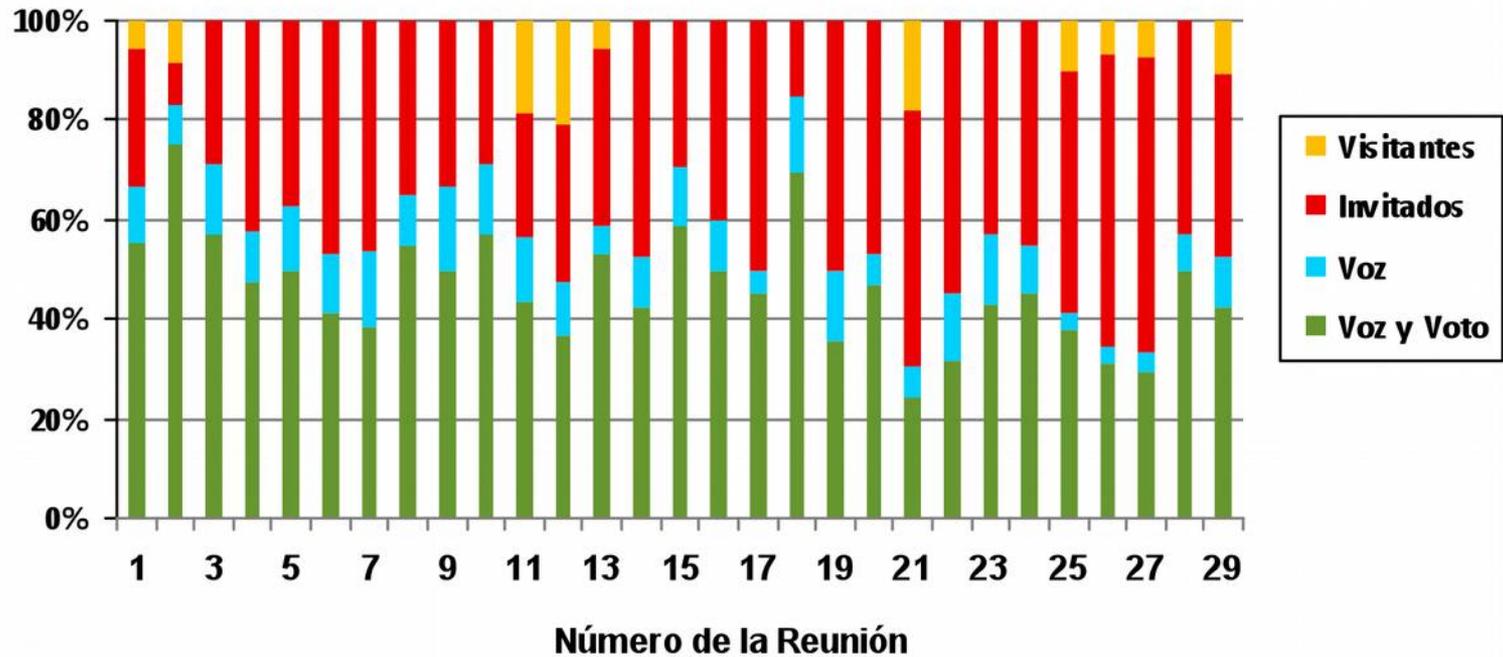
Representation Index

**Índice de Representación en las Reuniones del CD 2005-2009
Miembros con Voz**



Public Participation at Meetings

Categoría de los Representantes a las Reuniones del CD 2005-2009



Strengthening the PNC Management Council



Recommendations to Strengthen Governance of the PNC Management Council

- Improve coordination between the Management Council, the Scientific Committee, and the Fisheries Commission.
- The Scientific Committee and Fisheries Commission must be more efficient.
- Be strategic about meeting places.
- Improve attendance at meetings

Recommendations to Strengthen Governance of the PNC Management Council

- Recognize the great responsibility that Council Members have.
- Improve the internal organization of the Council.
- Increase transparency of Council operations.
- Include Transaction Costs in the Council budget.
- Promulgate regulations for management of the Coiba Fund.
- Critically assess emerging issues.

Coiba National Park

- The Management Plan designated a significant portion of the park area as a Marine Reserve. However, some areas are zoned exclusively for fishers of local communities in the PNC Buffer Zone.
- NGOs (CI, TNC, MarViva, Conservation Strategy Fund) have developed micro-financing projects to support initiatives from communities in the PNC Buffer Zone – guesthouses, small restaurants, dive shops, surf shops, boat captains.

Lack of Political Will

- 2018 – The Executive and Private Interests hope to grant a concession for a luxury hotel in Coiba National Park (UNESCO World Heritage Site) and build an airport on the island to facilitate access of tourists.
- They have ignored the Management Council in this process.
- In 2017, the Minister of the Environment was replaced due to her opposition to the President's development plans for Coiba National Park.

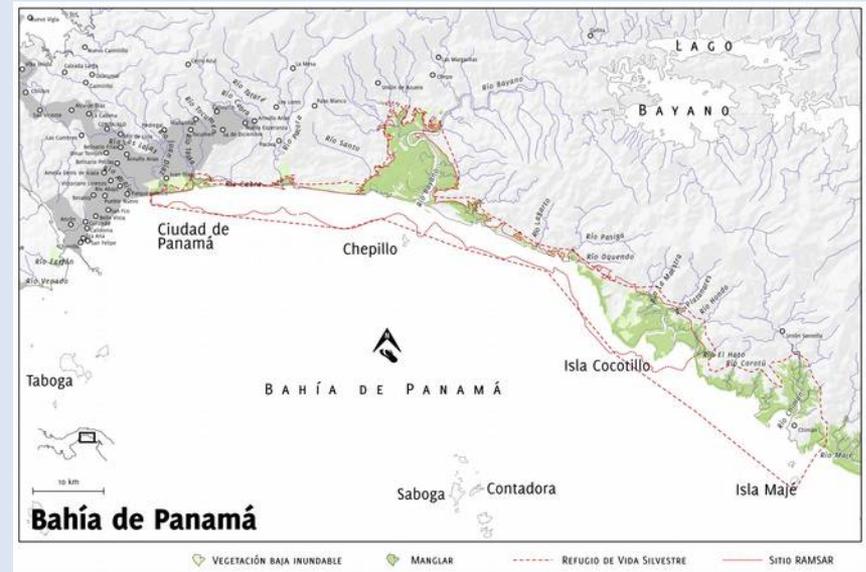
Institutional Fragmentation and Lack of Political Will

The Case of Panama Bay Wildlife Refuge and Ramsar Site (Panama)



Panama Bay Wetland Wildlife Refuge

- Over 2 million migratory shorebirds (more than 30 species) stop over at the Panama Bay Wetlands during their winter migrations from either the Southern or Northern Hemispheres.
- The Panama Government requested that the Panama Bay Wetlands be designated a Wetland of International Importance (Ramsar Convention List) in October 2003.



Migratory Shorebirds – Panamá Bay



More than 2 million shorebirds of more than 30 different species visit the mangroves and mudflats of Panama Bay during their annual migrations.

Panama Bay Wetland Wildlife Refuge

- In February 2009, the site was also designated as the “Panama Bay Wetland Wildlife Refuge”, forming part of the National System of Protected Areas.
- It extends more than 100 km from Panama City in the west to the border between Panama and Darien Provinces to the east and includes about 85,000 ha of mangrove forest. The wide tidal mudflats also form part of the Site.
- Due to the large number of migratory shorebirds, in 2005 the area has formed part of the Hemispheric Network of Shorebird Reserves and is known as the most important site in Central America.

Panama Bay Wetland Wildlife Refuge

- On 27 April 2012, the Panamanian Supreme Court temporarily suspended the regulation of the National Environment Authority (ANAM) that created the Panama Bay Wetland Wildlife Refuge.
- The western sections of the Wetland near Panama City are urban expansion areas and the temporary injunction facilitated land reclamation and mangrove clearing for housing and tourist developments.



Panama Bay Wetland Wildlife Refuge

- Soon after on 23 May 2012, the Panamanian Aquatic Resources Authority (ARAP) promulgated a resolution that decreased by 90% the cost of permits for removing mangroves, as well as the fines for unpermitted mangrove removal.
- In May 2012 the Ministry of Housing and Land Use (MIVIOT) began revising its land use plans for properties inside coastal wetlands and suggested a reduction in the limits of the Refuge.



Panama Bay Wetland Wildlife Refuge



- In June 2012, the Panama City Municipal Government emitted a decree that suspended filling of wetlands and movement of soil in the Juan Díaz and Tocumen Wetlands until **someone** performed scientific studies.

Construction activities continued,
however. . . .



Pressure from Development Projects



Google earth

Límites del AP Bahía de Panamá	Santa María Golf & Country Club	Área de Embarcadero de Juan Díaz	Balboa Academy
Límites del Sitio Ramsar	Equipos Furia Roja	Puerto de Juan Díaz	Parque Industrial Zona Sur
	Planta de Tratamiento de Aguas Residuales	Costa Linda	Biadel Management, S.A.
	Desarrollo Los Alcazares, S.A.	Planta de Acetoxígeno	Versailles
	Metro Park	Intra Group	Centro Comercial Costa Sur
	La Marina	Colegio Panamá	Panama Bay Country Club
	Costa Sur	PH Boulevard Corredor Sur	Costa del Sol (Panatrópolis)

Conflict Area

- In the area of Juan Díaz south of the Southern Expressway there are 21 projects either proposed or under construction. Four of these are within the limits of the protected area.
- Some of the projects are backed by investors from the highest levels of government.

Santa María Country Club



Developer = Ideal Living Corporation



Ideal Living Corporation?



Parque Industrial Zona Sur



PARQUE INDUSTRIAL

F&F Properties
Tel: 940-9000
Fax: 940-8810
US Toll Free: 1 781 207 6619
Web: www.fproperties.net

- ▼ Acceso directo desde el Corredor Sur
- ▼ A tan solo 3 minutos del Aeropuerto Internacional de DFW y a 7 minutos de la ciudad
- ▼ Edificios de Almacenes y Oficinas
- ▼ Edificios emplazados en lotes que van desde 300 mts² hasta 50,000 mts²
- ▼ Edificios de una sola planta o con mezzanine
- ▼ Todos los edificios con provisiones para oficina
- ▼ Sistema de cableado eléctrico y de comunicación terminado
- ▼ Área ventas
- ▼ Garita de seguridad
- ▼ Cerca perimetral para seguridad

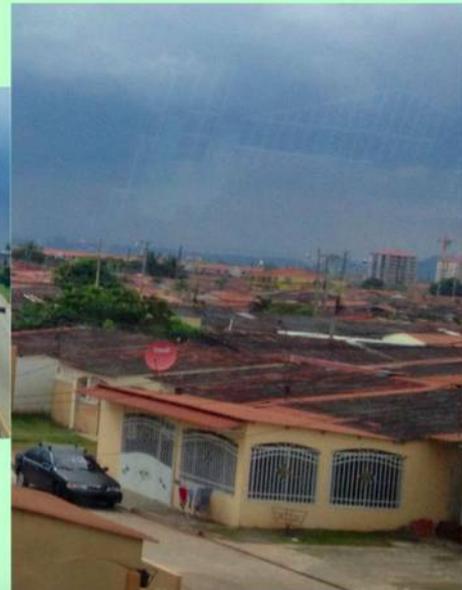
Y mucho más...

bt
BUILDING TECHNOLOGIES

Risks of Flooding – Environmental Justice Issues

An Expressway and Filling of the Mangrove Ecosystem increase the risk of flooding in low income neighborhoods.

La autopista Corredor Sur junto con el Relleno de los Manglares aumentan el Riesgo de Inundación para muchas Viviendas Populares.



Environmental Group Campaigns

- Panamanglar – www.panamanglar.org - This was a coordinated project of 20 environmental NGOs that attempted to educate the public about the importance of the mangrove ecosystem.
- Articles in the national press and communication media
- International campaign (IUCN, Audubon Society, Mangrove Action Project)
- Meetings in communities at risk of flooding due to the filling of mangroves

Supreme Court – December 2013

- On December 23, 2013 the Supreme Court reestablished the Panama Bay protected area.
- The court also called on environmental authorities to aggressively defend the public interest in Panama Bay Wetlands and noted their deficiencies in this arena.

Law No. 1 of 2015

- The National Assembly declared the Panama Bay Wetlands Ramsar Site a Wildlife Refuge. The vehicle was a LAW (stronger than the prior RESOLUTION).
- The boundaries would be the original boundaries.
- Environmental authorities should develop a management Plan within 2 years.
- Coordination between institutions of the Central Government and the Municipalities.

Law No. 1 of 2015

- Prohibitions
 - Cutting, removal, filling of mangroves and all activities that could affect their hydrology
 - Deposit of solid wastes
 - Release of pollutants into the marine and river waters
 - All new infrastructure
 - Entrance of new occupants and residents

The Challenge

- The opinion of the Supreme Court (2013) and Law No. 1 of 2015 represented victories for the Ramsar Site and environmentalists. However, today mangrove removal and filling continue in areas adjacent to Panama City.



Panama Bay Wetland Wildlife Refuge

- The final outcome of this conflict is still open. . . .
- Environmental groups are organized.
- The question is whether the government will realize the important ecosystem functions that mangroves provide.
- As of August 2018, the Management Plan has not been developed.





¡SALVA MANGLARES PARA QUE
SALVEN tu Vida!



Community Involvement

Principles of Public Participation - 1

- The public has a right to participate in and contribute to decisions that affect their livelihoods.
- Public participation includes a promise that participation will contribute to influencing the final decision.
- The process communicates the interests of all participants with fairness.
- Public participation searches for and facilitates the involvement of all persons who could potentially be affected.



Principles of Public Participation - 2



- Public participation offers participants the opportunity to determine how they will participate.
- The process offers participants the information they need to participate effectively.
- The process informs participants how their contribution affected the final decision.
- Participation is dynamic (It continues.)

Community Involvement

- Engaging fishers and other users usually improves outcomes.
- At all points in the process
 - Initial research and monitoring
 - Selection of Marine Reserve sites
 - Implementation
 - Monitoring
 - Adaptive management



Social Impacts – Who Gains? Who Loses?

EQUITY

- Often users who are excluded from Marine Reserves may be considered “losers”. They may experience lost livelihood opportunities, increased poverty, exclusion from management, or displacement. Thus, fishers may be opposed to Marine Reserves.
- It is difficult for them to see that Marine Reserves can be important fishery management tools that may promote sustainable fisheries. These are long-term benefits.

Social Impacts – Who Gains? Who Loses?

- Transition period to minimize the economic impacts of Marine Reserves for the “losers” – -
phaseout of fisheries over time
 - training for alternative livelihoods
 - fisheries buyouts
 - TURF-reserves
 - treating Marine Reserves as a business with users as shareholders who could obtain a return on their investment in the future
- Benefit-sharing with local communities

Variations of Public Participation Mechanisms

- Informational Materials
- Technical Reports
- Newspaper Articles
- Information Centers
- Web Sites
- Expert Panels
- Interviews with the Public



Variations of Public Participation Mechanisms

- Surveys
- Focal Groups
- Public Hearings
- Advisory Councils
- Workshops
- Visioning Exercises
- Referenda



Spectrum of Public Participation

Increasing Level of Public Impact



INFORM

CONSULT

INVOLVE

COLLABORATE

EMPOWER

INFORM

CONSULT

- Accept objectives from the public that helps iterative, and establish the response, opportunities, alternatives, and potential solutions.
- SURVEYS
- WEBSITES & SOCIAL MEDIA
- PUBLIC MEETINGS
- INFORMATION FACT SHEETS
- FOCAL GROUPS
- PUBLICATIONS FOR PUBLIC COMMENTS
- RADIO & TV PROGRAMS
- SOCIAL MEDIA FEEDBACK

INVOLVE

COLLABORATE

- ~~Worked participatory with the public bringing a perspective of the decision including the development of alternatives and the selected option.~~
- WORKSHOPS
- ~~ADVISORY COUNCIL~~
- EXERCISES TO FORMULATE A VISION FOR THE FUTURE –
- ~~CONSENSUS~~-BUILDING EXERCISES
- PARTICIPATORY DECISIONS

EMPOWER

- Place the final decision in hands of the public
- PUBLIC JURY
- REFERENDUM
- DELEGATED DECISION TO A MANAGEMENT COUNCIL

The Case of the Florida Keys National Marine Sanctuary (FKNMS)

- The US Congress created the FKNMS in 1990 without a Management Plan.
- It took the responsible agency (NOAA) 6 years to develop a Management Plan.
- NOAA used the typical public participation strategies – public hearings and publications, as well as a Sanctuary Advisory Council.
- The planners were from NOAA Headquarters – which local users resented.
- Local opposition to the FKNMS was fierce.



FKNMS Sanctuary Advisory Council

- Community-based advisory council required from the 1990 legislation that established the FKNMS.
- Sanctuary Advisory Council provides advice and recommendations that the Sanctuary Superintendent **may** accept.
- Voting Membership – boating industry, conservation groups, dive shops, environmental education groups, fishing sector, scientific research, submerged cultural resources, tourism sector, local government

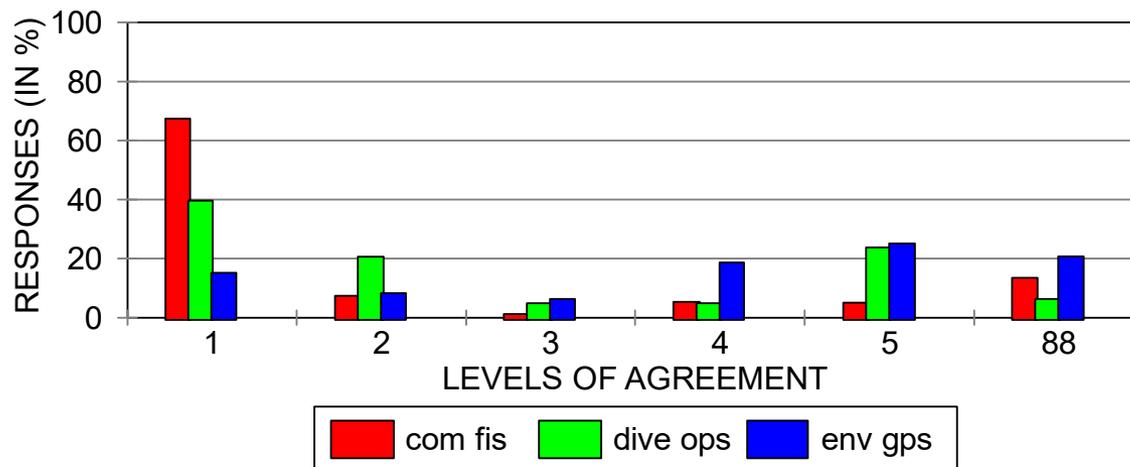
FKNMS User Perceptions

- Our research involved surveys of hundreds of persons from different user groups – commercial fishers, dive operators, and environmental group members.
- We assessed their perceptions of the FKNMS planning process, zoning, socio-economic impacts, as well as their sources of information about the FKNMS.

Stakeholder Perceptions – Florida Keys National Marine Sanctuary

Surveys of User Groups

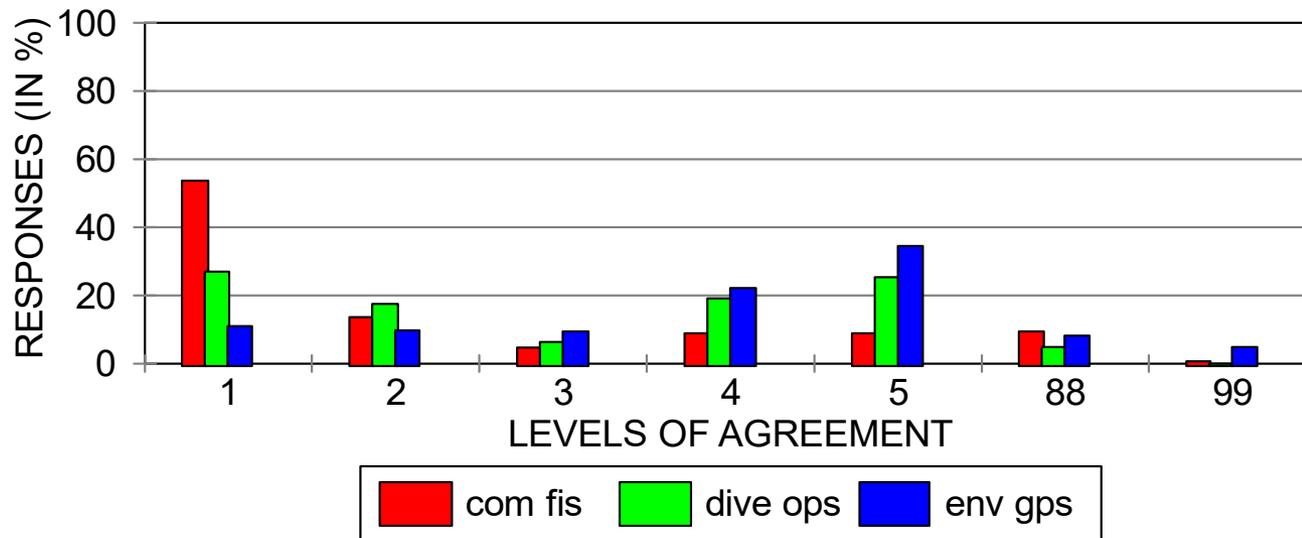
OPINIONS WILL NOT MATTER WHEN SANCTUARY REGULATIONS ARE ENACTED



Stakeholder Perceptions – Florida Keys National Marine Sanctuary

Surveys of User Groups

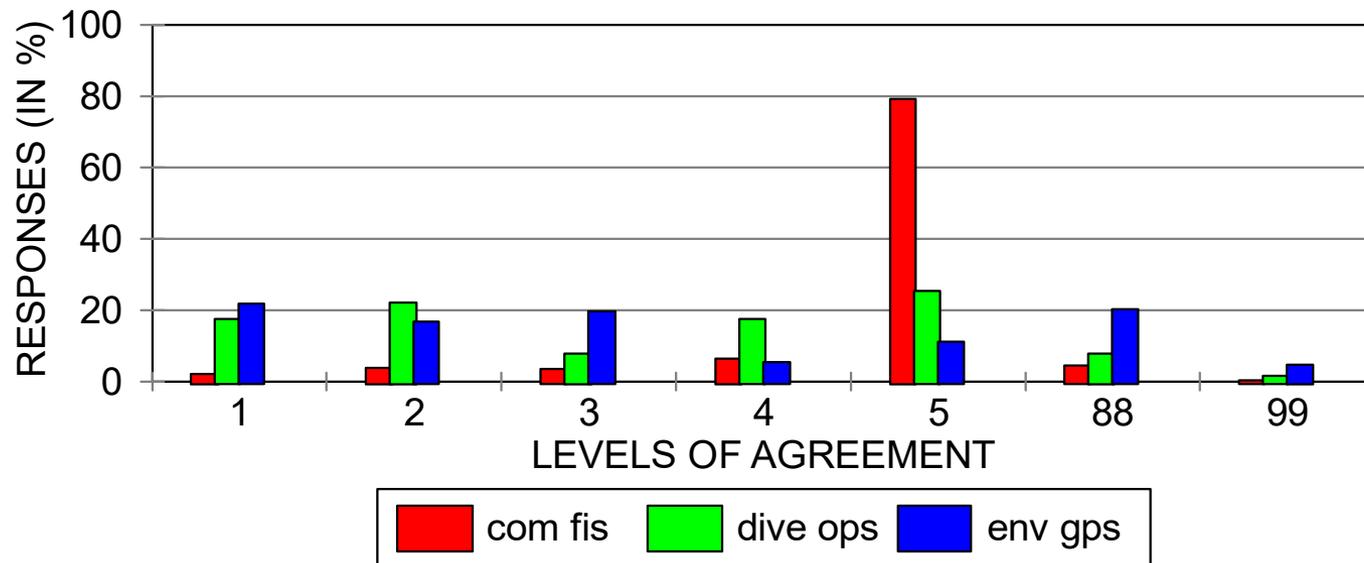
PARTICIPATION CANNOT MAKE A DIFFERENCE IN THE SANCTUARY PROCESS



Stakeholder Perceptions – Florida Keys National Marine Sanctuary

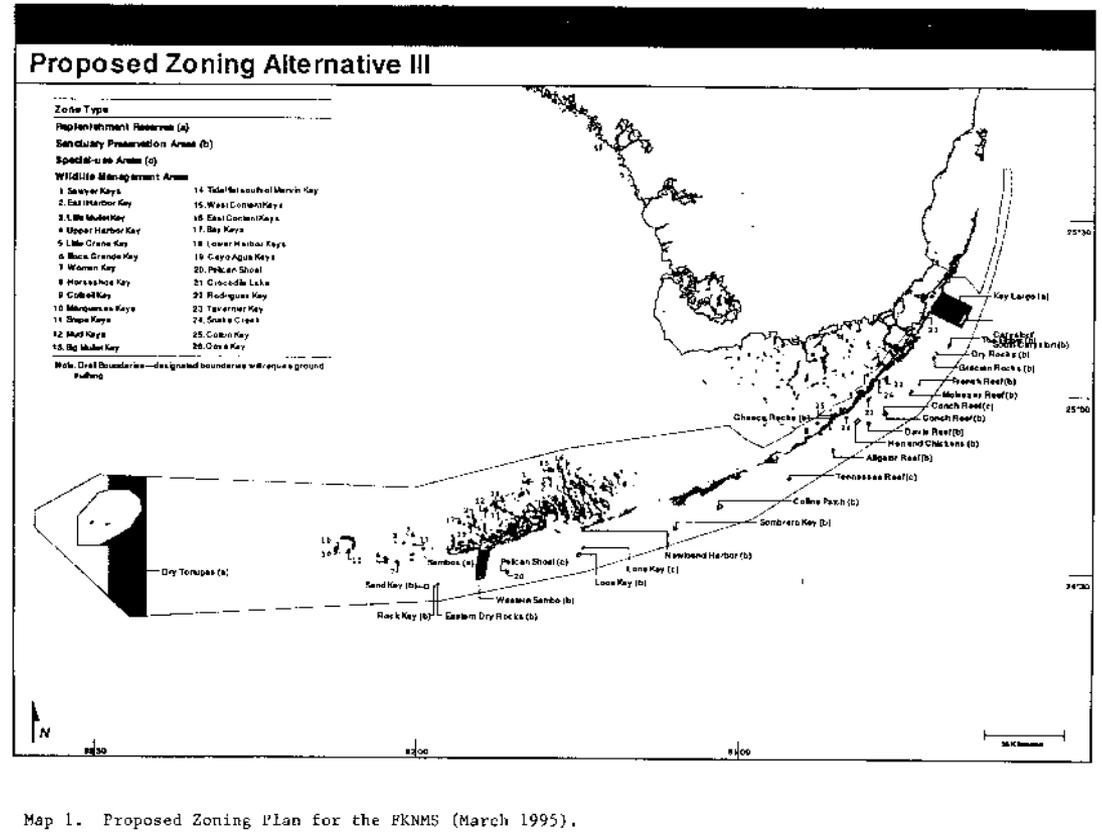
Surveys of User Groups

I SUPPORT ESTABLISHING ZONES AS PROPOSED IN THE SANCTUARY PLAN



Florida Keys National Marine Sanctuary

In 1996 NOAA published the Draft Management Plan. The most controversial topic was marine zoning.

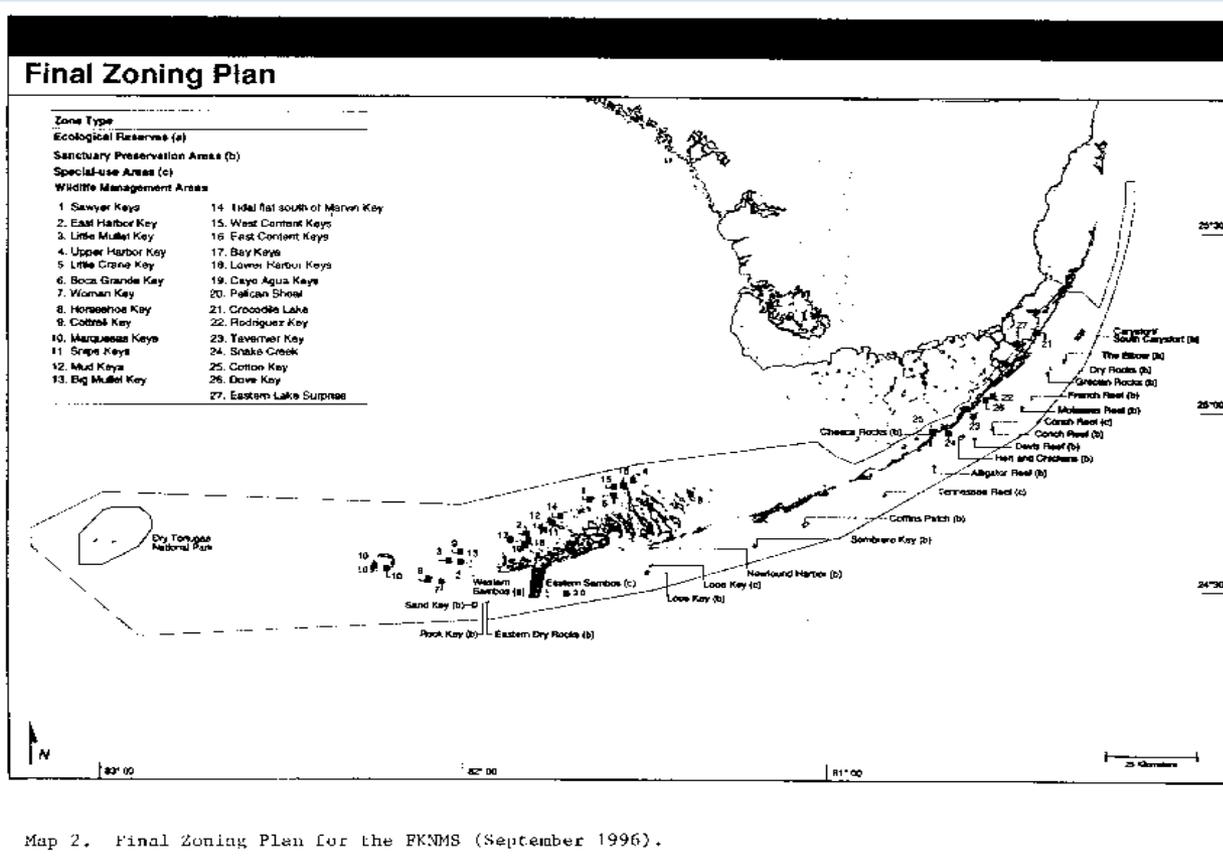


Florida Keys National Marine Sanctuary

- NOV 1996 – In a Non-Binding Referendum, residents of the Florida Keys rejected the FKNMS 55% to 45%.
- 1997 – As a result of the strong opposition, NOAA revised the Draft Management Plan and published the Final Management Plan.

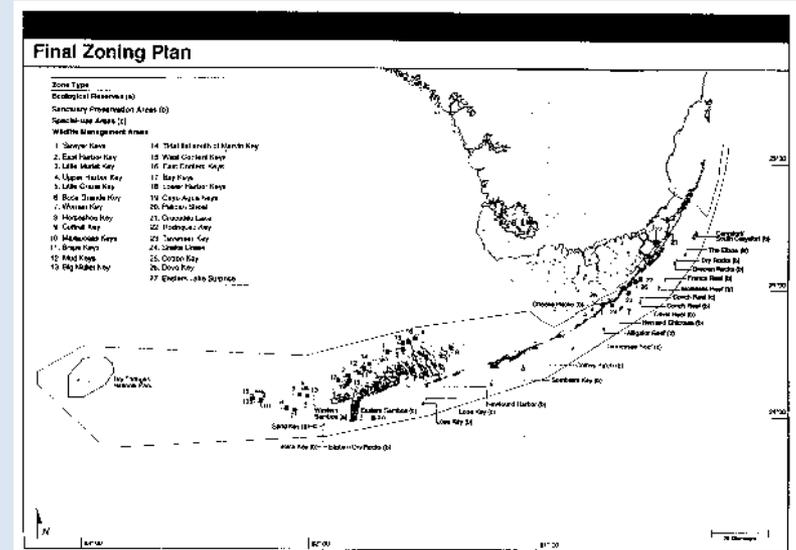
Florida Keys National Marine Sanctuary

The Final Zoning Plan eliminated 2 of the 3 Marine Reserves.



FKNMS and Tortugas 2000

- The Final Management Plan highlighted the goal of creating a Marine Reserve “somewhere” in the far west of the FKNMS.
- Strong opposition from fishers



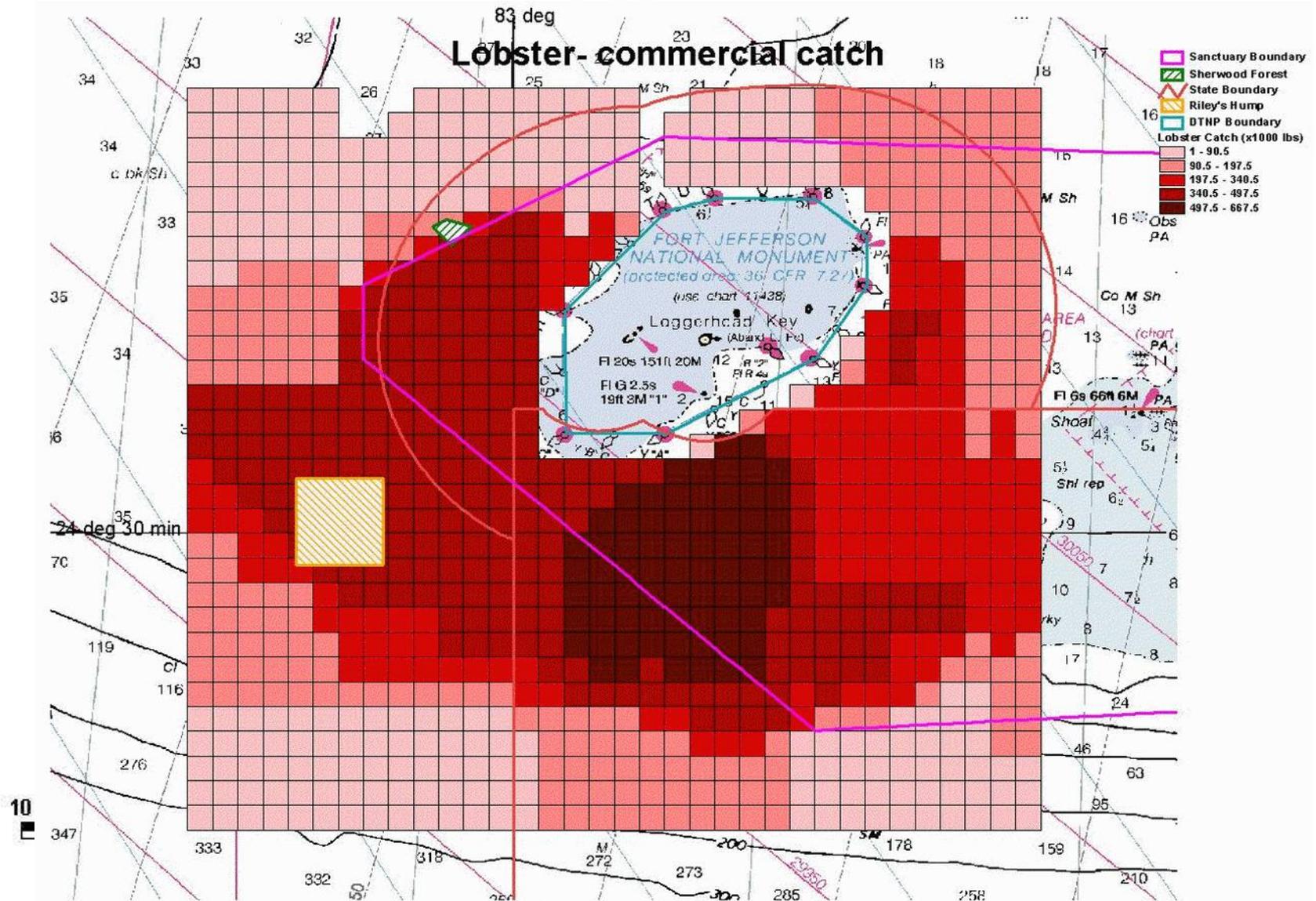
FKNMS and Tortugas 2000

- A 24-Member Working Group was formed in 1998.
- Members represented the different fishing communities, environmental groups, scientific communities, and regulatory communities.
- Their task was to recommend limits to the Dry Tortugas Marine Reserve.
- “Consensus” was the ground rule. Without consensus, there would be no Marine Reserve.

FKNMS and Tortugas 2000

- The Working Group heard scientific and socio-economic evidence about the Dry Tortugas Area.
- Taking into account the trans-disciplinary evidence, the Working Group decided unanimously for limits to a Marine Reserve in the Dry Tortugas region of the FKNMS.

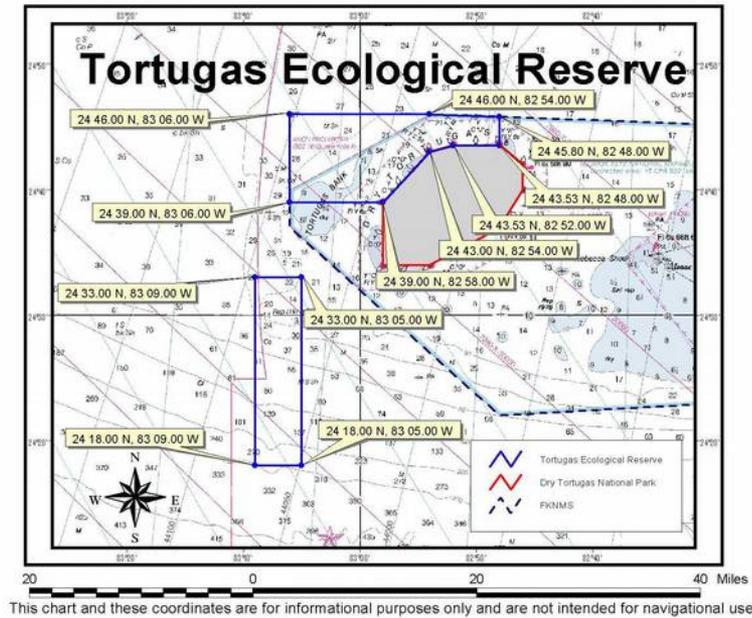
Caribbean Spiny Lobster Catch in the Dry Tortugas Area



These data are intended for informational purposes and should not be considered authoritative for navigational, legal, and other site specific uses.

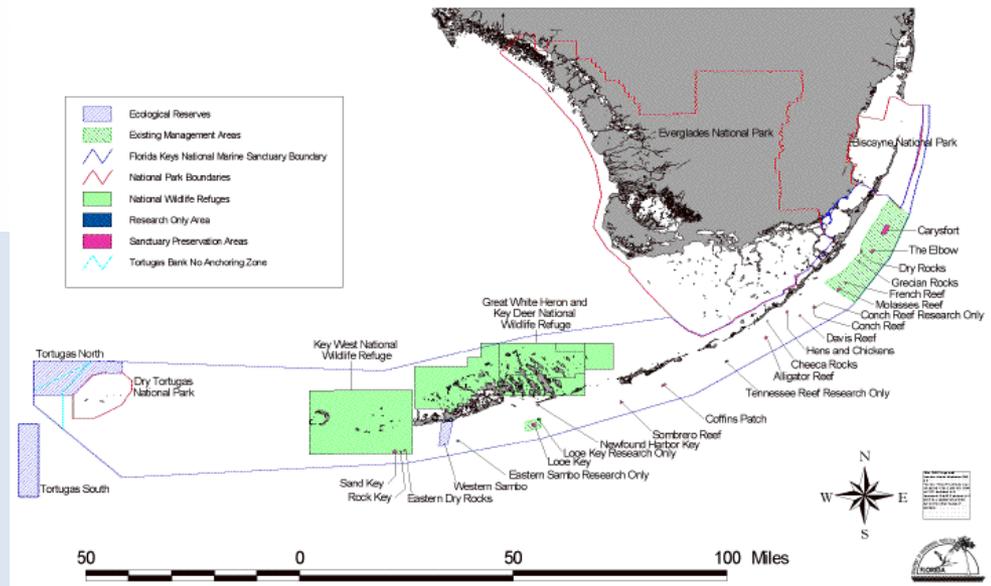
FKNMS and Tortugas 2000

The Dry Tortugas Marine Reserve (almost 500 km² in area) was implemented in 2001.



Without the participation and consensus of all the stakeholders, the Marine Reserve would have been impossible.

Florida Keys National Marine Sanctuary



FKNMS Restudy

- We repeated the 1996 surveys in 2006 among three different groups (commercial fishers, dive operators, and environmental group members).
- Surveys showed increased support for the FKNMS and NOAA's efforts – as well as remaining doubts among significant sectors of commercial fishers.

FKNMS Restudy (Commercial Fishers)

Question	Strongly Agree & Agree		Disagree & Strongly Disagree	
	1996	2006	1996	2006
NOAA process to develop boundaries for zones was open and fair to all groups.	8.9%	27.6%	61.6%	51.4%
NOAA has not addressed the concerns of citizens in developing FKNMS regulations.	75.6%	58.1%	7.3%	24.3%
FKNMS zones have reduced conflicts between user groups.	11.4%	22.4%	74.8%	57.3%
I support establishment of FKNMS zones as they currently exist.	5.7%	39.6%	86.2%	48.3%

FKNMS Restudy (Commercial Fishers)

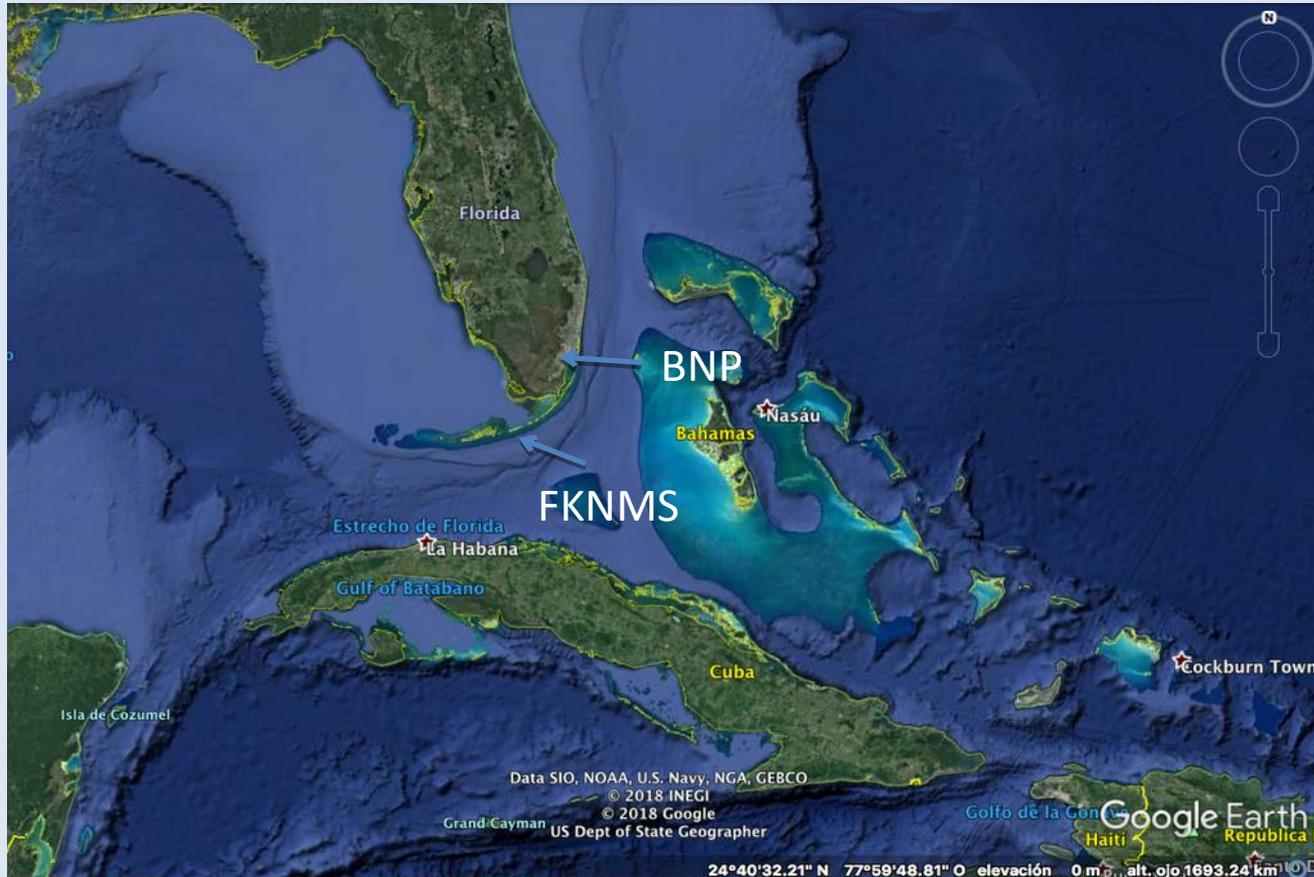
Question	Strongly Agree & Agree		Disagree & Strongly Disagree	
	1996	2006	1996	2006
Once FKNMS regulations have been adopted there is no way an average person could voice his/her opinion on their usefulness.	77.2%	63.1%	10.7%	20.7%
The Florida Keys have experienced a net economic benefit from the FKNMS.	16.4%	39.4%	69.7%	44.5%
I generally support establishment of the FKNMS.	12.7%	41.7%	78.4%	42%

Opposition from Resource Users

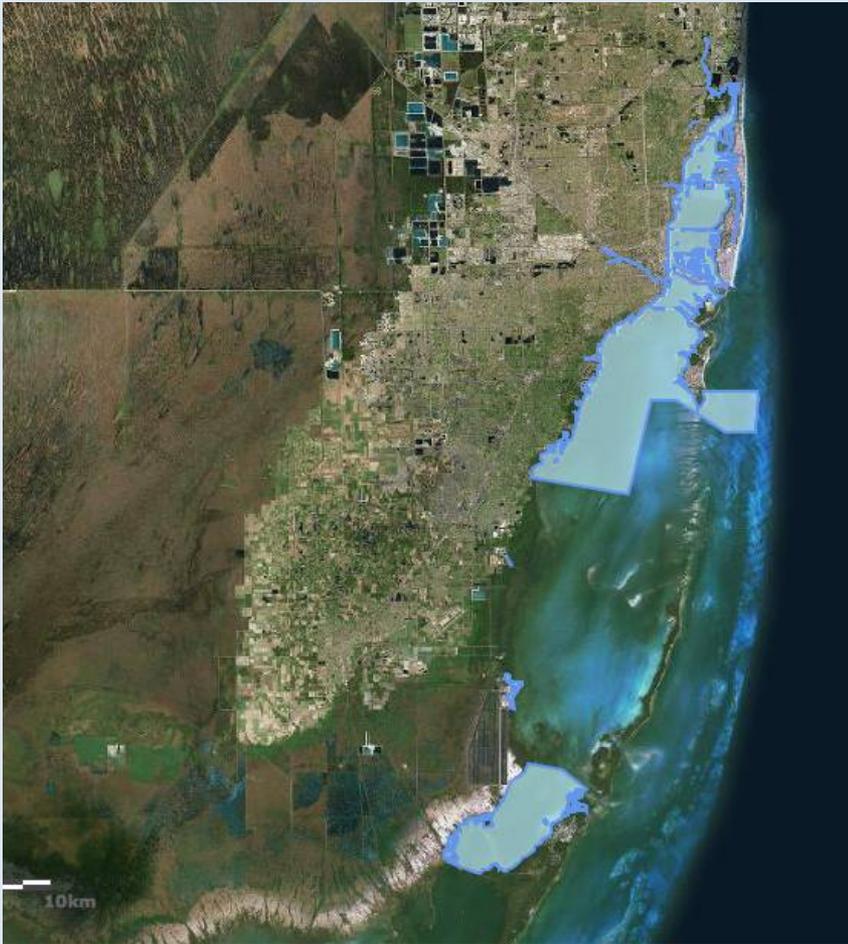
Challenges to Creation of a Marine Reserve

**The Case of Biscayne National Park
(Florida, USA)**

Biscayne National Park (BNP)

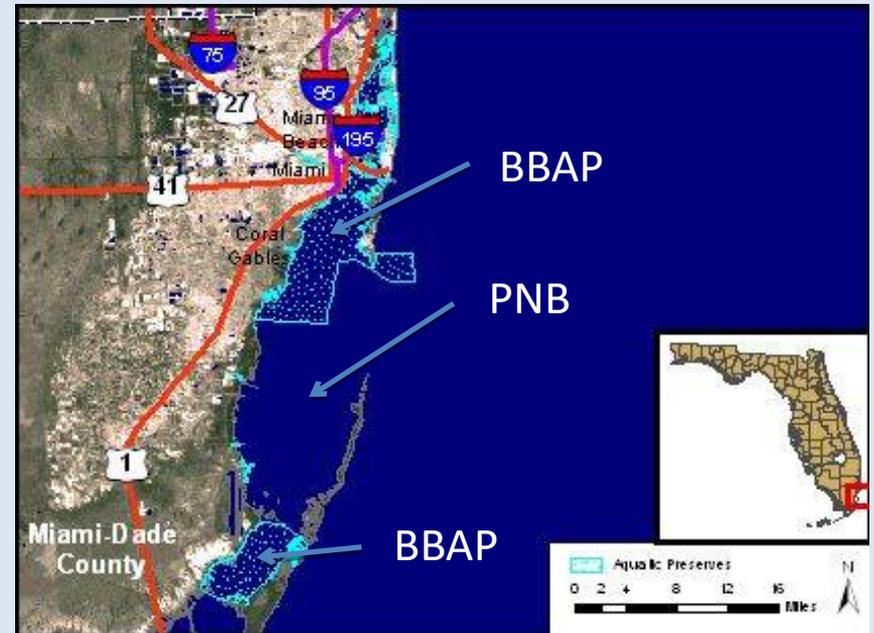
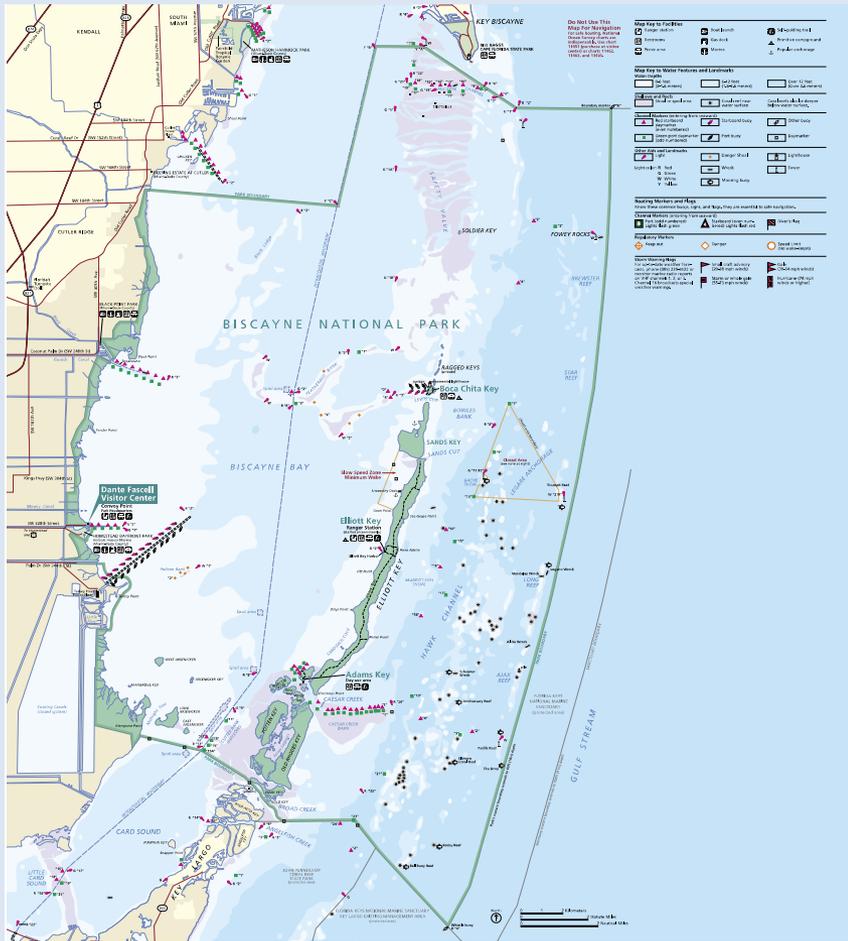


Biscayne National Park and Miami



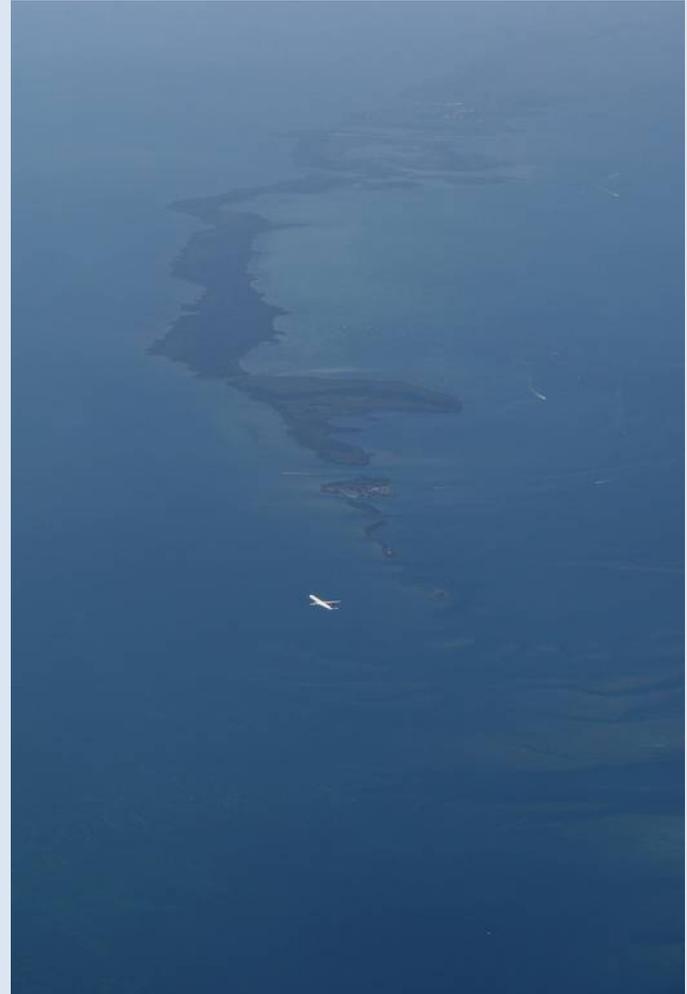
- Biscayne Bay extends 56 km from north to south.
- It is adjacent to Miami –an urban zone with 2.6 million residents
- Shallow Bathymetry
- From west to east, BNP has 1,953 ha of mangroves, shallow Biscayne Bay, 42 key islands, and open ocean to 18 meters depth.

Map of Biscayne National Park

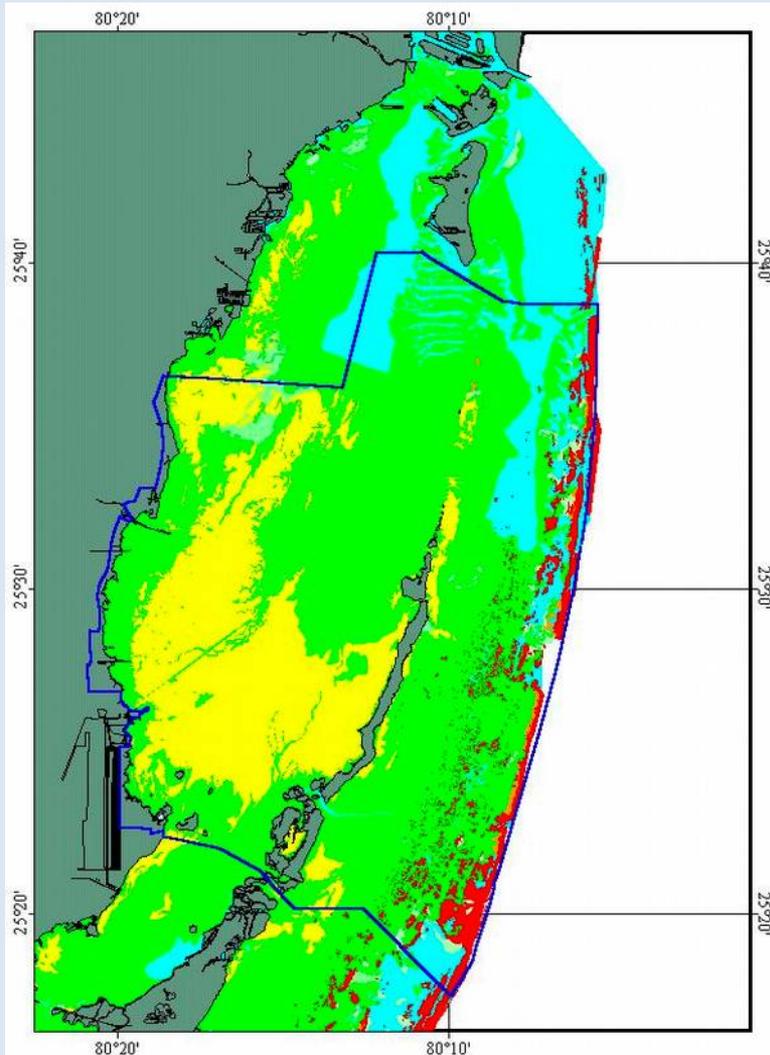


Biscayne National Park (BNP)

- Biscayne is the largest marine park in the National Park System (702 km²).
- Over 95% of the park area is marine. Only 5% is terrestrial (fringing mangroves and coralline barrier islands).
- BNP includes the northernmost extent of the Florida Keys coral reef tract that extends 320 km to the southwest (3rd longest in the world).



Benthic Habitats in BNP



Seagrass Beds – Green

Mix of Hard Bottom
and Seagrass Beds –
Yellow

Sand and Mud – Blue

Coral Reefs – Red

History of Biscayne National Park

- 1968 – Congress designated Biscayne National Monument by law and managed to block urban development that would have converted the area into “Islandia”, a “Miami Beach II”.
- 1980 – Congress expanded the park limits northward and declared the entire area Biscayne National Park.
- 1983 – 1st General Management Plan was approved
- 2001 – Start of the process to revise the Management Plan (Scoping Meetings)
- 2003 - 2009 – Many rounds of evaluation meetings

History of Biscayne National Park

- 2011 – National Park Service (NPS) published a Draft General Management Plan together with a DEIS with proposals for a Marine Reserve.
- 2013 – The Planning Team added 2 more alternatives in a Supplement to the Draft Plan.
- 2014 – 3 more public hearings
- MAY 2015 – NPS released a Final General Management Plan and FEIS.
- 31 AUG 2015 – Approval of the Final Plan by the NPS. (Record of Decision)
- During the entire process, NPS organized 24 public hearings and received over 43,000 written comments.

Uses of Biscayne National Park

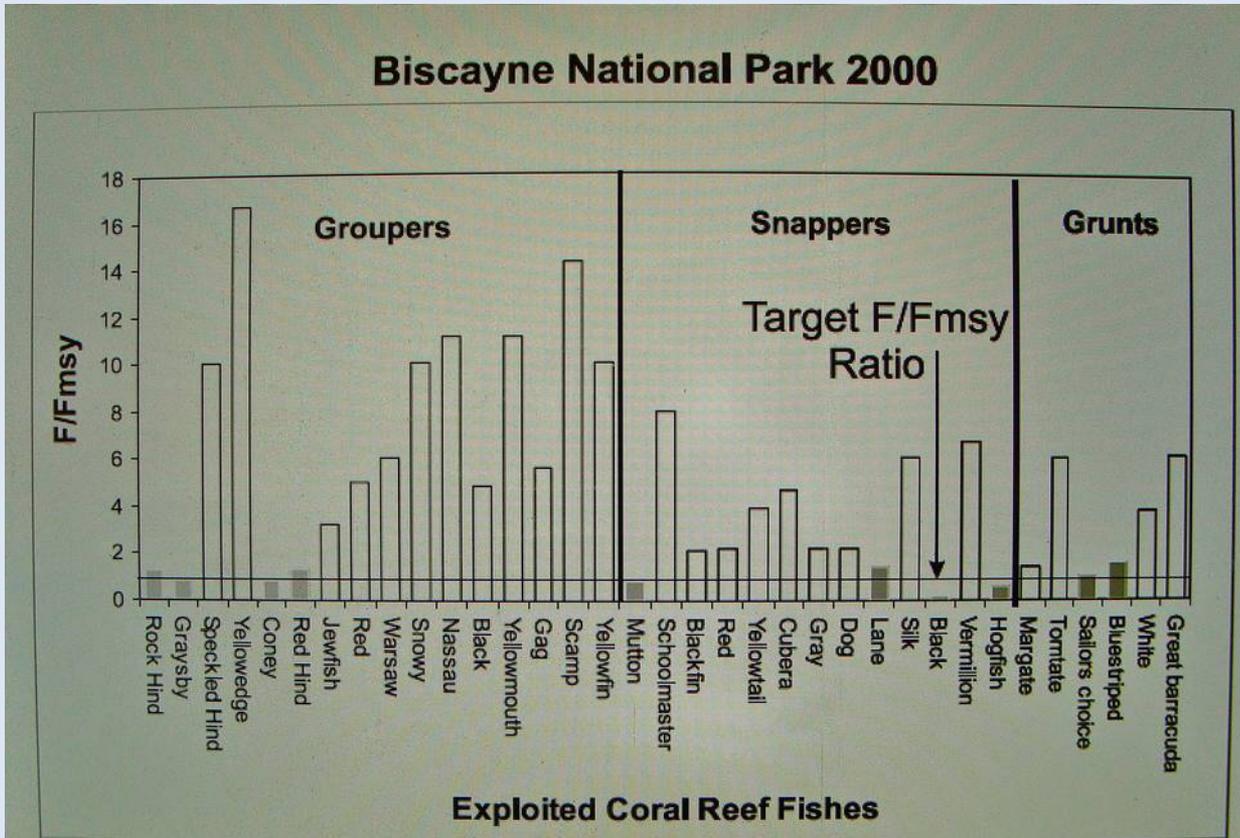
- Limited Commercial Fishing for Pink Shrimp
- Recreational Fishing
- Recreational Boating
- Diving
- Maritime Transportation
- Eco-Tourism
- Scientific Research

Over 486,848 persons visited the Park in 2013. The majority entered by small craft and did not even know that they were in a National Park.

Inter-Governmental Management Challenges

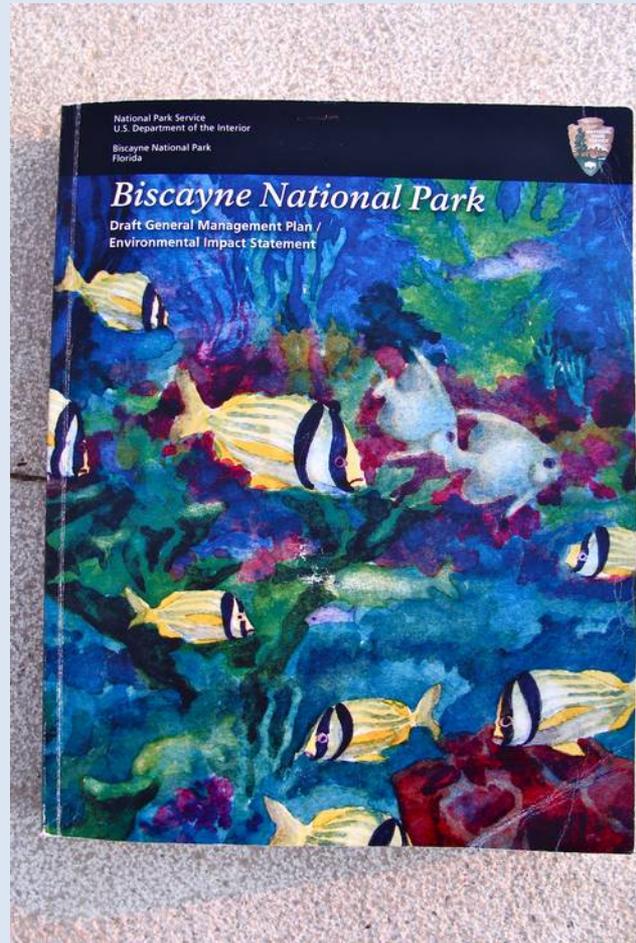
- By law the State of Florida maintains ambiguous control over fishing activities in the marine areas of Biscayne National Park.

Overfishing of Reef Fish



Many species of reef fish (snapper and grouper) are over-exploited.

Draft General Management Plan (2011)



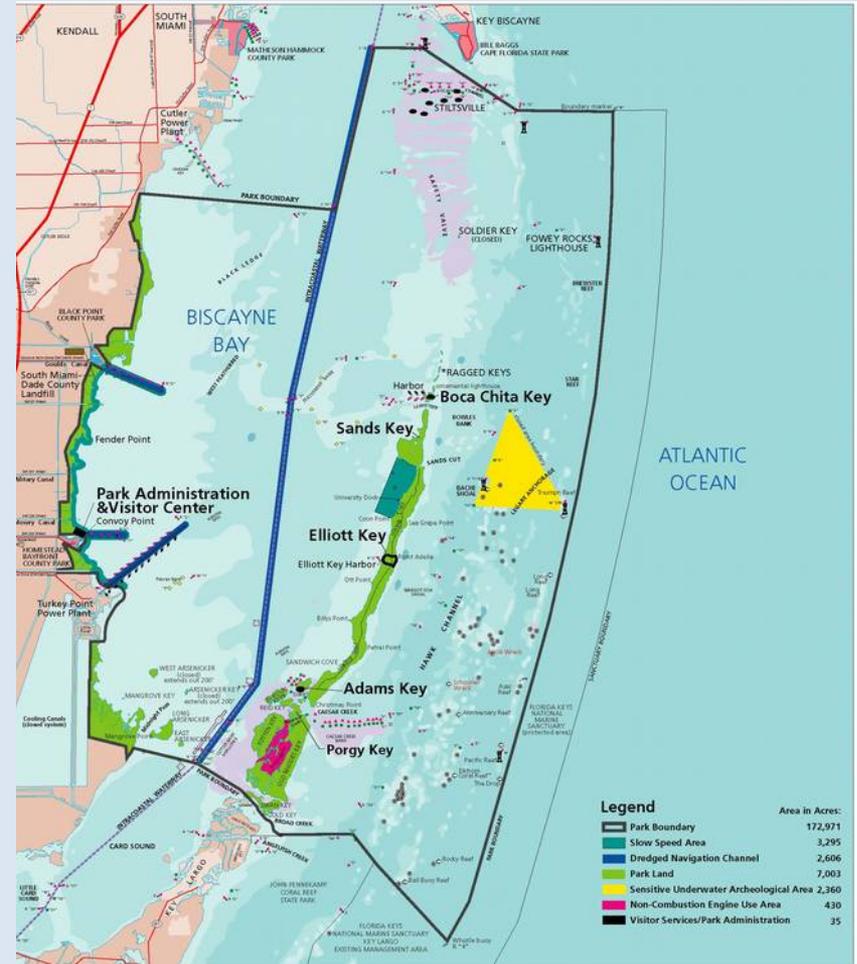
Alternatives in the Draft Management Plan

- The Draft Management Plan analyzed 5 alternatives with different mixtures of zones.
- Alternatives 3, 4, and 5 contained Marine Reserves.

Alternative 1 – No Action Alternative

The No Action Alternative is a legal mandate.

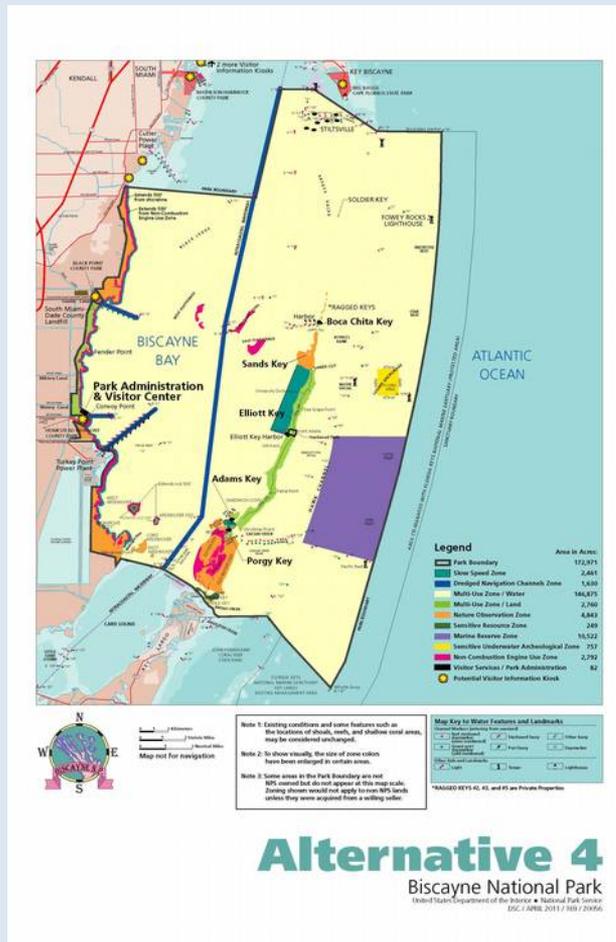
It projects the current situation into the future and presents a baseline for comparison.



Alternative 4 – Preferred Alternative

Alternative 4 was the Preferred Alternative of the NPS.

Its Marine Reserve would cover 4,252 ha (7% of the Park's area and 30% of the coral reef habitat).



Alternative 5

Alternative 5 was the environmentally favorable alternative and the most restrictive.

It included a Marine Reserve of 8,827 ha (15% of the Park area and 62% of the reef area).



Strong Opposition to the Creation of a Marine Reserve in BNP

- Recreational fishing contributes about \$7.6 billion to Florida's economy each year.
- A very strong sportfishing lobby exists in opposition to fishing restrictions and the creation of Marine Reserves.
- Its usual arguments are that the scientific information is uncertain and not conclusive, that other sectors are responsible for the problems, and that less drastic measures should be adopted.

Strong Opposition to the Creation of a Marine Reserve in BNP

- The sportfishing lobby enjoys support from the Florida Fish and Wildlife Conservation Commission (FWCC).
- FWCC has argued that Marine Reserves should only be used as a last resort. Before taking such “drastic measures”, less restrictive measures should be adopted and evaluated.

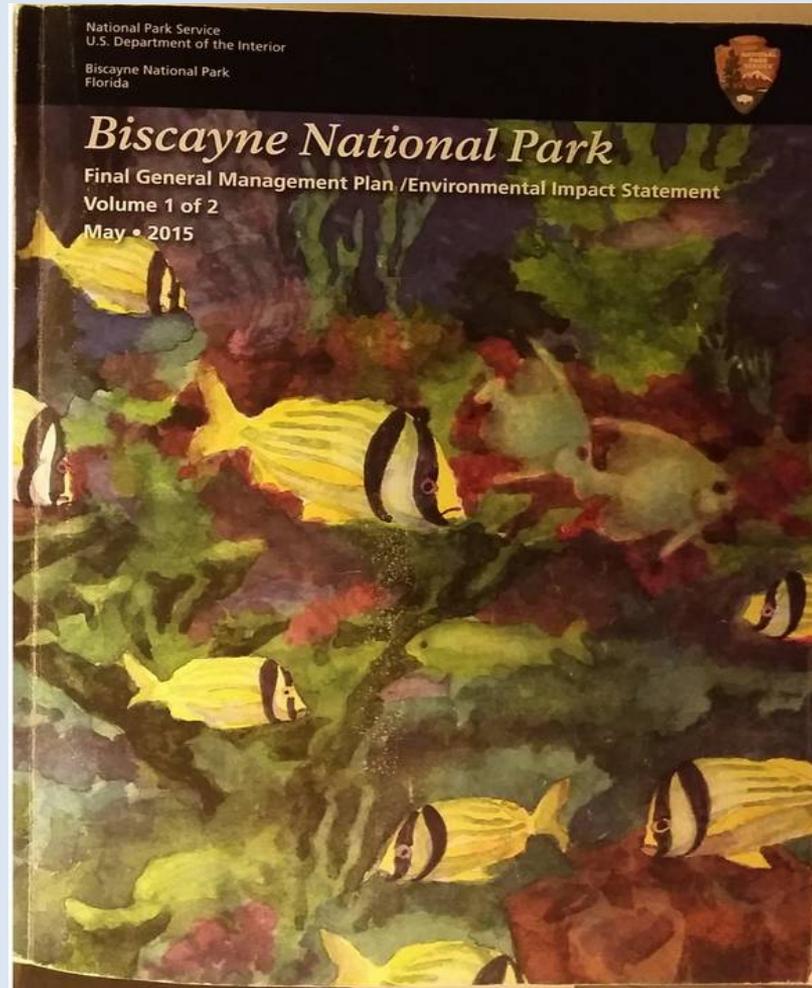
Opposition to and **Support for** the Creation of a Marine Reserve in BNP

- Jet Ski Users and Associations
- Sportfishing Associations and Groups
- + Environmental Groups
- + Scientists and Researchers

Supplement to the Draft GMP (2013)

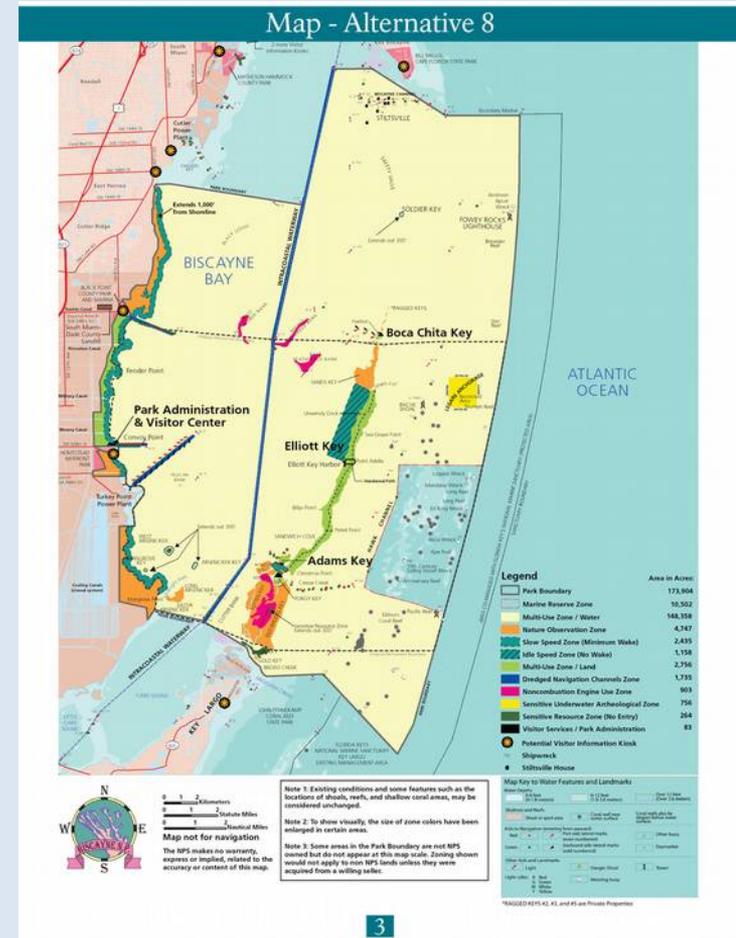
- NPS responded to the vocal opposition to the Marine Reserves by creating 2 new alternatives with “Special Recreation Zones”.
- These zones would have required fishing permits, placed restrictions on anchoring, and mandated closed seasons.

Final General Management Plan



Final General Management Plan (May 2015)

- The NPS created an additional alternative in its Final General Management Plan - Alternative 8.
- Alternative 8 included a No-Take Marine Reserve of 4,252 ha (only 30% of the coral reef habitat or 6% of the BNP area). 70% of BNP waters would remain open for sportfishing.



Final General Management Plan (2015)

- The Marine Reserve would protect against overfishing, reduce anchor damage to the reef structure, and reduce boat groundings on the reef habitat.
- Divers would have the opportunity to observe a healthy coral reef with greater populations of larger fish.

Approval of the Final General Management Plan

- August 2015 – NPS approved the Management Plan (Record of Decision)
- Partial Implementation of the Plan began within 30 days of the Plan (October 2015)
- Regulations promulgated in 2016
- However, strong opposition from the Sportfishing Sector and allies in the Florida Congressional delegation, as well as the anti-environment Trump Administration, have led to the abandonment of the plans for the Marine Reserve.

Financing

Financing

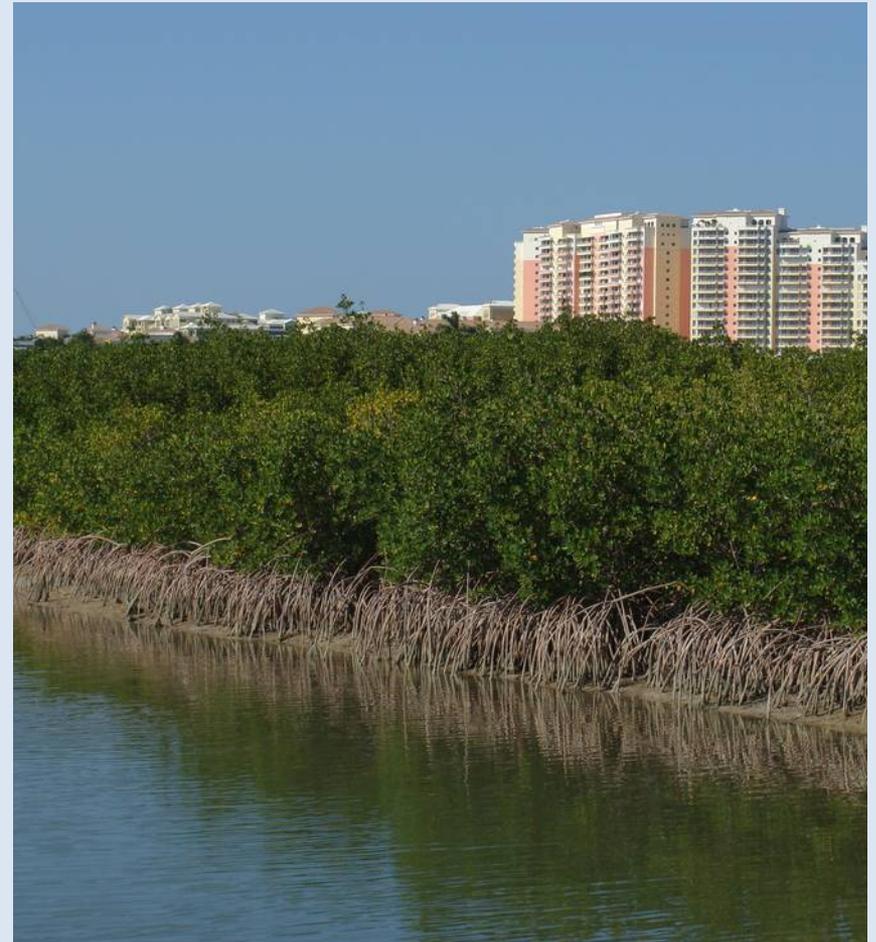
Financing for MPAs must be sustainable.

Possible Funding Sources

- Mitigation Payments
- Blue Carbon (REDD+)
- PES – Payment for Ecosystem Services (taxes, fines and fees from shipping industry, oil and gas extraction)
- Cost-Sharing with beneficiaries – fishing and tourism industries
- Block Chain Financing

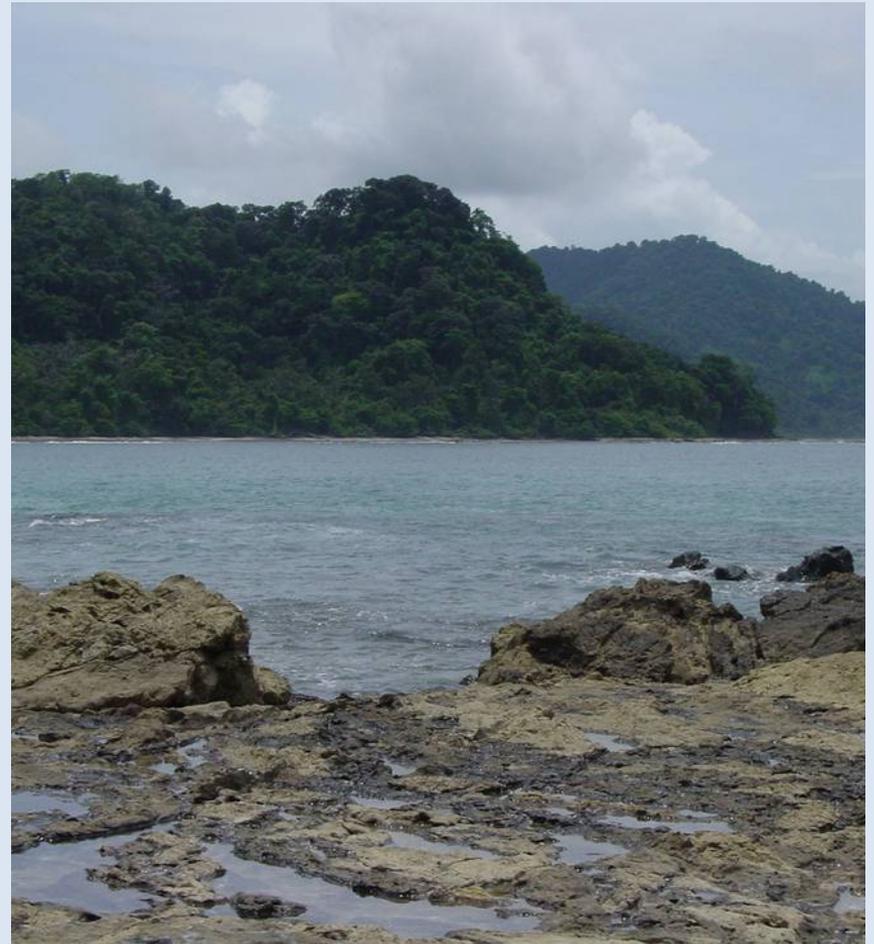
Mitigation and Mangrove Restoration

- Payment to a Restoration Fund or Mitigation Bank
 - The Fund can be used to create a large restoration project.
 - One large area is ecologically superior to many small fragmented areas.
 - The Fund could be administered by a government entity, an NGO, or a private company.

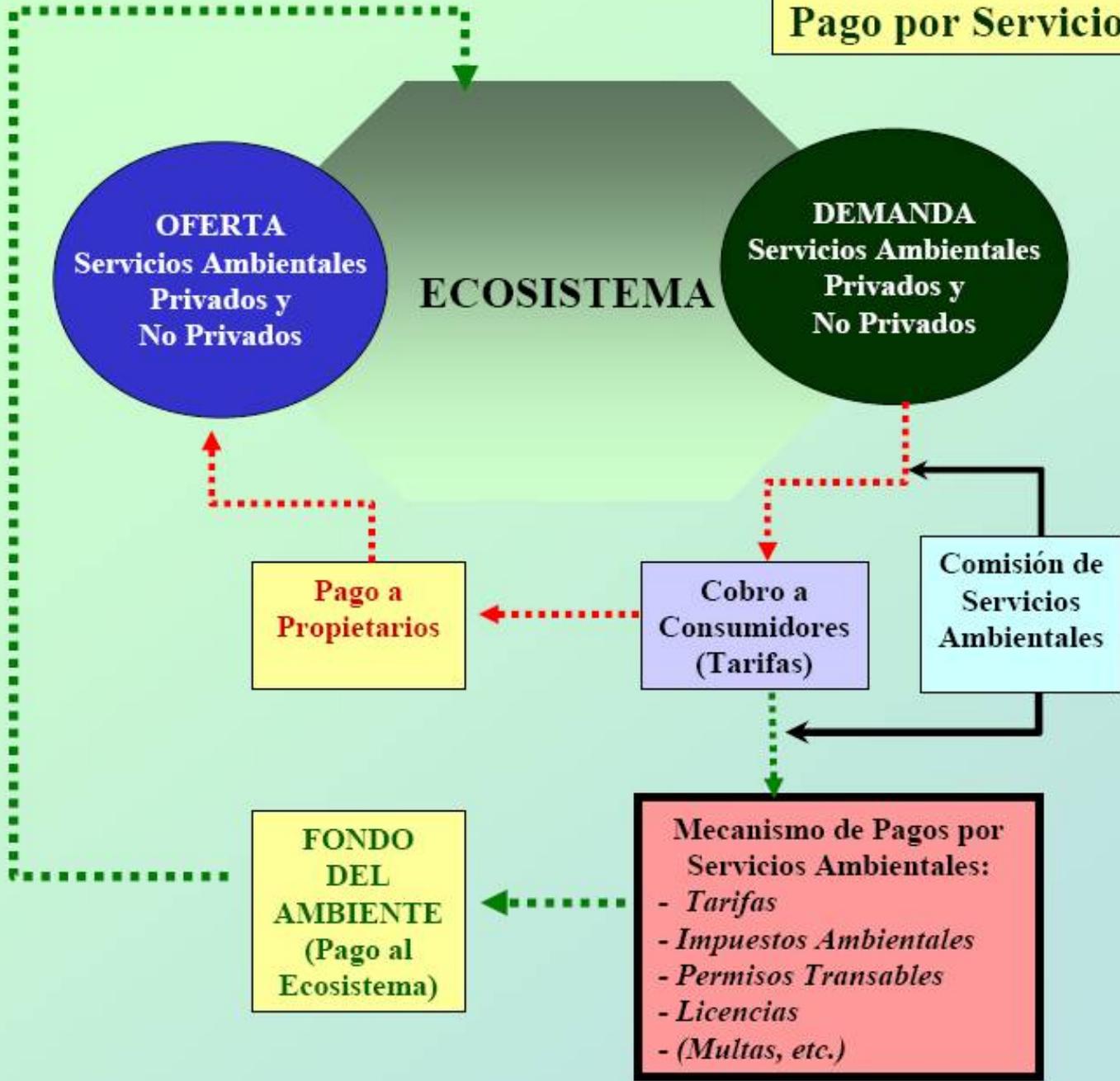


Payment for Ecosystem Services (PES)

- A new concept for the conservation of coastal resources that is based on the capture of values for ecosystem services.
- PES depends on investments and payments of the private sector.
- These payments can compliment management efforts of the public sector.



Pago por Servicios Ambientales



Current Use of PES

- There are few examples in the coastal-marine environment.
- Perhaps this is due to the public property regime in coastal-marine lands and waters.
- Moreover, the causation chain of responsibility is not always direct and evident in coastal and marine areas.

Potential Opportunities for Future Applications of PES in the Coastal-Marine Areas



Oppportunities – Supply of Clean Water

- Theme – Supply of clean water from a watershed
- Demand – Users of water in an estuary or the lower reaches of the watershed and municipal water supply companies pay for clean water.
- Offer – Land owners in upper reaches of the watershed who maintain their lands as forest or in its natural state



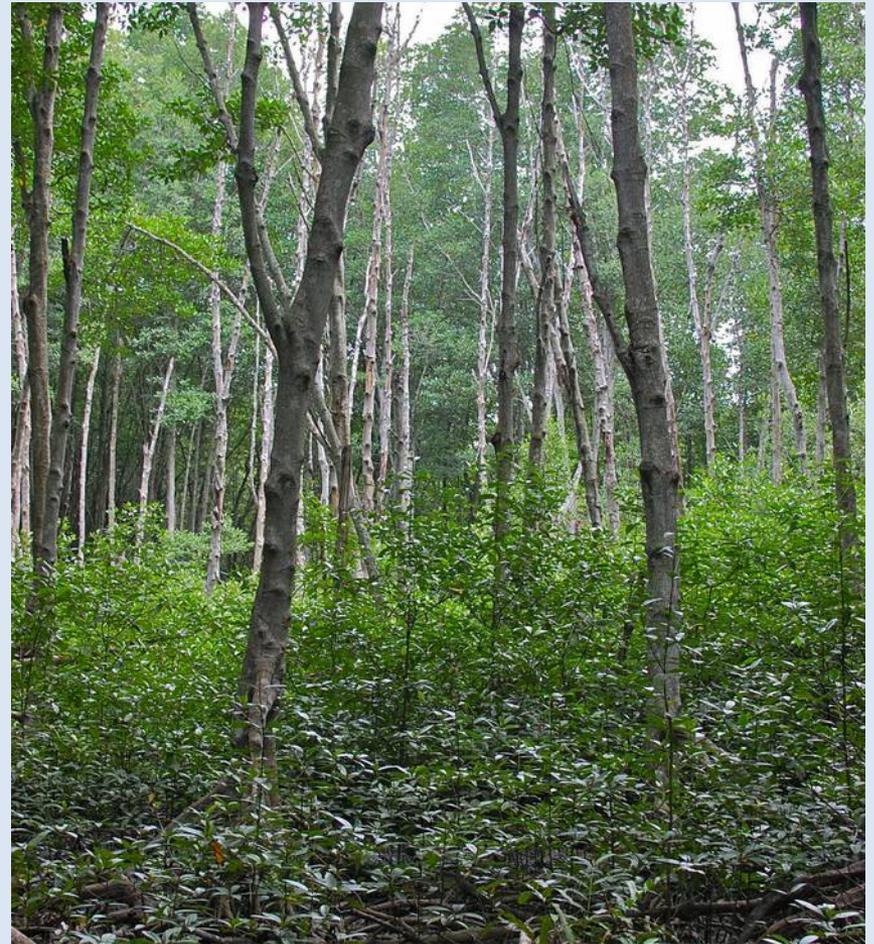
Opportunity – Protection of Mangroves as Essential Fish Habitat

- Theme – Protection of mangroves for their function as nurseries for marine resources
- Demand – Fishing sector could pay for the protection of important nursery sites for juveniles of commercially important species.
- Offer – Mangrove users and stewards, National Governments



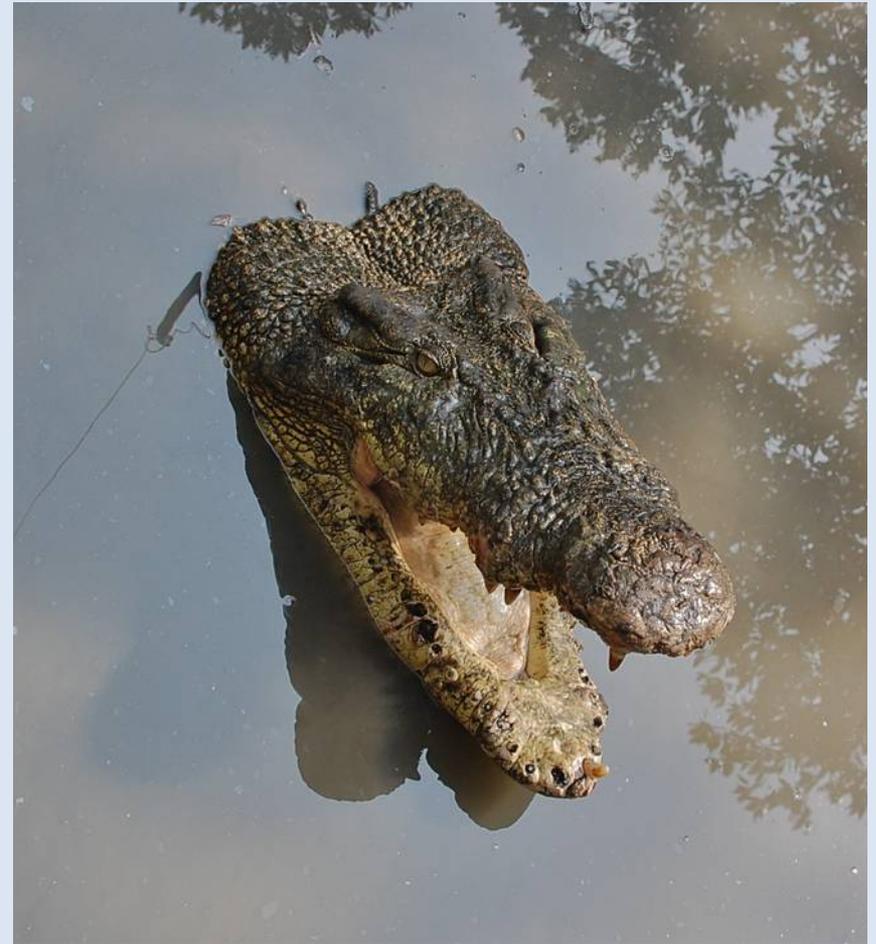
Opportunity – Carbon Markets

- Theme – Payment for Carbon Sequestration and Protection of the Mangrove Ecosystem
- Demand – International Funds (GEF), Voluntary Carbon Markets, CO₂ emitters in the North (REDD+)
- Offer – National Governments or Local Communities (Mangrove Stewards)



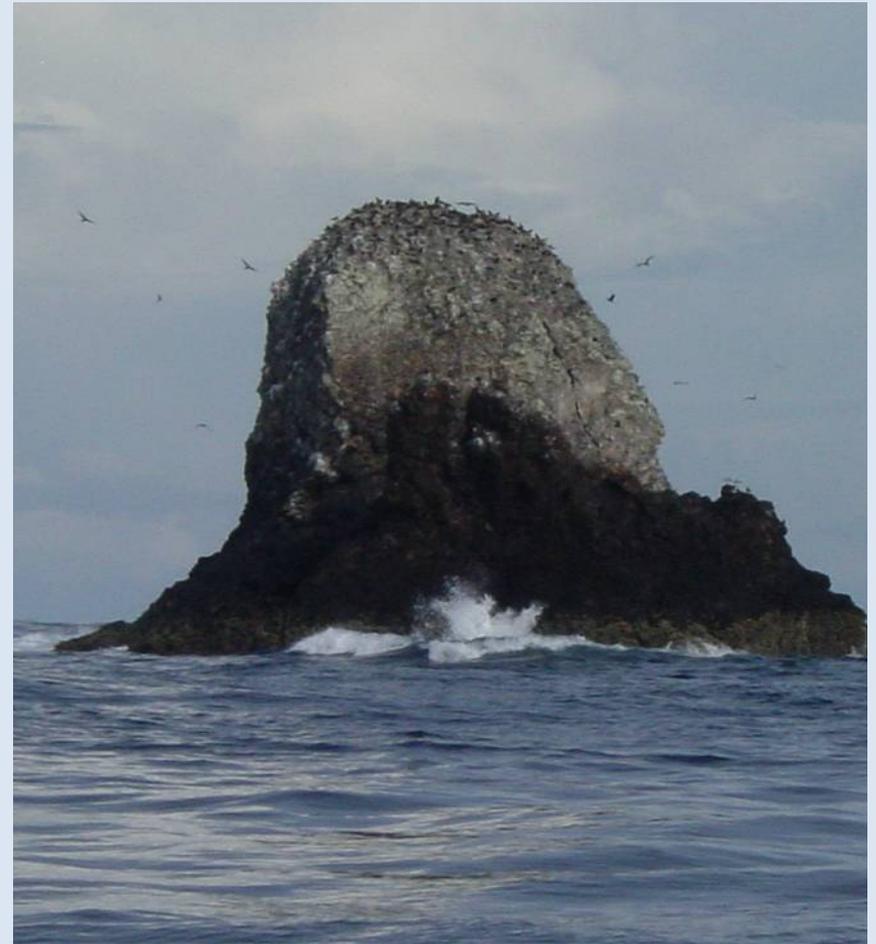
Opportunity – Biodiversity Conservation

- Theme – Payments to maintain biodiversity, corridors for migratory birds, options for potential use of genetic resources
- Demand – NGOs, international conservation funds
- Offer – National Governments or Stewards of Biodiversity



Opportunity – Marine Reserves

- Theme – Payments to protect an area that is important in the life cycle of an economically important fish species (enforcement, research expenses)
- Demand – Fishing sector that benefits from the marine reserve (spillover effects, larval export)
- Offer – National Governments



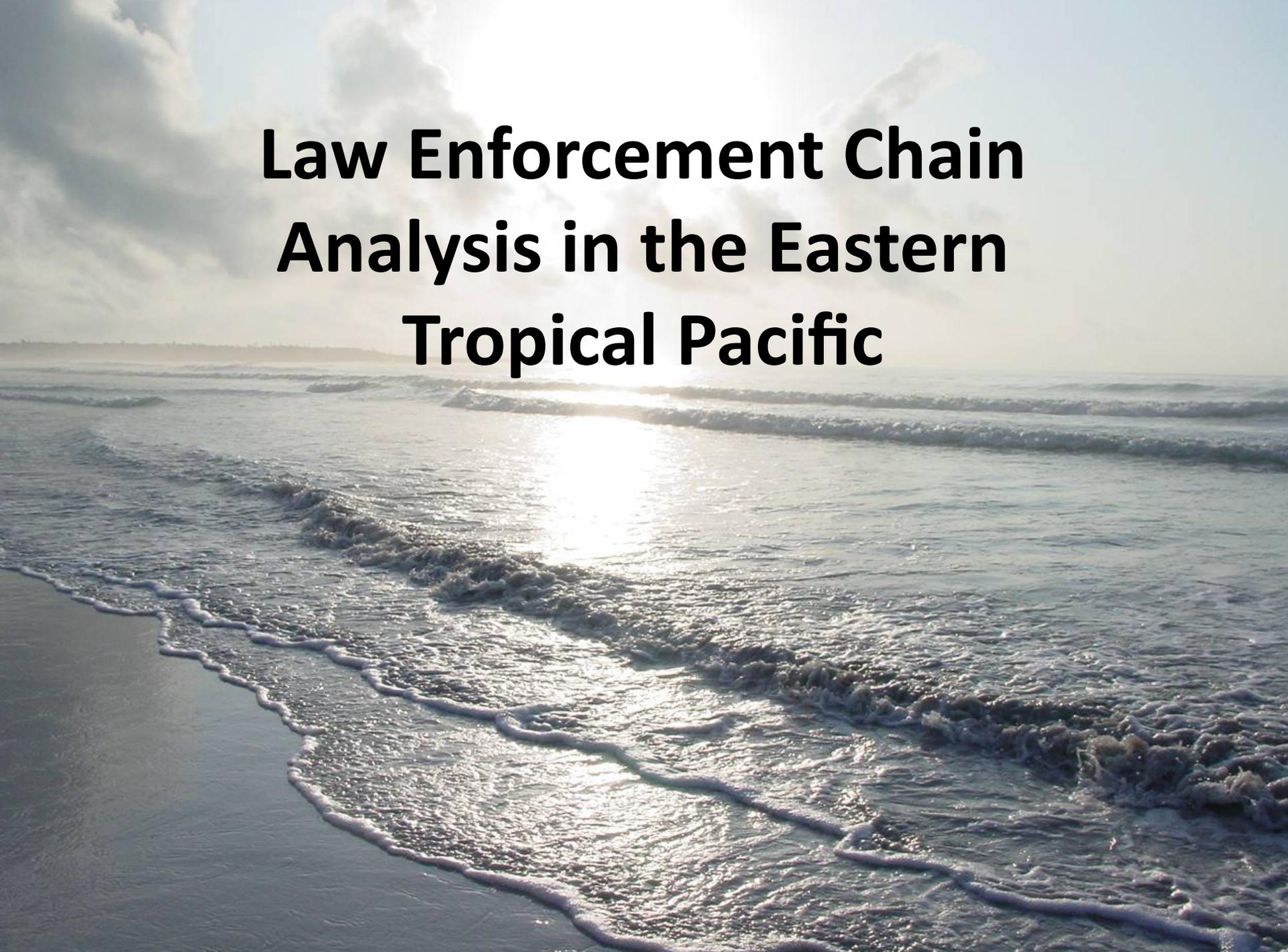
Uncertainties and Challenges

- Difficulties in identifying and quantifying Environmental Services.
- Who pays? Difficult to determine this?
- Who will collect? Difficult to determine this.
- Who would administer the system in an open and transparent way?
- Coastal lands and marine waters usually do not have private owners, rather they are publically owned.

Enforcement

Enforcement

- MPAs must be effective – not “paper tigers”
- TURFs – Exclusive community rights could lead to self-patrolling of interlopers and an increased sense of stewardship.
- Increase in law enforcement
- New Technologies
 - Satellite tracking; VMS



Law Enforcement Chain Analysis in the Eastern Tropical Pacific

Objective of the Study

- Determine strengths and weaknesses of the legal framework and their compatibility with existing management plans;
- Assess the effectiveness of law enforcement programs considering both soft and hard measures as compared to their initial design;
- Pinpoint the weaknesses of the law enforcement system and recommend concrete cost-effective actions to improve overall effectiveness of programs.

Methodology

- Four-country analysis using a similar methodology that involved interviews and examination of MPA documents and judicial records:
 - Background information: legal frameworks, actors, existing educational and outreach activities
 - Surveillance and detection capabilities
 - Interception and arrest procedures and capacities
 - Prosecution records (administrative, civil, criminal)
 - Sentencing success

Eastern Tropical Pacific Region



Eastern Tropical Pacific Region

- 2002 – The four countries (Costa Rica, Colombia, Ecuador, Panamá) signed an agreement creating the Eastern Tropical Pacific Marine Corridor (211 million ha).
- Initiative supported by UNEP, UNESCO, IUCN, and Conservation International.
- Objectives – 1) promote the conservation and sustainable development of the ETP Region and its exceptional marine biodiversity, 2) foster regional cooperation in training, education, and monitoring.

Characteristics of the ETP Region

- Defined by submarine ridges and the Panama Bight
- High marine biodiversity
- MPAs isolated from the continent
- High endemism
- Extreme climatic events (ENSO – El Niño)
- High biological productivity
- High levels of connectivity

Eastern Tropical Pacific MPAs

- ECUADOR - Galápagos Marine Reserve (1998)
- COSTA RICA - Isla del Coco National Park (1978)
- PANAMA - Coiba National Park (2004)
- COLOMBIA - Malpelo Flora and Fauna Sanctuary (1995)
- COLOMBIA - Gorgona Natural National Park (1983)
- UNESCO recognizes all 5 MPAs as World Heritage Sites.

Threats to the ETP MPAs – Illegal Fishing

- Illegal fishing
- Marine Pollution
- Unregulated tourism
- Introduction of invasive species



Threats to ETP MPAs – Unregulated Tourism



Enforcement Chain

- Law enforcement is essential for the success of MPA management plans.
- Enforcement is only as good as the weakest link in the enforcement chain.
- Unsuccessful enforcement creates an incentive for further infractions.

Detection

Problems

- Limited financial autonomy of MPAs
- Adjacent communities do not identify with the MPA.

Recommendations

- Create a local fund with monies paid by park visitors that the park director can use for urgent needs.
- Establish programs in communities in conjunction with a NGO to foster a sense of ownership of the MPA and realization of benefits that the MPA can generate for them.

Detection

Problems

- Low salaries of park guards
- Insufficient numbers of personnel

Recommendations

- Increase salaries or per diem support.
- Develop cooperation with Environmental Police or Coast Guard to increase personnel during operations.

Detection

Problems

- Institutional weaknesses

Recommendations

- Develop manuals with functions of all MPA personnel.
- Develop procedures for documenting and storing information.
- Designate a maintenance position at every MPA.
- Create the capacity for maintaining and repairing boats and motors at every MPA.

Detection

Problems

- Training level of Park Guards is low and there are few opportunities for learning new skills.

Recommendations

- Prepare course materials for Park Guards in environmental and enforcement issues (such as boarding, interception, documentation, investigation).
- Create a School for Park Guards in the ETP Region.

Detection

Problems

- Limited capacity for detection of violators

Recommendations

- Implement electronic means of detection (radar, VMS)
- Allow Environmental Authorities to use these electronic systems for monitoring park resources.

Detection

Problems

- Lack of basic detection equipment (binoculars, cameras, rapid boats, radios, GPS, night vision equipment)
- Absence of current registries of MPA users (fishers, tour operators) and of infractions

Recommendations

- Purchase or obtain through donations.
- Create these data bases.

Galapagos Patrol Boats



Interception and Arrest

Problems

- Lack of training of proper procedures for boarding vessels and of crime scene investigation.

Recommendations

- Regional training workshops to standardize procedures and protocols among the four countries.

Confiscation of Sea Cucumbers



Prosecution

Problems

- Local marine environmental and MPA laws and regulations are confusing, have overlaps and gaps, and, moreover, are constantly violated.

Recommendations

- Revise legislation and clarify institutional roles.
- Develop inter-agency enforcement mechanisms at the operational level.
- Increase the judicial authority of the operational MPA staff to write tickets for common violations.

Prosecution

Problems

- Constant pressure of industrial fishing fleets on the MPA marine resources

Recommendations

- Increase enforcement in the EEZ outside the MPAs.
- Create buffer zones around the MPAs.
- Integrate the electronic monitoring systems between the 4 countries. Begin with a regional workshop followed by bilateral or multilateral agreements.

Infraction, Sanction or Sentencing

Problems

- Weak success in sanctioning infractions and judicial proceedings

Recommendations

- Implement economic sanctions, such as:
 - Detention of the vessel
 - Prohibition of navigation permits
 - Retention of fishing gear
 - Temporary suspension of fishing licenses
 - Permanent revocation of operation licenses

Infraction, Sanction or Sentencing

Problems

- High number of failed cases

Recommendations

- Provide technical and legal assistance of environmental authorities (NGO role).
- Conduct regular workshops for judges and MPA attorneys.
- Use the press and other media to inform the public about cases of impunity.

Infraction, Sanction or Sentencing

Problems

- Impunity due to other pressures

Recommendations

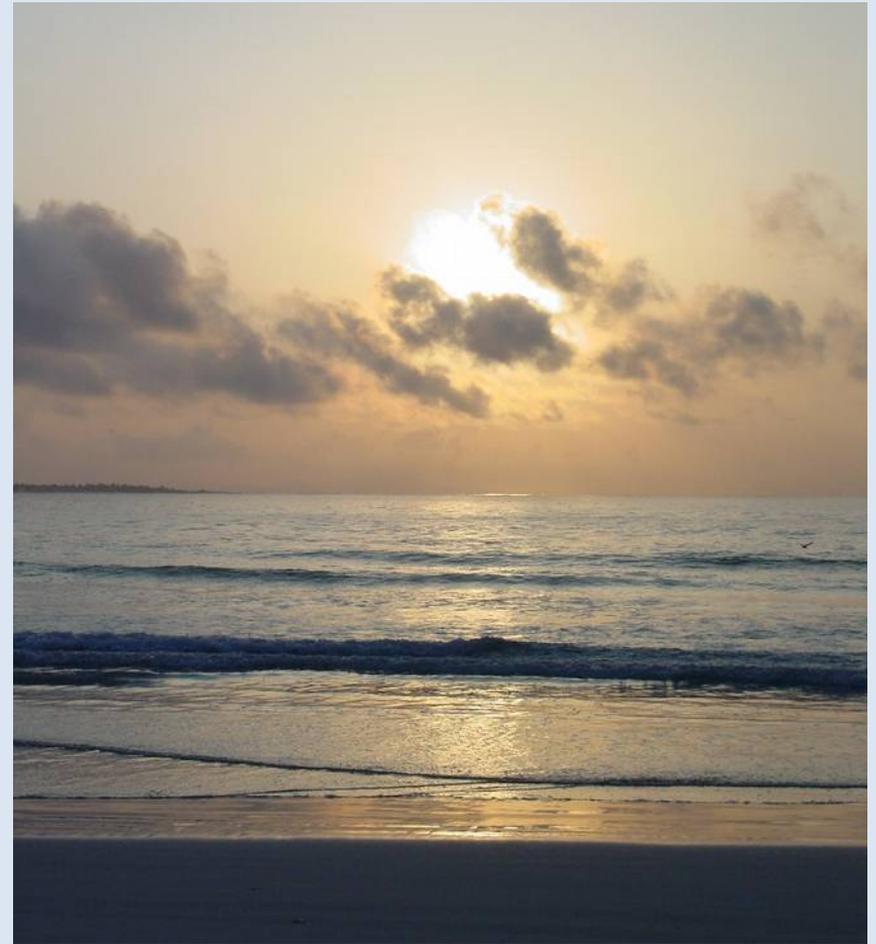
- Promote application of administrative sanctions rather than judicial proceeding to minimize intervention.
- Assign additional attorneys paid by NGOs to follow these cases.
- Utilize private law suits with private attorneys for prominent cases.

Monitoring and Research

Support for MPA Designation and
Management

Social Science Research

- Social Science has been under-utilized in the Management of MPAs.
- Social Science information is essential at all stages of the management process.



Central Social Science Themes

1. Governance and Institutions

- Nature of the Relationships between Agencies and between the Various Levels of Government
- Gaps and Overlaps in Agencies' Authority
- Public Participation Mechanisms

2. Use Patterns

- Ways in which people use the resources (both extractive and non-extractive) in time and space

Central Social Science Themes

3. Attitudes, Perceptions, and Beliefs

- How the public and resource users view the environmental resources, environmental quality, and the management process.
- How Traditional Ecological Knowledge can be incorporated into the current management process.

4. Economics

- Baseline economic information about the different activities (fishing, diving, tourism)
- Valuation – both market and non-market values
- Benefits and Costs of Management
- Monitoring of social and economic impact of MPAs to track distribution of costs and benefits

Central Social Science Themes

5. Communities

- Socio-economic conditions of the community
- Capacity of communities to foster a stewardship ethic
- Information flows and decision-making
- Reaching, integrating, and empowering marginalized groups

Biological Questions

- Larval transport in and out of Marine Reserves
- Is the Marine Reserve self-replenishing?
- Can the Marine Reserve Network exchange recruits?
- Marine Reserve benefits over time and comparison with control areas – abundance, size, biomass, species diversity
- Impact of Marine Reserves on fisheries and biodiversity in adjacent areas
- What is the optimal size of the Marine Reserve?

Moving Forward

Areas Beyond National Jurisdiction(ABNJ)

- High Sea areas – Half of the planet but its biodiversity is poorly protected. Less than 1% of ABNJ is protected.
- No single global legal instrument exists to protect Biodiversity in ABNJ.
- 2016 – UN General Assembly resolution to begin the process toward a binding international treaty concerning the conservation and sustainable use of marine biodiversity in ABNJ.
- Issues
 - MPA designation (Area-based management tools) – North/South divide
 - Environmental Impact Assessments
 - Benefit-sharing of Marine Genetic Resources
 - Capacity Building

Effective Marine Protected Areas

- Development of Management Plans
- Implementation of Management Strategies
- Sustainable Funding Mechanisms
- Inclusion of Users and Local Communities
- Creation of Benefits to Local Communities

Thank you for your Attention!





Marine Protected Areas

Daniel Suman

Rosenstiel School of Marine and Atmospheric
Science

University of Miami

Threats to Marine Biodiversity

Reduction of Biological Diversity

Coral Reefs –

- 20% have been destroyed.
- 24% of remaining reefs are under imminent risk of collapse.

Threats to Marine Biodiversity

Degradation of Habitats

Mangroves –

- Annual losses of 1.1%.
- Mangrove deforestation rates are 3 to 5 times greater than global deforestation rates.
- The estimate of global mangrove area in 1980 was 19.8 million ha.
- Some 5 million ha of mangrove forests were lost during this 20 year period amounting to about 25% of the 1980 mangrove area.

Global Decline in Fisheries

Fishing Down the Food Web

- Pauly calculated the mean trophic level of global fisheries since 1950 using FAO data.
- The tendency is a gradual shift to lower trophic levels - that is from long-lived, high trophic level bottom fish to short-lived, low trophic level invertebrates and planktivorous pelagic fish.
- Initially, fishing down the food web leads to increasing catches. However, this is followed by stagnant or decreased catches due to ecosystem disturbances.

Fishing Down the Food Web

- The global decline in trophic level has been about 0.1 per decade without a substantial increase in landings.
- The declines have been greatest in the Northern Hemisphere where industrial fisheries have worked for the longest time. Fishery managers must rebuild fish populations within large no-take MPAs (marine reserves).

from Sobel and Dahlgren,
Marine Reserves (2004)

from Sobel and Dahlgren, *Marine Reserves* (2004)

Sustainability

- Fisheries have not been managed sustainably despite the rhetoric (MSY = Maximum Sustainable Yield).
- The fishing industry with its improved technologies has caused serial depletions, expansion of range (further offshore and into the Southern Hemisphere, as well as deeper waters), and targeting of lower level species.
- These factors often mask overfishing to casual observers.

from Sobel and Dahlgren, *Marine Reserves* (2004)

Marine Protected Areas (MPAs) may offer a solution to these problems.

- Fisheries Collapses  Fisheries Benefits
- Biodiversity Losses  Conservation Benefits

What are Marine Protected Areas (MPAs)?

- **Protected Areas (IUCN)** – a geographical space, recognize, dedicated, and managed through legal and other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
- **MPA** – any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features which has been reserved by law or other effective means to protect part or all of the enclosed environment.

What is a Marine Reserve?

- A *MARINE RESERVE* is an delimited area of the ocean where extractive activities are prohibited. It is a NO TAKE area.
- *MARINE RESERVES* are a subset of *MARINE PROTECTED AREAS* (MPAs) that are delimited areas of the ocean with conservation goals (but not necessarily “No Take”).
- Great confusion exists about MPA nomenclature.

IUCN Classifications

- Category Ia – Strict Nature Reserve; 1b – Wilderness Area
- Category II – National Park
- Category III – Natural Monument or Feature
- Category IV – Habitat/Species Management Area - sites with positive intervention, such as restoration
- Category V – Protected Landscape/Seascape – Extractive activities may be part of the seascape.
- Category VI – Protected Area with Sustainable Use of Natural Resources

- Categories I, II, and III correspond to No-Take Marine Reserves.

UN Millennium Development Goals

- Goal 7 – Ensure Environmental Sustainability
- Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss
- Protected ecosystems covered 15.2% of land and 8.4% of *coastal* marine areas worldwide by 2014.
- The UN Millennium Development Goals called for 10% of the Global Ocean to be classified as an MPA by 2010. **We did not meet this goal.**

Aichi Biodiversity Target 11

- The COP-10 (Nagoya, Japan, 2010) of the Convention on Biological Diversity (CDB) adopted the Aichi Biodiversity Targets.
- By 2020, at least 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

UN Sustainable Development Goals

- At the United Nations General Assembly on 25 September 2015, 193 Nations unanimously adopted the **2030 Agenda for Sustainable Development** and its 17 Sustainable Development Goals (SDGs).
- The aim of the 17 goals is to end poverty, protect the Earth, address Climate Change, and ensure prosperity for everyone.
- Each goal has specific targets to be achieved over the next 15 years (2016-2030).

UN Sustainable Development Goals

- Implementation involves International Organizations, as well as the public and private sectors of all countries (poor, middle-income, and rich).
- Although the SDGs are not legally binding, all governments are expected to establish national frameworks to achieve the 17 Goals.

UN Sustainable Development Goals

Sustainable Development Goal 14

- By 2020, *conserve at least 10 per cent of coastal and marine areas*, consistent with national and international law and based on the best available scientific information.
- By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.

Sustainable Development Goal 14

- The 10% spatial conservation target has a broad scope of protection. Lubchenco and Grorud-Colvert divide these areas into those:
 - Lightly protected – significant extractive activities occur
 - Strongly protected – no commercial activity but some artisanal and recreational fishing
 - Fully protected – no extractive activities (**Marine Reserves**)

Sustainable Development Goal 14

- MPAs – 3.5% of the Ocean
- Strongly protected or fully protected MPAs – 1.6% of the Ocean. In 2000, only 0.1% of the ocean was strongly or fully protected.
- Existing MPAs are largely within marine areas under national jurisdiction (Territorial Seas and EEZ) – even though the High Sea accounts for 58% of the Ocean.

MPAs compared to Global Ocean

from *Protect Planet Ocean*

How are We doing?

MPAs as Percentage of Territorial Waters

How are We Doing?

- Over 10,000 MPAs have been designated.
- Most MPAs are located in areas under national jurisdiction.
- Many countries have made significant progress in recent years.
- However, it is unlikely that we will meet the 10% goal by 2020.

However . . .

- These targets provide measureable indicators for progress.
- Nevertheless, they may provide a false sense of process because many designated MPAs are only “paper MPAs” with little or no management.

Land vs. Marine

- Between 10% and 15% of global terrestrial areas have protection.
- At most, about 3% of the global ocean has some protection. However, if the MPAs offer effective protection, the area is lowered to about 1%.
- Why is there a difference?

Differences between Terrestrial and Marine Protected Areas

Features	Terrestrial Ecosystems	Marine Ecosystems
Dimensions	2-D	3-D
Scale of Material Transport	smaller	greater
Openness	less	more
Sensitivity to Habitat Fragmentation	greater	less
Rate of Response to Environmental Variability	lower	faster
Reliance on External Sources of Recruitment	lower	higher

Differences between Terrestrial and Marine Protected Areas

Features	Terrestrial Ecosystems	Marine Ecosystems
Per Capita Fecundity of Invertebrates	lower	higher
Importance of Connectivity	less	greater
Ownership	Private land ownership	Public
Access	closed	open
Habitat Destruction	great	locally-focused

Biological Issues of Marine Reserves

Benefits for Fisheries – Larval Dispersal

- Larval export is the mechanism by which Marine Reserves can enhance fisheries.
- Pelagic larval dispersal distance varies by species.
- Dispersal drives replenishment.
- Important factor – surface ocean currents
- Reef fish – generally between 10 and 100 km
- Larger female fish have more eggs, and they tend to be of higher quality with higher fat content.

Fisheries Benefits - Spillover

- Density-dependent spillover into adjacent areas
- Florida – Estuarine area closed to public access for security around Kennedy Space Center. Marine Reserves in the Merritt Island National Wildlife Refuge (oldest Marine Reserve in USA) have supplied increasing numbers of world record-size game fish in adjacent waters
- St. Lucia (Soufrière Marine Management Area) – Network of 5 Marine Reserves (35% of coral reef area) has increased artisanal catch between 46 and 90%

Merritt Island National Wildlife Refuge

IGFA:

Record captures of “trophy species” are concentrated around Cape Canaveral and Everglades National Park – both areas where fishing is prohibited or highly restricted.

Fishing has been prohibited in a 39 km² zone of Merritt Island NWR since 1963.

Spotted
Seatrout

Red
Drum

Black
Drum

Snook

Bohannon 2011

The above image indicates the areas where International Game Fish Association (IGFA) world record landings occurred. The dots with black centers illustrate the particularly largest records for each species. Letter A represents Spotted Seatrout landings. Letter B is Red Drum Landings, C is Black Drum and D is Common Snook. Nearly 75% of all IGFA records for three of the four species examined were concentrated near the two MPA's that had additional fishery restrictions, especially complete closure to fishing. Regionally, total catch and catch per trip for these species increased in northeast and southwest Florida, where the most protective MPAs are located, while numbers declined or remained unchanged in areas without additional protection.

Benefits for Fisheries - Insurance

- Enhance spawning stocks of exploited species
- Provide insurance policy against failure of traditional fishery management techniques outside Marine Reserves
- Marine Reserves can increase resilience to environmental changes and biological crashes.

Networks of Marine Reserves

- Networks may span political boundaries.
- Networks can extend from coastal habitats out to deeper waters.
- Network connectivity occurs through movement of larvae, juveniles, or adults.
- Benefits can be greater than those from unconnected reserves.
- Networks can allow fishing between reserves.
- Larval dispersal – replenishment within a reserve or outside a Marine Reserve (upstream areas to downstream areas)
- Areas with large upstream reef areas may be more resilient to recruitment overfishing because there is a supply of larvae or juveniles from elsewhere.

Networks of Marine Reserves

- Marine Reserves with large downstream reef areas may be very important in supporting fisheries elsewhere.
- To be effective Marine Reserves need to be placed close enough so that the upstream site can replenish the downstream site.
Considerations – surface ocean currents and lifetime of larvae.
Roberts et al. (1997) suggest a 1-month envelop of larval transport.

California Network of Marine Reserves

Protection of Biological Diversity

- Protect marine habitats and biodiversity from the impacts of fishing gear
- No-Take Marine Reserves conserve and recover Biodiversity (species richness, community complexity, species density and biomass) inside their boundaries.
 - Greater number of species
 - Greater biomass/abundance
 - Larger sizes of individuals
- New evidence that Marine Reserves enhance Biodiversity beyond their boundaries.
 - Spillover of species richness and community complexity
 - Density-dependent fluxes and relocation to non-reserves sites

Benefits of Marine Reserves

- Aesthetics
- Enhance scientific understanding
 - Marine Reserves serve as control areas for scientific research that studies human impacts on the marine environment.
- Environmental Education
- Reduce User Conflicts
- Income Generation from Ecotourism
- Marine Reserves are simple management tools that can simplify enforcement.

Criteria for Selecting Marine Reserves

- Representation of Habitats – Protection of all biogeographical regions and transition zones
- Ensure that all major habitats are protected within the regions (Habitat Heterogeneity)
- Centers of Endemism (cover 16% of world's coral reefs)
- Marine Biodiversity Hotspots (especially coral reefs) – areas of high species richness (Coral Triangle in SE Asia)
- Sites having a significant proportion of a species population

Criteria for Selecting Marine Reserves

- Sites that offer important export functions
- Sites important for critical life stages – vulnerable life stages, spawning aggregation or breeding sites, migration bottlenecks
- Sites having globally endangered species (critically endangered or threatened)
- Important areas that are particularly susceptible to anthropogenic threats – highly vulnerable sites
- Sites that connect marine and terrestrial biodiversity hotspots

Criteria for Selection

- Connectivity – Siting reserves to allow for replenishment within the reserve and with other reserves or unprotected areas
- Important to select important sites with a biological basis and propose alternatives before considering biases from stakeholder input. (Note: Some Marine Reserve biologists suggest this.)
Often MPAs are designated in sites of low conservation value.
- Sites that are important for the ecosystem services they provide
- Political opportunism
- Management capacity – Many small reserves may be harder to manage and enforce than a larger reserve

Social and Political Issues

Socio-Political Themes

- **Governance** – Coiba National Park (Panamá)
- **Institutional Fragmentation and Lack of Political Will** – Panama Bay Ramsar Site
- **Community Involvement** – Florida Keys National Marine Sanctuary
- **Opposition from Users** – Biscayne National Park
- **Financing**
- **Enforcement** – East Tropical Pacific Marine Corridor
- **Monitoring and Research**

Governance

Challenges to Governance of MPAs

- Need to Integrate Land and Sea
- Off-Site impacts can be accentuated by the aquatic medium.
- Difficulties of Institutional Coordination by the Competent Authorities
- Need to Determine the Degree and Type of Social Inclusion of Users, Local Communities, and the General Public
- Governance of Marine Space – typically viewed as an “open access” property regime.

**The Case of
Governance in Coiba
National Park, Panama**

Coiba National Park (Panama)

Coiba 

Coiba National Park (PNC)

- Coiba Island is the largest island in the Pacific Ocean of Central America.
- No permanent residents since the penal colony was closed in 2004.
- PNC created in 1991. Law no. 44 (“Coiba Law”) passed in 2004.
- PNC includes 537 km² of islands and 2,165 km² of marine space.
- PNC has 17 km² of coral reefs – most extensive reef system in the Eastern Tropical Pacific.

Coiba National Park (PNC)

- Home to many marine mammals and threatened/endangered species.
- UNESCO World Heritage Site – 2005
- PNC Management Plan approved - 2009

Zoning in Coiba National Park

Governance

- Rules of the game in the administration of Marine Protected Areas
- Control of access to the resources
- Assignment of user rights
- Determination of limits of use and extraction
- Who decides?
- How are decisions reached?
- What is the object of the decisions?
- What outside forces exert pressure on decision-making?

Governance – Participation in the Decision-Making Process

- Representativeness – Social Inclusion
- Transparency
- Access to the Information
- Public participation of the users, interested groups, and affected groups

Characterization of Decision-Making in the PNC

Management Council

- Management Council - a new model of governance in Panama's protected areas
 - new experience with “co-management”
 - Promotes inter-agency coordination
 - The model of the “Management Council”, as “maximum authority”, replaced the absolute authority of the National Environmental Authority (ANAM) in the management of this protected area. The role of ANAM focuses on the operational level.

Management Council - Functions

- Establish conservation policies
- Approve the Management Plan
- Oversee the implementation of the Management Plan
- Evaluate and approve the regulations concerning the Special Zone of Marine Protection (ZEPM)
- Evaluate the Scientific Research Plan
- Promote the necessary investments
- Coordinate the work of the commissions

Management Council - Membership

- ANAM (presides)
- MGJ
- IPAT
- SENACYT
- AMP [ARAP]
- Municipality of Montijo
- Municipality of Soná
- Additional Municipal Representative
- Representative of the Fishery Sector
- Chamber of Commerce of Veraguas
- UP-CRV [University of Panama]
- Environmental NGO [MarViva]
- Environmental NGO [ANCON]
- Scientific Research Institution [STRI]
- International Cooperation Organization
- Governor of Chiriquí Province

Management Council – Functioning

- Ordinary sessions every 3 months & Extraordinary Sessions
- The Management Council has held over 40 meetings.
- ANAM presides at meetings.
- Secretariat – MarViva
- Quorum - 7

Scientific Committee

Functions – Support the Management Council
with advice on scientific research

- Offer scientific advice
- Evaluate research conducted in the Park
- Contribute to the elaboration of research proposals
- Propose a Five-Year Research Plan for the Park
Management Plan

Scientific Committee

Composition

- SENACYT (presides)
- ANAM
- AMP (DGRMC) - ARAP
- UP-CRV [University of Panama]
- STRI
- NGOs designated by the Management Council

Commission for the Sustainable Management of Fisheries in the Special Zone of Marine Protection

- Functions
 - Prepare fishery regulations for the Special Zone of Marine Protection
 - Evaluate the results of the implementation of the regulation

Fishery Commission

- Composition
 - AMP (DGRMC) [ARAP]
(presides)
 - ANAM
 - University of Panama
 - Sportfishing Sector
 - Industrial Fishing Sector
 - Artisanal Fishing Sector (2)
 - Fishery Exporter
 - Environmental NGO
 - STRI
 - SENACYT

Governance Indicators

- We recommended the following Governance Indicators and they were included in the Management Plan:
 - Level of Attendance at Meetings
 - Frequency of Meetings of the Management Council
 - Consistency of Attendance of Members
 - Compliance with the Agenda
 - Preparation and Distribution of Minutes
 - Themes discussed
 - Number of Decisions Adopted
 - Level of Compliance with Decisions and Actions

Location of Meetings

Attendance at Meetings of the Management Council

Attendance of the Represented Group

Trends in Attendance with Time

Trends in Attendance with Time (Non-Voting Members)

Quora at Meetings

Representation Index

Representation Index

Public Participation at Meetings

Strengthening the PNC Management Council

Recommendations to Strengthen Governance of the PNC Management Council

- Improve coordination between the Management Council, the Scientific Committee, and the Fisheries Commission.
- The Scientific Committee and Fisheries Commission must be more efficient.
- Be strategic about meeting places.
- Improve attendance at meetings

Recommendations to Strengthen Governance of the PNC Management Council

- Recognize the great responsibility that Council Members have.
- Improve the internal organization of the Council.
- Increase transparency of Council operations.
- Include Transaction Costs in the Council budget.
- Promulgate regulations for management of the Coiba Fund.
- Critically assess emerging issues.

Coiba National Park

- The Management Plan designated a significant portion of the park area as a Marine Reserve. However, some areas are zoned exclusively for fishers of local communities in the PNC Buffer Zone.
- NGOs (CI, TNC, MarViva, Conservation Strategy Fund) have developed micro-financing projects to support initiatives from communities in the PNC Buffer Zone – guesthouses, small restaurants, dive shops, surf shops, boat captains.

Lack of Political Will

- 2018 – The Executive and Private Interests hope to grant a concession for a luxury hotel in Coiba National Park (UNESCO World Heritage Site) and build an airport on the island to facilitate access of tourists.
- They have ignored the Management Council in this process.
- In 2017, the Minister of the Environment was replaced due to her opposition to the President's development plans for Coiba National Park.

Institutional Fragmentation and Lack of Political Will

The Case of Panama Bay Wildlife Refuge and Ramsar Site (Panama)



Panama Bay
Wildlife
Refuge

Panama Bay Wetland Wildlife Refuge

- Over 2 million migratory shorebirds (more than 30 species) stop over at the Panama Bay Wetlands during their winter migrations from either the Southern or Northern Hemispheres.
- The Panama Government requested that the Panama Bay Wetlands be designated a Wetland of International Importance (Ramsar Convention List) in October 2003.

Migratory Shorebirds – Panamá Bay

More than 2 million shorebirds of more than 30 different species visit the mangroves and mudflats of Panama Bay during their annual migrations.

Panama Bay Wetland Wildlife Refuge

- In February 2009, the site was also designated as the “Panama Bay Wetland Wildlife Refuge”, forming part of the National System of Protected Areas.
- It extends more than 100 km from Panama City in the west to the border between Panama and Darien Provinces to the east and includes about 85,000 ha of mangrove forest. The wide tidal mudflats also form part of the Site.
- Due to the large number of migratory shorebirds, in 2005 the area has formed part of the Hemispheric Network of Shorebird Reserves and is known as the most important site in Central America.

Panama Bay Wetland Wildlife Refuge

- On 27 April 2012, the Panamanian Supreme Court temporarily suspended the regulation of the National Environment Authority (ANAM) that created the Panama Bay Wetland Wildlife Refuge.
- The western sections of the Wetland near Panama City are urban expansion areas and the temporary injunction facilitated land reclamation and mangrove clearing for housing and tourist developments.

Panama Bay Wetland Wildlife Refuge

- Soon after on 23 May 2012, the Panamanian Aquatic Resources Authority (ARAP) promulgated a resolution that decreased by 90% the cost of permits for removing mangroves, as well as the fines for unpermitted mangrove removal.
- In May 2012 the Ministry of Housing and Land Use (MIVIOT) began revising its land use plans for properties inside coastal wetlands and suggested a reduction in the limits of the Refuge.

Panama Bay Wetland Wildlife Refuge

- In June 2012, the Panama City Municipal Government emitted a decree that suspended filling of wetlands and movement of soil in the Juan Díaz and Tocumen Wetlands until **someone** performed scientific studies.

Construction activities continued,
however. . . .

Pressure from Development Projects

Conflict Area

- In the area of Juan Díaz south of the Southern Expressway there are 21 projects either proposed or under construction. Four of these are within the limits of the protected area.
- Some of the projects are backed by investors from the highest levels of government.

Santa María Country Club

Developer = Ideal Living Corporation

Ideal Living Corporation?

Parque Industrial Zona Sur

Risks of Flooding – Environmental Justice Issues

An Expressway and Filling of the Mangrove Ecosystem increase the risk of flooding in low income neighborhoods.

Environmental Group Campaigns

- Panamanglar – www.panamanglar.org - This was a coordinated project of 20 environmental NGOs that attempted to educate the public about the importance of the mangrove ecosystem.
- Articles in the national press and communication media
- International campaign (IUCN, Audubon Society, Mangrove Action Project)
- Meetings in communities at risk of flooding due to the filling of mangroves

Supreme Court – December 2013

- On December 23, 2013 the Supreme Court reestablished the Panama Bay protected area.
- The court also called on environmental authorities to aggressively defend the public interest in Panama Bay Wetlands and noted their deficiencies in this arena.

Law No. 1 of 2015

- The National Assembly declared the Panama Bay Wetlands Ramsar Site a Wildlife Refuge. The vehicle was a LAW (stronger than the prior RESOLUTION).
- The boundaries would be the original boundaries.
- Environmental authorities should develop a management Plan within 2 years.
- Coordination between institutions of the Central Government and the Municipalities.

Law No. 1 of 2015

- Prohibitions
 - Cutting, removal, filling of mangroves and all activities that could affect their hydrology
 - Deposit of solid wastes
 - Release of pollutants into the marine and river waters
 - All new infrastructure
 - Entrance of new occupants and residents

The Challenge

- The opinion of the Supreme Court (2013) and Law No. 1 of 2015 represented victories for the Ramsar Site and environmentalists. However, today mangrove removal and filling continue in areas adjacent to Panama City.

Panama Bay Wetland Wildlife Refuge

- The final outcome of this conflict is still open. . . .
- Environmental groups are organized.
- The question is whether the government will realize the important ecosystem functions that mangroves provide.
- As of August 2018, the Management Plan has not been developed.

Community Involvement

Principles of Public Participation - 1

- The public has a right to participate in and contribute to decisions that affect their livelihoods.
- Public participation includes a promise that participation will contribute to influencing the final decision.
- The process communicates the interests of all participants with fairness.
- Public participation searches for and facilitates the involvement of all persons who could potentially be affected.

Principles of Public Participation - 2

- Public participation offers participants the opportunity to determine how they will participate.
- The process offers participants the information they need to participate effectively.
- The process informs participants how their contribution affected the final decision.
- Participation is dynamic (It continues.)

Community Involvement

- Engaging fishers and other users usually improves outcomes.
- At all points in the process
 - Initial research and monitoring
 - Selection of Marine Reserve sites
 - Implementation
 - Monitoring
 - Adaptive management

Social Impacts – Who Gains? Who Loses?

EQUITY

- Often users who are excluded from Marine Reserves may be considered “losers”. They may experience lost livelihood opportunities, increased poverty, exclusion from management, or displacement. Thus, fishers may be opposed to Marine Reserves.
- It is difficult for them to see that Marine Reserves can be important fishery management tools that may promote sustainable fisheries. These are long-term benefits.

Social Impacts – Who Gains? Who Loses?

- Transition period to minimize the economic impacts of Marine Reserves for the “losers” –
 - phaseout of fisheries over time
 - training for alternative livelihoods
 - fisheries buyouts
 - TURF-reserves
 - treating Marine Reserves as a business with users as shareholders who could obtain a return on their investment in the future
- Benefit-sharing with local communities

Variations of Public Participation Mechanisms

- Informational Materials
- Technical Reports
- Newspaper Articles
- Information Centers
- Web Sites
- Expert Panels
- Interviews with the Public

Variations of Public Participation Mechanisms

- Surveys
- Focal Groups
- Public Hearings
- Advisory Councils
- Workshops
- Visioning Exercises
- Referenda

Spectrum of Public Participation

Increasing Level of Public Impact



INFORM

CONSULT

INVOLVE

COLLABORATE

EMPOWER

INFORM

CONSULT

- Accept objectives from the public that help
understand the response opportunities, alternatives, and potential solutions.
- SURVEYS
- WEBSITES & SOCIAL MEDIA
- PUBLIC MEETINGS
- INFORMATION FACT SHEETS
- LOCAL GROUPS
- APPLICATIONS FOR PUBLIC COMMENTS
- RADIO & TV PROGRAMS
- SOCIAL MEDIA FEEDBACK

INVOLVE

COLLABORATE

- Work directly with the public on the development of the project to guarantee that public concerns are developed and considered and the selected option.
- WORKSHOPS
- ADVISORY COUNCIL
- EXERCISES TO FORMULATE A VISION FOR THE FUTURE –
- CONSENSUS-BUILDING EXERCISES
- PARTICIPATORY DECISIONS

EMPOWER

- Place the final decision in hands of the public
- PUBLIC JURY
- REFERENDUM
- DELEGATED DECISION TO A MANAGEMENT COUNCIL

The Case of the Florida Keys National Marine Sanctuary (FKNMS)

- The US Congress created the FKNMS in 1990 without a Management Plan.
- It took the responsible agency (NOAA) 6 years to develop a Management Plan.
- NOAA used the typical public participation strategies – public hearings and publications, as well as a Sanctuary Advisory Council.
- The planners were from NOAA Headquarters – which local users resented.
- Local opposition to the FKNMS was fierce.

FKNMS Sanctuary Advisory Council

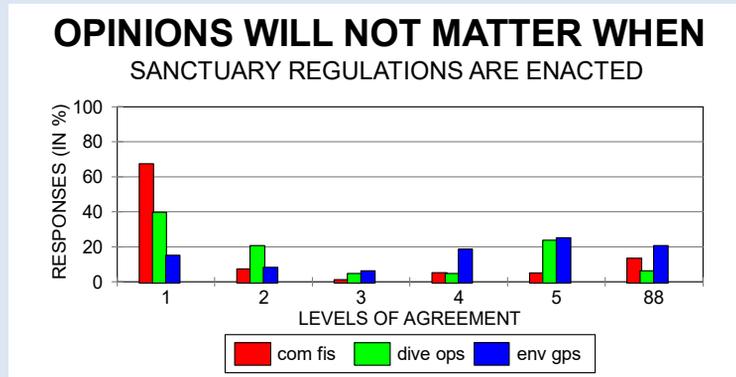
- Community-based advisory council required from the 1990 legislation that established the FKNMS.
- Sanctuary Advisory Council provides advice and recommendations that the Sanctuary Superintendent **may** accept.
- Voting Membership – boating industry, conservation groups, dive shops, environmental education groups, fishing sector, scientific research, submerged cultural resources, tourism sector, local government

FKNMS User Perceptions

- Our research involved surveys of hundreds of persons from different user groups – commercial fishers, dive operators, and environmental group members.
- We assessed their perceptions of the FKNMS planning process, zoning, socio-economic impacts, as well as their sources of information about the FKNMS.

Stakeholder Perceptions – Florida Keys National Marine Sanctuary

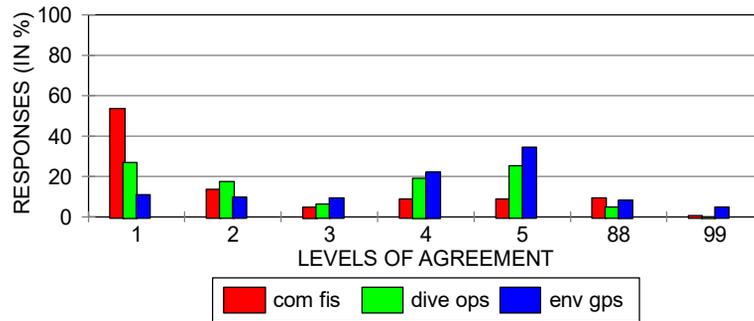
Surveys of User Groups



Stakeholder Perceptions – Florida Keys National Marine Sanctuary

Surveys of User Groups

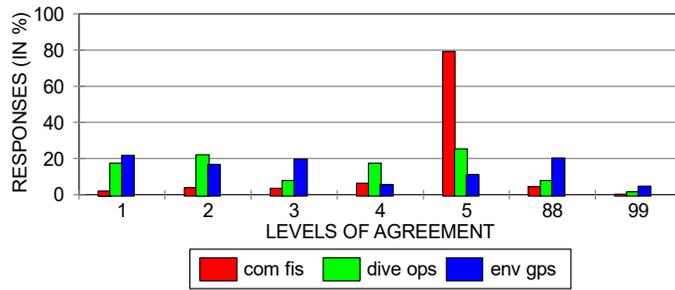
PARTICIPATION CANNOT MAKE A DIFFERENCE IN THE SANCTUARY PROCESS



Stakeholder Perceptions – Florida Keys National Marine Sanctuary

Surveys of User Groups

I SUPPORT ESTABLISHING ZONES AS PROPOSED IN THE SANCTUARY PLAN



Florida Keys National Marine Sanctuary

In 1996 NOAA
published the
Draft
Management
Plan. The most
controversial
topic was
marine zoning.

Florida Keys National Marine Sanctuary

- NOV 1996 – In a Non-Binding Referendum, residents of the Florida Keys rejected the FKNMS 55% to 45%.
- 1997 – As a result of the strong opposition, NOAA revised the Draft Management Plan and published the Final Management Plan.

Florida Keys National Marine Sanctuary

The Final
Zoning Plan
eliminated 2
of the 3
Marine
Reserves.

FKNMS and Tortugas 2000

- The Final Management Plan highlighted the goal of creating a Marine Reserve “somewhere” in the far west of the FKNMS.
- Strong opposition from fishers

FKNMS and Tortugas 2000

- A 24-Member Working Group was formed in 1998.
- Members represented the different fishing communities, environmental groups, scientific communities, and regulatory communities.
- Their task was to recommend limits to the Dry Tortugas Marine Reserve.
- “Consensus” was the ground rule. Without consensus, there would be no Marine Reserve.

FKNMS and Tortugas 2000

- The Working Group heard scientific and socio-economic evidence about the Dry Tortugas Area.
- Taking into account the trans-disciplinary evidence, the Working Group decided unanimously for limits to a Marine Reserve in the Dry Tortugas region of the FKNMS.

Caribbean Spiny Lobster Catch in the Dry Tortugas Area

Shrimp Catch in the Dry Tortugas Area

FKNMS and Tortugas 2000

The Dry Tortugas Marine Reserve (almost 500 km² in area) was implemented in 2001.

Without the participation and consensus of all the stakeholders, the Marine Reserve would have been impossible.

FKNMS Restudy

- We repeated the 1996 surveys in 2006 among three different groups (commercial fishers, dive operators, and environmental group members).
- Surveys showed increased support for the FKNMS and NOAA's efforts – as well as remaining doubts among significant sectors of commercial fishers.

FKNMS Restudy (Commercial Fishers)

Question	Strongly Agree & Agree		Disagree & Strongly Disagree	
	1996	2006	1996	2006
NOAA process to develop boundaries for zones was open and fair to all groups.	8.9%	27.6%	61.6%	51.4%
NOAA has not addressed the concerns of citizens in developing FKNMS regulations.	75.6%	58.1%	7.3%	24.3%
FKNMS zones have reduced conflicts between user groups.	11.4%	22.4%	74.8%	57.3%
I support establishment of FKNMS zones as they currently exist.	5.7%	39.6%	86.2%	48.3%

FKNMS Restudy (Commercial Fishers)

Question	Strongly Agree & Agree		Disagree & Strongly Disagree	
	1996	2006	1996	2006
Once FKNMS regulations have been adopted there is no way an average person could voice his/her opinion on their usefulness.	77.2%	63.1%	10.7%	20.7%
The Florida Keys have experienced a net economic benefit from the FKNMS.	16.4%	39.4%	69.7%	44.5%
I generally support establishment of the FKNMS.	12.7%	41.7%	78.4%	42%

Opposition from Resource Users

Challenges to Creation of a Marine Reserve

**The Case of Biscayne National Park
(Florida, USA)**

Biscayne National Park (BNP)

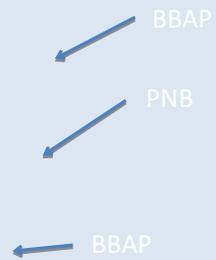
← BNP

←
FKNMS

Biscayne National Park and Miami

- Biscayne Bay extends 56 km from north to south.
- It is adjacent to Miami –an urban zone with 2.6 million residents
- Shallow Bathymetry
- From west to east, BNP has 1,953 ha of mangroves, shallow Biscayne Bay, 42 key islands, and open ocean to 18 meters depth.

Map of Biscayne National Park



Biscayne National Park (BNP)

- Biscayne is the largest marine park in the National Park System (702 km²).
- Over 95% of the park area is marine. Only 5% is terrestrial (fringing mangroves and coralline barrier islands).
- BNP includes the northernmost extent of the Florida Keys coral reef tract that extends 320 km to the southwest (3rd longest in the world).

Benthic Habitats in BNP

Seagrass Beds – Green

Mix of Hard Bottom
and Seagrass Beds –
Yellow

Sand and Mud – Blue

Coral Reefs – Red

History of Biscayne National Park

- 1968 – Congress designated Biscayne National Monument by law and managed to block urban development that would have converted the area into “Islandia”, a “Miami Beach II”.
- 1980 – Congress expanded the park limits northward and declared the entire area Biscayne National Park.
- 1983 – 1st General Management Plan was approved
- 2001 – Start of the process to revise the Management Plan (Scoping Meetings)
- 2003 - 2009 – Many rounds of evaluation meetings

History of Biscayne National Park

- 2011 – National Park Service (NPS) published a Draft General Management Plan together with a DEIS with proposals for a Marine Reserve.
- 2013 – The Planning Team added 2 more alternatives in a Supplement to the Draft Plan.
- 2014 – 3 more public hearings
- MAY 2015 – NPS released a Final General Management Plan and FEIS.
- 31 AUG 2015 – Approval of the Final Plan by the NPS. (Record of Decision)
- During the entire process, NPS organized 24 public hearings and received over 43,000 written comments.

Uses of Biscayne National Park

- Limited Commercial Fishing for Pink Shrimp
- Recreational Fishing
- Recreational Boating
- Diving
- Maritime Transportation
- Eco-Tourism
- Scientific Research

Over 486,848 persons visited the Park in 2013. The majority entered by small craft and did not even know that they were in a National Park.

Inter-Governmental Management Challenges

- By law the State of Florida maintains ambiguous control over fishing activities in the marine areas of Biscayne National Park.

Overfishing of Reef Fish

Many species
of reef fish
(snapper and
grouper) are
over-
exploited.

Draft General Management Plan (2011)

Alternatives in the Draft Management Plan

- The Draft Management Plan analyzed 5 alternatives with different mixtures of zones.
- Alternatives 3, 4, and 5 contained Marine Reserves.

Alternative 1 – No Action Alternative

The No Action Alternative
is a legal mandate.

It projects the current
situation into the future
and presents a baseline for
comparison.

Alternative 4 – Preferred Alternative

Alternative 4 was the Preferred Alternative of the NPS.

Its Marine Reserve would cover 4,252 ha (7% of the Park's area and 30% of the coral reef habitat).

Alternative 5

Alternative 5 was the environmentally favorable alternative and the most restrictive.

It included a Marine Reserve of 8,827 ha (15% of the Park area and 62% of the reef area).

Strong Opposition to the Creation of a Marine Reserve in BNP

- Recreational fishing contributes about \$7.6 billion to Florida's economy each year.
- A very strong sportfishing lobby exists in opposition to fishing restrictions and the creation of Marine Reserves.
- Its usual arguments are that the scientific information is uncertain and not conclusive, that other sectors are responsible for the problems, and that less drastic measures should be adopted.

Strong Opposition to the Creation of a Marine Reserve in BNP

- The sportfishing lobby enjoys support from the Florida Fish and Wildlife Conservation Commission (FWCC).
- FWCC has argued that Marine Reserves should only be used as a last resort. Before taking such “drastic measures”, less restrictive measures should be adopted and evaluated.

Opposition to and **Support for** the **Creation of a Marine Reserve in BNP**

- Jet Ski Users and Associations
- Sportfishing Associations and Groups
- + Environmental Groups
- + Scientists and Researchers

Supplement to the Draft GMP (2013)

- NPS responded to the vocal opposition to the Marine Reserves by creating 2 new alternatives with “Special Recreation Zones”.
- These zones would have required fishing permits, placed restrictions on anchoring, and mandated closed seasons.

Final General Management Plan

Final General Management Plan (May 2015)

- The NPS created an additional alternative in its Final General Management Plan - Alternative 8.
- Alternative 8 included a No-Take Marine Reserve of 4,252 ha (only 30% of the coral reef habitat or 6% of the BNP area). 70% of BNP waters would remain open for sportfishing.

Final General Management Plan (2015)

- The Marine Reserve would protect against overfishing, reduce anchor damage to the reef structure, and reduce boat groundings on the reef habitat.
- Divers would have the opportunity to observe a healthy coral reef with greater populations of larger fish.

Approval of the Final General Management Plan

- August 2015 – NPS approved the Management Plan (Record of Decision)
- Partial Implementation of the Plan began within 30 days del Plan (October 2015)
- Regulations promulgated in 2016
- However, strong opposition from the Sportfishing Sector and allies in the Florida Congressional delegation, as well as the anti-environment Trump Administration, have led to the abandonment of the plans for the Marine Reserve.

Financing

Financing

Financing for MPAs must be sustainable.

Possible Funding Sources

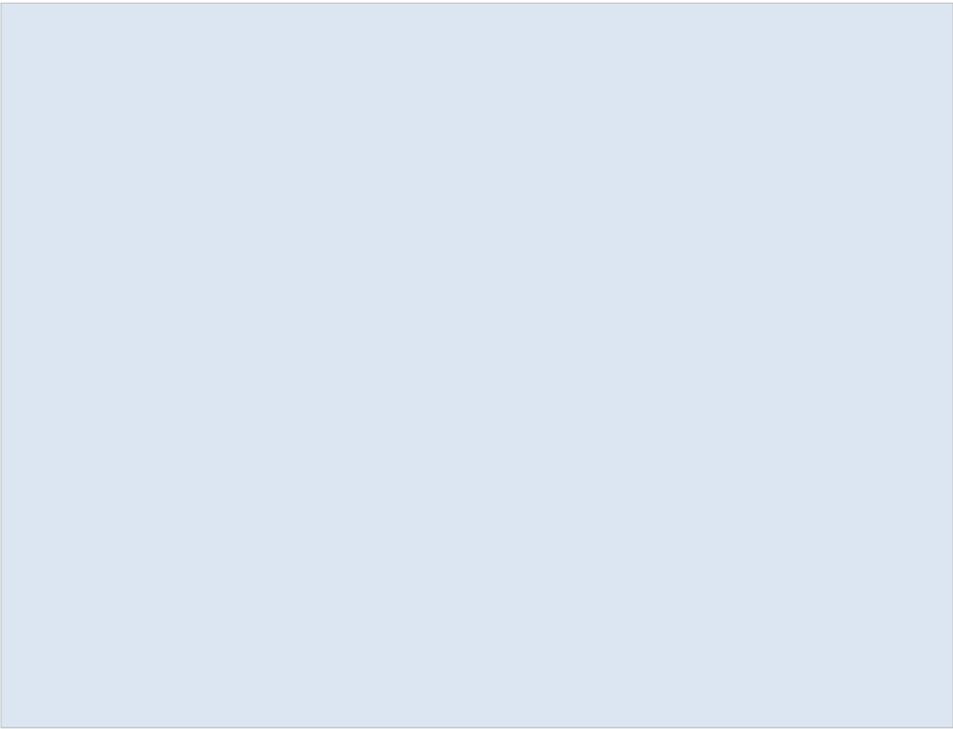
- Mitigation Payments
- Blue Carbon (REDD+)
- PES – Payment for Ecosystem Services (taxes, fines and fees from shipping industry, oil and gas extraction)
- Cost-Sharing with beneficiaries – fishing and tourism industries
- Block Chain Financing

Mitigation and Mangrove Restoration

- Payment to a Restoration Fund or Mitigation Bank
 - The Fund can be used to create a large restoration project.
 - One large area is ecologically superior to many small fragmented areas.
 - The Fund could be administered by a government entity, an NGO, or a private company.

Payment for Ecosystem Services (PES)

- A new concept for the conservation of coastal resources that is based on the capture of values for ecosystem services.
- PES depends on investments and payments of the private sector.
- These payments can compliment management efforts of the public sector.



Current Use of PES

- There are few examples in the coastal-marine environment.
- Perhaps this is due to the public property regime in coastal-marine lands and waters.
- Moreover, the causation chain of responsibility is not always direct and evident in coastal and marine areas.

Potential Opportunities for Future Applications of PES in the Coastal- Marine Areas

Oppportunities – Supply of Clean Water

- Theme – Supply of clean water from a watershed
- Demand – Users of water in an estuary or the lower reaches of the watershed and municipal water supply companies pay for clean water.
- Offer – Land owners in upper reaches of the watershed who maintain their lands as forest or in its natural state

Opportunity – Protection of Mangroves as Essential Fish Habitat

- Theme – Protection of mangroves for their function as nurseries for marine resources
- Demand – Fishing sector could pay for the protection of important nursery sites for juveniles of commercially important species.
- Offer – Mangrove users and stewards, National Governments

Opportunity – Carbon Markets

- Theme – Payment for Carbon Sequestration and Protection of the Mangrove Ecosystem
- Demand – International Funds (GEF), Voluntary Carbon Markets, CO₂ emitters in the North (REDD+)
- Offer – National Governments or Local Communities (Mangrove Stewards)

Opportunity – Biodiversity Conservation

- Theme – Payments to maintain biodiversity, corridors for migratory birds, options for potential use of genetic resources
- Demand – NGOs, international conservation funds
- Offer – National Governments or Stewards of Biodiversity

Opportunity – Marine Reserves

- Theme – Payments to protect an area that is important in the life cycle of an economically important fish species (enforcement, research expenses)
- Demand – Fishing sector that benefits from the marine reserve (spillover effects, larval export)
- Offer – National Governments

Uncertainties and Challenges

- Difficulties in identifying and quantifying Environmental Services.
- Who pays? Difficult to determine this?
- Who will collect? Difficult to determine this.
- Who would administer the system in an open and transparent way?
- Coastal lands and marine waters usually do not have private owners, rather they are publically owned.

Enforcement

Enforcement

- MPAs must be effective – not “paper tigers”
- TURFs – Exclusive community rights could lead to self-patrolling of interlopers and an increased sense of stewardship.
- Increase in law enforcement
- New Technologies
 - Satellite tracking; VMS

**Law Enforcement Chain
Analysis in the Eastern
Tropical Pacific**

Objective of the Study

- Determine strengths and weaknesses of the legal framework and their compatibility with existing management plans;
- Assess the effectiveness of law enforcement programs considering both soft and hard measures as compared to their initial design;
- Pinpoint the weaknesses of the law enforcement system and recommend concrete cost-effective actions to improve overall effectiveness of programs.

Methodology

- Four-country analysis using a similar methodology that involved interviews and examination of MPA documents and judicial records:
 - Background information: legal frameworks, actors, existing educational and outreach activities
 - Surveillance and detection capabilities
 - Interception and arrest procedures and capacities
 - Prosecution records (administrative, civil, criminal)
 - Sentencing success

Eastern Tropical Pacific Region

Eastern Tropical Pacific Region

- 2002 – The four countries (Costa Rica, Colombia, Ecuador, Panamá) signed an agreement creating the Eastern Tropical Pacific Marine Corridor (211 million ha).
- Initiative supported by UNEP, UNESCO, IUCN, and Conservation International.
- Objectives – 1) promote the conservation and sustainable development of the ETP Region and its exceptional marine biodiversity, 2) foster regional cooperation in training, education, and monitoring.

Characteristics of the ETP Region

- Defined by submarine ridges and the Panama Bight
- High marine biodiversity
- MPAs isolated from the continent
- High endemism
- Extreme climatic events (ENSO – El Niño)
- High biological productivity
- High levels of connectivity

Eastern Tropical Pacific MPAs

- ECUADOR - Galápagos Marine Reserve (1998)
- COSTA RICA - Isla del Coco National Park (1978)
- PANAMA - Coiba National Park (2004)
- COLOMBIA - Malpelo Flora and Fauna Sanctuary (1995)
- COLOMBIA - Gorgona Natural National Park (1983)

- UNESCO recognizes all 5 MPAs as World Heritage Sites.

Threats to the ETP MPAs – Illegal Fishing

- Illegal fishing
- Marine Pollution
- Unregulated tourism
- Introduction of invasive species

Threats to ETP MPAs – Unregulated Tourism

Enforcement Chain

- Law enforcement is essential for the success of MPA management plans.
- Enforcement is only as good as the weakest link in the enforcement chain.
- Unsuccessful enforcement creates an incentive for further infractions.

Detection

Problems

- Limited financial autonomy of MPAs
- Adjacent communities do not identify with the MPA.

Recommendations

- Create a local fund with monies paid by park visitors that the park director can use for urgent needs.
- Establish programs in communities in conjunction with a NGO to foster a sense of ownership of the MPA and realization of benefits that the MPA can generate for them.

Detection

Problems

- Low salaries of park guards
- Insufficient numbers of personnel

Recommendations

- Increase salaries or per diem support.
- Develop cooperation with Environmental Police or Coast Guard to increase personnel during operations.

Detection

Problems

- Institutional weaknesses

Recommendations

- Develop manuals with functions of all MPA personnel.
- Develop procedures for documenting and storing information.
- Designate a maintenance position at every MPA.
- Create the capacity for maintaining and repairing boats and motors at every MPA.

Detection

Problems

- Training level of Park Guards is low and there are few opportunities for learning new skills.

Recommendations

- Prepare course materials for Park Guards in environmental and enforcement issues (such as boarding, interception, documentation, investigation).
- Create a School for Park Guards in the ETP Region.

Detection

Problems

- Limited capacity for detection of violators

Recommendations

- Implement electronic means of detection (radar, VMS)
- Allow Environmental Authorities to use these electronic systems for monitoring park resources.

Detection

Problems

- Lack of basic detection equipment (binoculars, cameras, rapid boats, radios, GPS, night vision equipment)
- Absence of current registries of MPA users (fishers, tour operators) and of infractions

Recommendations

- Purchase or obtain through donations.
- Create these data bases.

Galapagos Patrol Boats

Interception and Arrest

Problems

- Lack of training of proper procedures for boarding vessels and of crime scene investigation.

Recommendations

- Regional training workshops to standardize procedures and protocols among the four countries.

Confiscation of Sea Cucumbers

Prosecution

Problems

- Local marine environmental and MPA laws and regulations are confusing, have overlaps and gaps, and, moreover, are constantly violated.

Recommendations

- Revise legislation and clarify institutional roles.
- Develop inter-agency enforcement mechanisms at the operational level.
- Increase the judicial authority of the operational MPA staff to write tickets for common violations.

Prosecution

Problems

- Constant pressure of industrial fishing fleets on the MPA marine resources

Recommendations

- Increase enforcement in the EEZ outside the MPAs.
- Create buffer zones around the MPAs.
- Integrate the electronic monitoring systems between the 4 countries. Begin with a regional workshop followed by bilateral or multilateral agreements.

Infraction, Sanction or Sentencing

Problems

- Weak success in sanctioning infractions and judicial proceedings

Recommendations

- Implement economic sanctions, such as:
 - Detention of the vessel
 - Prohibition of navigation permits
 - Retention of fishing gear
 - Temporary suspension of fishing licenses
 - Permanent revocation of operation licenses

Infraction, Sanction or Sentencing

Problems

- High number of failed cases

Recommendations

- Provide technical and legal assistance of environmental authorities (NGO role).
- Conduct regular workshops for judges and MPA attorneys.
- Use the press and other media to inform the public about cases of impunity.

Infraction, Sanction or Sentencing

Problems

- Impunity due to other pressures

Recommendations

- Promote application of administrative sanctions rather than judicial proceeding to minimize intervention.
- Assign additional attorneys paid by NGOs to follow these cases.
- Utilize private law suits with private attorneys for prominent cases.

Monitoring and Research

Support for MPA Designation and
Management

Social Science Research

- Social Science has been under-utilized in the Management of MPAs.
- Social Science information is essential at all stages of the management process.

Central Social Science Themes

1. Governance and Institutions

- Nature of the Relationships between Agencies and between the Various Levels of Government
- Gaps and Overlaps in Agencies' Authority
- Public Participation Mechanisms

2. Use Patterns

- Ways in which people use the resources (both extractive and non-extractive) in time and space

Central Social Science Themes

3. Attitudes, Perceptions, and Beliefs

- How the public and resource users view the environmental resources, environmental quality, and the management process.
- How Traditional Ecological Knowledge can be incorporated into the current management process.

4. Economics

- Baseline economic information about the different activities (fishing, diving, tourism)
- Valuation – both market and non-market values
- Benefits and Costs of Management
- Monitoring of social and economic impact of MPAs to track distribution of costs and benefits

Central Social Science Themes

5. Communities

- Socio-economic conditions of the community
- Capacity of communities to foster a stewardship ethic
- Information flows and decision-making
- Reaching, integrating, and empowering marginalized groups

Biological Questions

- Larval transport in and out of Marine Reserves
- Is the Marine Reserve self-replenishing?
- Can the Marine Reserve Network exchange recruits?
- Marine Reserve benefits over time and comparison with control areas – abundance, size, biomass, species diversity
- Impact of Marine Reserves on fisheries and biodiversity in adjacent areas
- What is the optimal size of the Marine Reserve?

Moving Forward

Areas Beyond National Jurisdiction(ABNJ)

- High Sea areas – Half of the planet but its biodiversity is poorly protected. Less than 1% of ABNJ is protected.
- No single global legal instrument exists to protect Biodiversity in ABNJ.
- 2016 – UN General Assembly resolution to begin the process toward a binding international treaty concerning the conservation and sustainable use of marine biodiversity in ABNJ.
- Issues
 - MPA designation (Area-based management tools) – North/South divide
 - Environmental Impact Assessments
 - Benefit-sharing of Marine Genetic Resources
 - Capacity Building

Effective Marine Protected Areas

- Development of Management Plans
- Implementation of Management Strategies
- Sustainable Funding Mechanisms
- Inclusion of Users and Local Communities
- Creation of Benefits to Local Communities

Thank you for your Attention!