Society and MPAs: Understanding the Human Dimensions

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Talk overview

- The marine conservation and MPA discourse
- Philippine context
- Empirical findings
- MPAs and social design criteria
- Future research

The most favored tool of marine conservation: the marine protected area or 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."

(Resolution 17.38 of the IUCN general assembly (1988) reaffirmed in Resolution 19.46 (1994))

In the Philippines, MPAs are frequently small (<10 ha), where fishing is prohibited, but where recreational diving is allowed.

State of Understanding about MPAs and the human dimension

Know

- Constituency important
- Participatory processes fundamental to avoid backlash
- Conflict derails management processes

Don't know

- A lot!
- Process to develop effective, participative processes in divided contexts
- How do people perceive the ocean, MPAs
- Whether modeling the way devl. optimal design

Diverse goals for MPAs

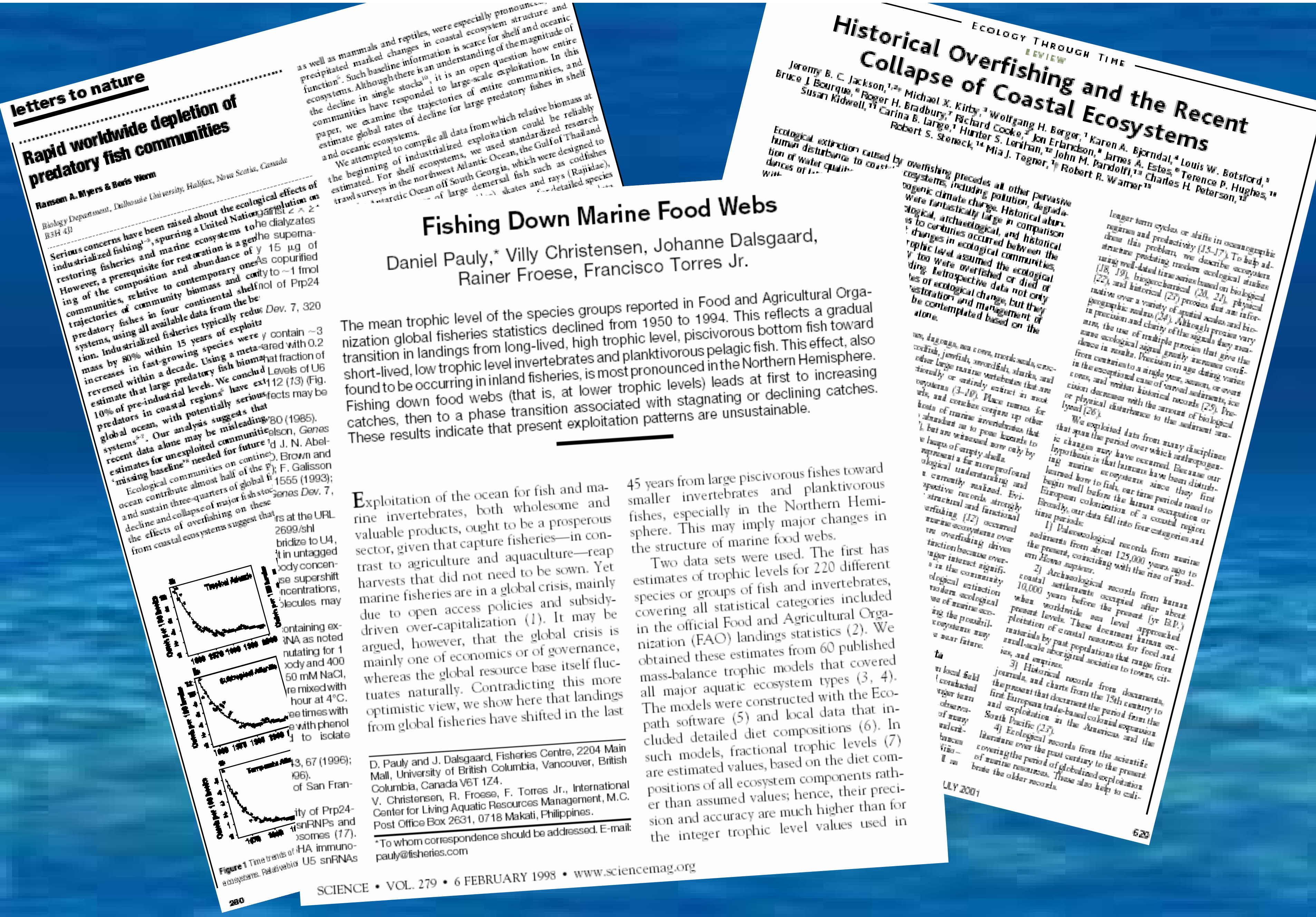
Biological

- Habitat and biodiversity protection
- Ecosystem form and function relative to unexploited conditions
- Protecting non-target species
- Ecosystem restoration

Social

- Religious/spiritual fulfillment
- Aesthetic
- Economic vitality
- Environment stewardship and education
- Improved or restored fishery
- Increasing food supply and fundamental needs
- Pride
- Increase government support and accountability
- Empowerment

Read all about it: influential papers declare worldwide ocean decline!



letters to nature

Rapid worldwide depletion of predatory fish communities

Ransom A. Myers & Boris Worm

Biology Department, Dalhousie University, Halifax, Nova Scotia, Canada B3H 4J1

Serious concerns have been raised about the ecological effects of industrialized fishing, spurring a United Nations resolution on restoring fisheries and marine ecosystems to healthy levels. However, a prerequisite for restoration is a general understanding of the composition and abundance of unexploited fish communities, relative to contemporary ones. We constructed trajectories of community biomass and composition of large predatory fishes in four continental shelf and nine oceanic systems, using all available data from the beginning of exploitation. Industrialized fisheries typically reduced community biomass by 80% within 15 years of exploitation. Compensatory increases in fast-growing species were observed, but often reversed within a decade. Using a meta-analytic approach, we estimate that large predatory fish biomass today is only about 10% of pre-industrial levels. We conclude that declines of large predators in coastal regions have extended throughout the global ocean, with potentially serious consequences for ecosystems. Our analysis suggests that management based on recent data alone may be misleading, and provides minimum estimates for unexploited communities, which could serve as the 'missing baseline' needed for future restoration efforts.

Figure 1 Time trends of ...

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Fishing Down Marine Food Webs

Daniel Pauly,* Villy Christensen, Johanne Dalsgaard, Rainer Froese, Francisco Torres Jr.

The mean trophic level of the species groups reported in Food and Agricultural Organization global fisheries statistics declined from 1950 to 1994. This reflects a gradual transition in landings from long-lived, high trophic level, piscivorous bottom fish toward short-lived, low trophic level invertebrates and planktivorous pelagic fish. This effect, also found to be occurring in inland fisheries, is most pronounced in the Northern Hemisphere. Fishing down food webs (that is, at lower trophic levels) leads at first to increasing catches, then to a phase transition associated with stagnating or declining catches. These results indicate that present exploitation patterns are unsustainable.

Exploitation of the ocean for fish and marine invertebrates, both wholesome and valuable products, ought to be a prosperous sector, given that capture fisheries—in contrast to agriculture and aquaculture—reap harvests that did not need to be sown. Yet marine fisheries are in a global crisis, mainly due to open access policies and subsidy-driven over-capitalization (1). It may be argued, however, that the global crisis is mainly one of economics or of governance, whereas the global resource base itself fluctuates naturally. Contradicting this more optimistic view, we show here that landings from global fisheries have shifted in the last 45 years from large piscivorous fishes toward smaller invertebrates and planktivorous fishes, especially in the Northern Hemisphere. This may imply major changes in the structure of marine food webs.

Two data sets were used. The first has estimates of trophic levels for 220 different species or groups of fish and invertebrates, covering all statistical categories included in the official Food and Agricultural Organization (FAO) landings statistics (2). We obtained these estimates from 60 published mass-balance trophic models that covered all major aquatic ecosystem types (3, 4). The models were constructed with the Ecopath software (5) and local data that included detailed diet compositions (6). In such models, fractional trophic levels (7) are estimated values, based on the diet compositions of all ecosystem components rather than assumed values; hence, their precision and accuracy are much higher than for the integer trophic level values used in

D. Pauly and J. Dalsgaard, Fisheries Centre, 2204 Main Mall, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z4. V. Christensen, R. Froese, F. Torres Jr., International Center for Living Aquatic Resources Management, M.C. Post Office Box 2631, 0718 Makati, Philippines.

*To whom correspondence should be addressed. E-mail: pauly@fisheries.com

SCIENCE • VOL. 279 • 6 FEBRUARY 1998 • www.sciencemag.org

ECOLOGY THROUGH TIME

REVIEW

Historical Overfishing and the Recent Collapse of Coastal Ecosystems

Jeremy B. C. Jackson, Michael X. Kirby, Wolfgang H. Berger, Karen A. Bjorndal, Louis W. Botsford, Bruce J. Bourque, Roger H. Bradbury, Richard Cooke, Jon Erlandson, James A. Estes, Terence P. Hughes, Susan Kidwell, Carina B. Lange, Hunter S. Lenihan, John M. Pandolfi, Charles H. Peterson, Robert S. Steneck, Mia J. Tegner, Robert R. Warner

Ecological extinction caused by overfishing precedes all other pervasive human disturbance to coastal ecosystems, including pollution, degradation of water quality, and anthropogenic climate change. Historical abundances of large consumer species were fantastically large in comparison with recent observations. Paleoecological, archaeological, and historical data show that time lags of decades to centuries occurred between the onset of overfishing and consequent changes in ecological communities, because unfished species of similar trophic level assumed the ecological roles of overfished species until they too were overfished or died of epidemic diseases related to overcrowding. Retrospective data not only help to clarify underlying causes and rates of ecological change, but they also demonstrate achievable goals for restoration and management of coastal ecosystems that could not even be contemplated based on the limited perspective of recent observations alone.

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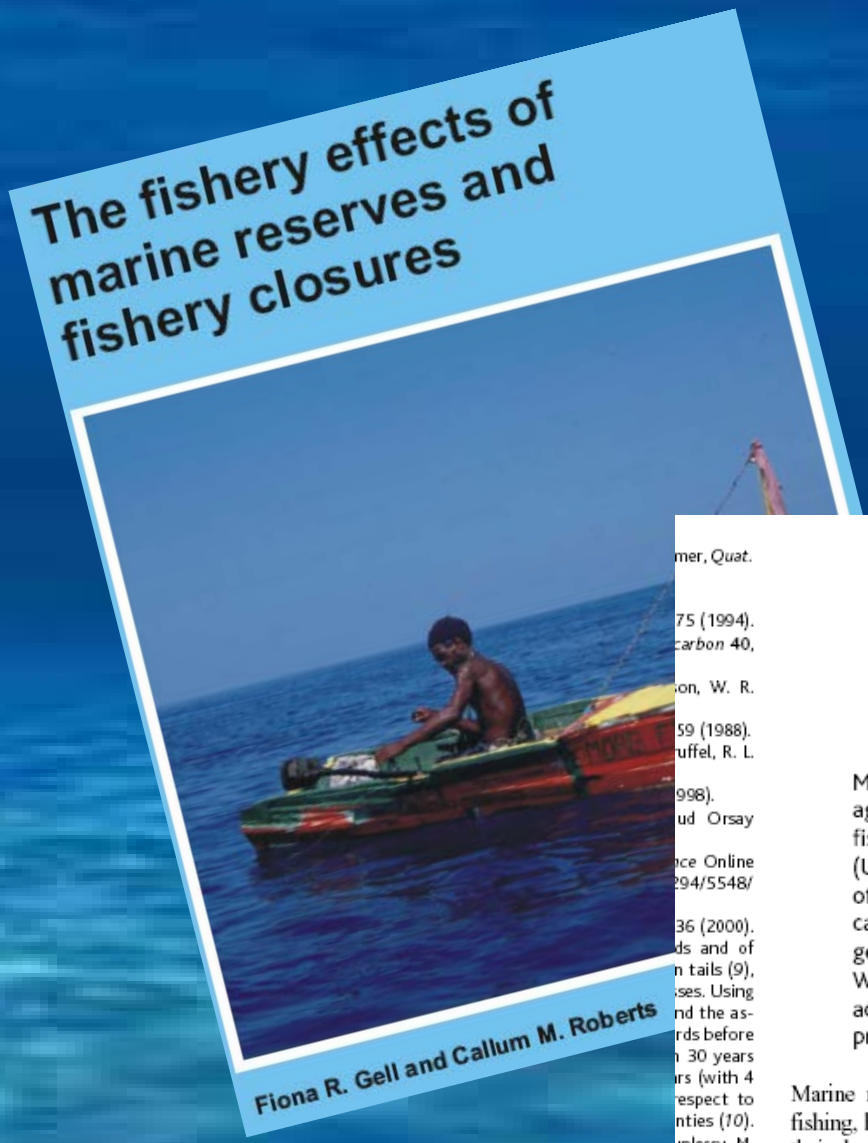
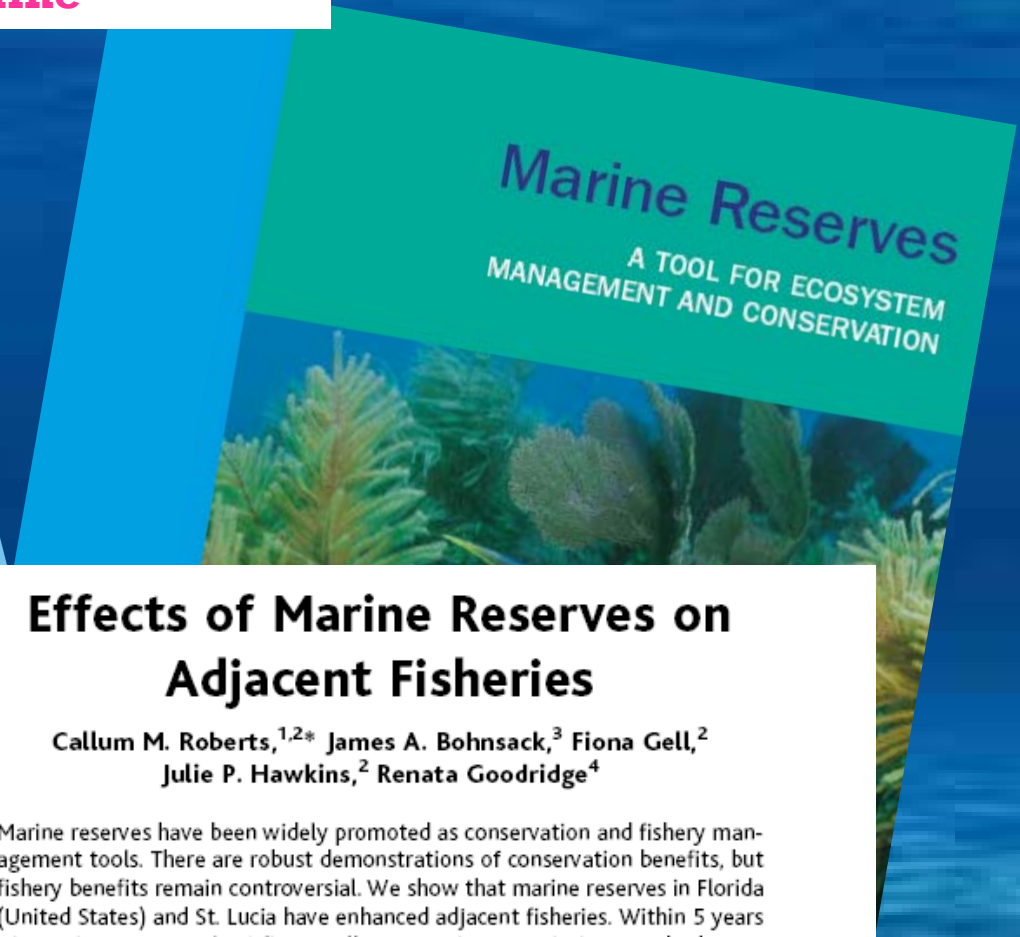
Influential papers and reports identifying MPAs as potent tools to address ocean decline





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Effects of Marine Reserves on Adjacent Fisheries

Callum M. Roberts,[1,2]* James A. Bohnsack,[3] Fiona Gell,[2] Julie P. Hawkins,[2] Renata Goodridge[4]

Marine reserves have been widely promoted as conservation and fishery management tools. There are robust demonstrations of conservation benefits, but fishery benefits remain controversial. We show that marine reserves in Florida (United States) and St. Lucia have enhanced adjacent fisheries. Within 5 years of creation, a network of five small reserves in St. Lucia increased adjacent catches of artisanal fishers by between 46 and 90%, depending on the type of gear the fishers used. In Florida, reserve zones in the Merritt Island National Wildlife Refuge have supplied increasing numbers of world record–sized fish to adjacent recreational fisheries since the 1970s. Our study confirms theoretical predictions that marine reserves can play a key role in supporting fisheries.

Marine reserves, areas that are closed to all fishing, have been attracting much attention for their dual potential as conservation and fishery management tools (*1*–*5*). A synthesis of more than 100 studies of reserves worldwide shows that protection from fishing leads to rapid increases in biomass, abundance, and average size of exploited organisms and to increased species diversity (*6*). Such effects are of great interest to fishery managers, because rebuilding

In response, ambitious targets for MPAs are set

WORLD PARKS CONGRESS 2003 DURBAN BENEFITS BEYOND BOUNDARIES IUCN

WPC Recommendation 22
Building a Global System of Marine and Coastal Protected Area Networks

The 17th IUCN General Assembly (San Jose, Costa Rica; 1988) adopted Recommendation 17.38 (*Protection of the coastal and marine environment*), which called on international bodies and all nations to establish a global representative system of marine protected areas (MPAs) to provide for the protection, restoration, wise use, understanding and enjoyment of the marine heritage of the world in perpetuity. Also, delegates attending the IVth World Parks Congress (Caracas, 1992) adopted Recommendation 11 (*Marine Protected Areas*), which called for the establishment of a global network of marine protected areas.

And, more recently, the 8th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) to the convention on biological diversity noted in March 2003 that "... the available indicate that regionally and globally, marine and protected area networks are severely deficient, and probably ... proportion of marine and coastal environments ... that the goal for marine ... should

Federal Register / Vol. 65, No. 105 / Wednesday, May 31, 2000 / Presidential Documents

Presidential Documents

Executive Order 13158 of May 26, 2000

Marine Protected Areas

By the authority vested in me as President by the laws of the United States of America and in fu... of the National Marine Sanctuaries Act (16 U.S.C. ... Wildlife Refuge System Administration Act of ... National Park Service Organic Act (16 U.S.C. ... Preservation Act (16 U.S.C. 470 *et seq.*), Wil... *et seq.*), Magnuson-Stevens Fishery Conservati... U.S.C. 1801 *et seq.*), Coastal Zone Manage... *seq.*), Endangered Species Act of 1973 (16 ... Mammal Protection Act (16 U.S.C. 1362 *et s*... (33 U.S.C. 1251 *et seq.*), National Environm... (42 U.S.C. 4321 *et seq.*), Outer Continent... 1331 *et seq.*), and other pertinent statutes, it i...

Section 1. *Purpose.* This Executive Order ... natural and cultural resources within the marine environ...

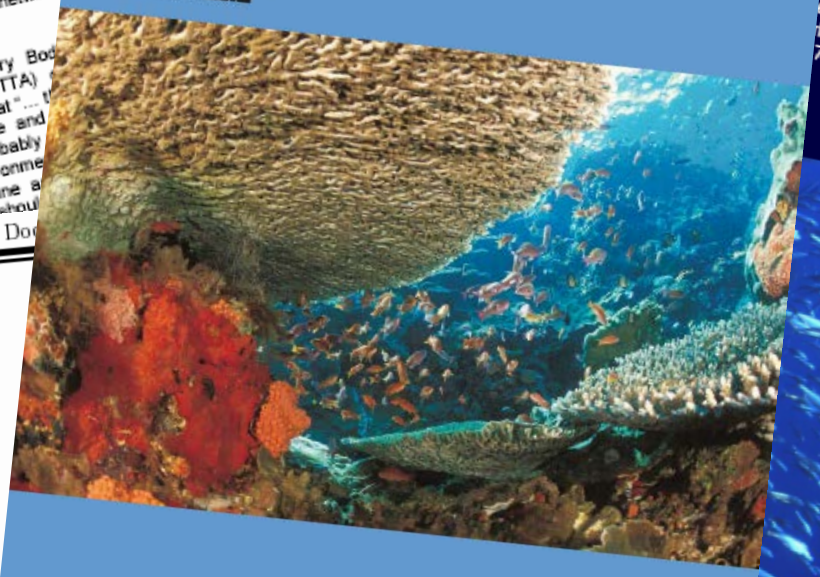
TEN-YEAR HIGH SEAS MARINE PROTECTED AREA STRATEGY:

A ten-year strategy to promote the development of a global representative system of high seas marine protected area networks

Summary Version
e Participants at the
ld Parks Congress,
7 September 2003)

WCPA

The Nature Conservancy



The Nature Conservancy's Marine Initiative

Although once considered a limitless and inexhaustible resource, the oceans of the world are increasingly in jeopardy. The cycle of influence between land and sea is delicate, and human activities are taking a heavy toll on the health of all ocean systems, from marshes and mangroves to reefs and the deepest reaches.

In response, The Nature Conservancy has launched the Marine Initiative to link land and sea conservation in an effort to protect the rich array of plant and animal life and safeguard the tremendous benefits the oceans provide.

But how influential are papers and reports on the human dimensions of MPAs?

Some emerging analyses suggest that MPAs may have complex, sometimes troubling, social dimensions

American Fisheries Society Symposium 00:000–000, 2004

In press, January 5, 2004

Marine Protected Areas as Biological Successes and Social Failures in Southeast Asia

PATRICK CHRISTIE[1]

School of Marine Affairs and Henry M. Jackson School of International Studies, University of Washington, 3707 Brooklyn Avenue NE, Seattle, Washington 98105-6715, USA

Abstract. Marine protected areas (MPAs) are of growing interest g... studied from a biological perspective, with some cases document... conditions and increased fish yields. The MPAs that meet narro... are generally presented as "successes." However, these same ... "failures" when social evaluation criteria are applied. A review o... and Indonesia demonstrates this scenario. The cases are revie... of biological and social success. Their historic and preser... reviewed. It is suggested that a strong linkage exists betwee... with social considerations determining long-term biologica... that standards for measuring both biological and social su... and that MPAs should be designed to meet multiple social an... and portrayal of MPAs has implications for the managem... broader discourse surrounding marine environmental man...

Introduction

The marine protected area (MPA) literature to date ... is mainly comprised of studies considering the bio... logical significance of this management approach. ... The so-called "spill-over effect," connectivity, ap... propriate dimensions, and habitat representation are ... some of the most active areas of inquiry (e.g., Russ ... and Alcala 1996; Salm et al. 2000; NRC 2001; Rob... erts et al. 2001). As highlighted in a recent essay by ... seventeen social scientists, MPA research and the ... resultant literature is generally lacking detailed ac... counts of the social implications of MPAs and the ... activities associated with them such as fishing, rec... reational diving, tourism, and research (Christie et ... al. 2003c). This paper grew out of a conference spon... sored by the National Oceanic and Atmospheric ... Administration (NOAA) in 2002 as an attempt to fill ... this notable gap in MPA research and published lit... erature (NOAA 2002). There are a few notable ex... ceptions to this characterization (e.g., Trist 1999; ... Sandersen and Koester 2000; Pollnac et al. 2001), ...

[1] E-mail: patricke@u.washington.edu

Recreating Ocean Space: Recreational Consumption and Representation of the Caribbean Marine Environment*

Carolyn Trist

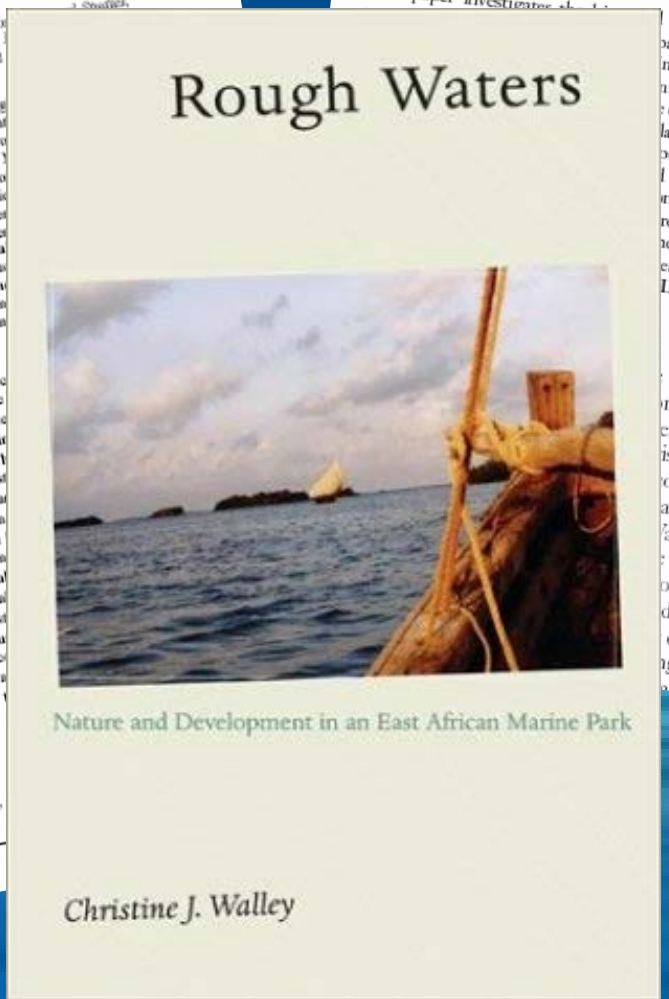
University of California, Berkeley

This paper investigates th... relationship between the development of marine-based tourism and repre... past 100 years, the Caribbean Sea has been transformed from a transportation ... into a commodity itself. Imagined by early travelers as a two-dimensional space ... ne part of a new tropical marine aesthetic, a three-dimensional spectacle to be ... changing representations of the marine environment as a space of consumption ... lationships between marine and terrestrial political economies. As marine-based ... power among coastal resource users has shifted. The increasingly conflictive ... l by the case of Soufrière in St. Lucia where new uses of marine space have ... nships. Soufrière's coastal economy has been transformed and its marine space ... resentations of the sea have been used to assert conflicting claims to resource ... he power of these representations by investigating their historical relationship ... ea in the international tourism industry. **Key Words: marine recreation, ... Lucia.**

... Caribbean ... mmodified ... esponse to ... ism. Once ... onnecting ... a is now a ... far I, trav... sea as a ... of history ... dventure ... colonial ... g in the ... and the ...

sea from a two-dimensional surface to a three-dimensional, ecologically fragile environment, establishing the link between recreation and conservation that is now central to marine resource politics in much of the Caribbean.

Changing representations of the sea associated with this new political economy of marine space[1] have become an integral part of the politics of resource access in coastal communities throughout the Caribbean region. The transformation has been particularly dramatic in the Soufrière area along the southwest coast of St. ... Lucia, where rapid growth in marine recreation ...



This has lead to analysis arguing for a cautious approach to MPAs and other PAs

AQUATIC CONSERVATION: MARINE AND FRESHWATER ECOSYSTEMS
Aquatic Conserv: Mar. Freshw. Ecosyst. (in press)
Published online in Wiley InterScience
(www.interscience.wiley.com). DOI: 10.1002/aqc.583

VIEWPOINT

Dangerous targets? Unresolved issues and ideological clashes around marine protected areas

TUNDI AGARDY[a,1,2,*], PETER BRIDGEWATER[b], MICHAEL P. CROSBY[c], JON DAY[d], PAUL K. DAYTON[e], RICHARD KENCHINGTON[f], DAN LAFFOLEY[g], PATRICK McCONNEY[h], PETER A. MURRAY[i], JOHN E. PARKS[j] and LELEI PEAU[k]

[a] *Sound Seas, Bethesda, MD, USA*
[b] *UNESCO Man and the Biosphere Program, Paris, France*
[c] *National Oceanic and Atmospheric Administration, Washington, DC, USA*
[d] *Great Barrier Reef Marine Park Authority, Townsville, Australia*
[e] *Scripps Institution of Oceanography, La Jolla, CA, USA*
[f] *Maritime Policy Centre, University of Wollongong, NSW, Australia*
[g] *English Nature, Peterborough, England, UK*
[h] *Caribbean Conservation Association, St Michael, Barbados*
[i] *Organization of Eastern Caribbean States, Environment and Sustainable Development Unit, Castries, Saint Lucia*
[j] *Biological Resources Program, World Resources Institute, Washington, DC, USA*
[k] *Department of Commerce, Government of American Samoa, Pago Pago, American Samoa, USA*

ABSTRACT

1. While conservationists, resource managers, scientists and coastal planners have recognized the broad applicability of marine protected areas (MPAs), they are often implemented without a firm understanding of the conservation science — both ecological and socio-economic — underlying marine protection. The rush to implement MPAs has set the stage for paradoxical differences of opinions in the marine conservation community.
2. The enthusiastic prescription of simplistic solutions to marine conservation problems risks polarization of interests and ultimately threatens *bona fide* progress in marine conservation. The blanket assignment and advocacy of empirically unsubstantiated rules of thumb in marine protection creates potentially dangerous targets for conservation science.
3. Clarity of definition, systematic testing of assumptions, and adaptive application of diverse MPA management approaches are needed so that the appropriate mix of various management tools can be utilized, depending upon specific goals and conditions. Scientists have a professional and

WORLD•WATCH
VISION FOR A SUSTAINABLE WORLD

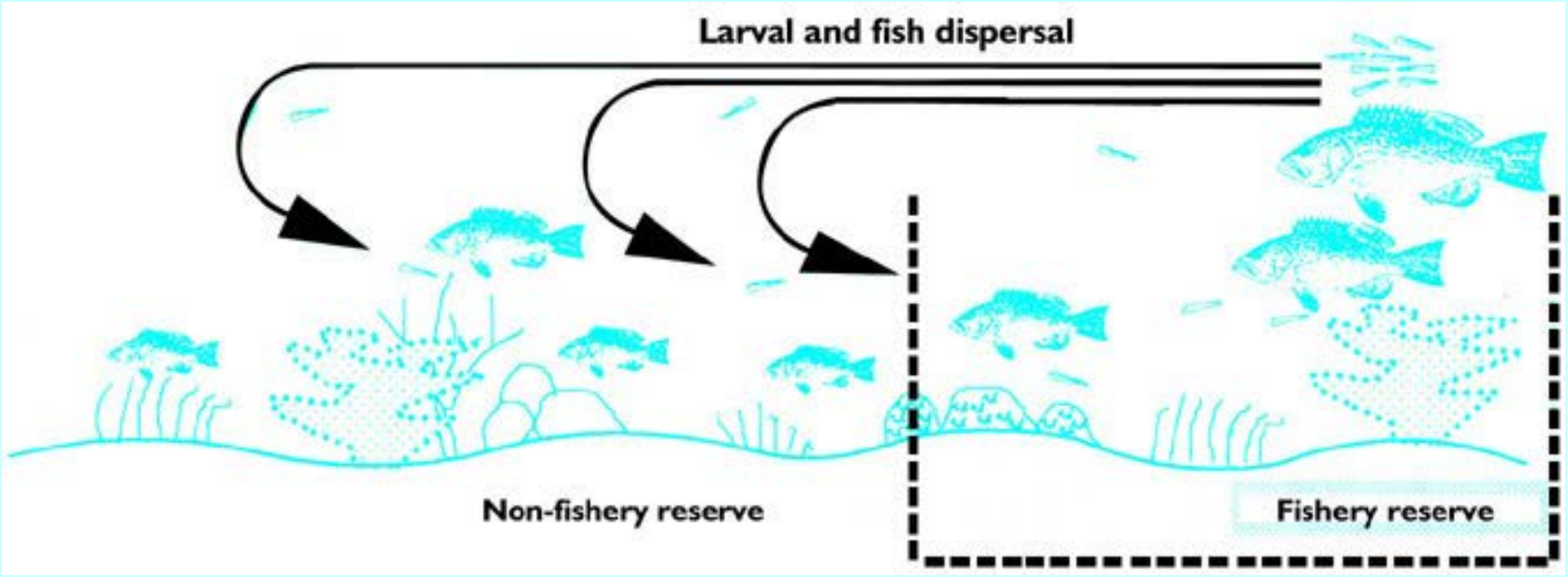
A Challenge to Conservationists

BY MAC CHAPIN

Excerpted from the November/December 2004 WORLD WATCH magazine

WORLDWATCH INSTITUTE
www.worldwatch.org

What Dominates the Discussions… Does this Happen?

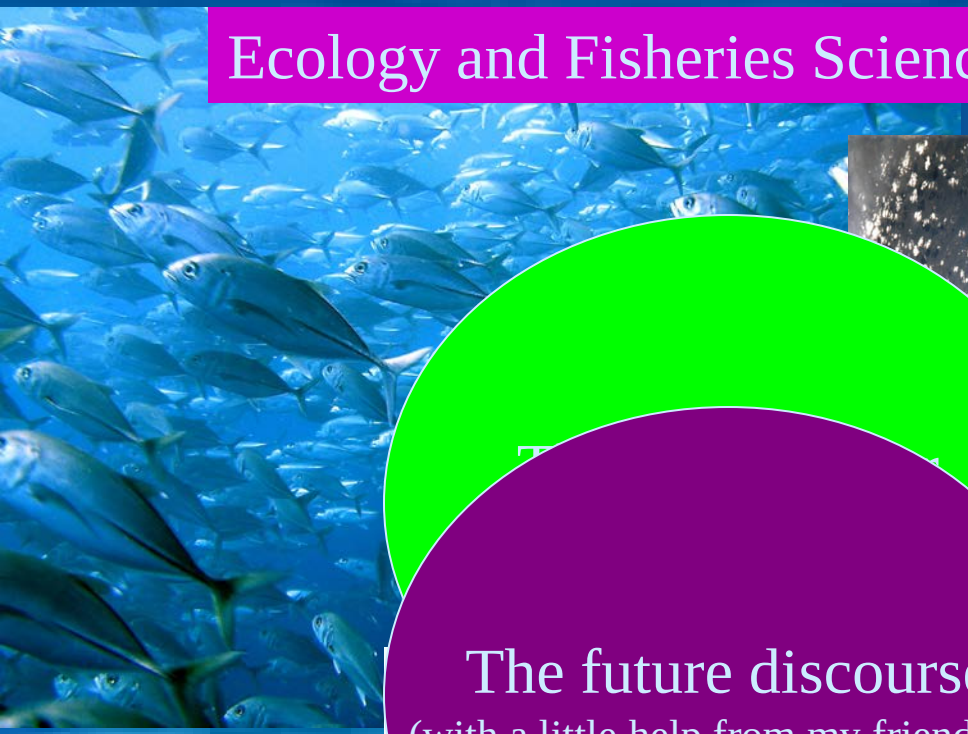


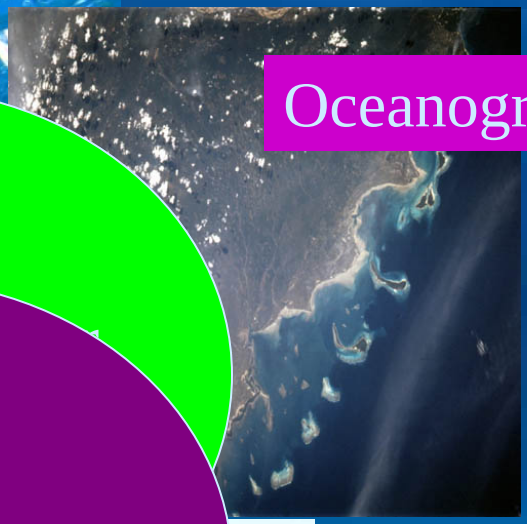
Bohnsack 1990

I would suggest that it's fairly elementary – if you don't fish, the fish grow larger… Some adults may leave the reserve and larvae do.

Mapping the MPA discourse…

Ecology and Fisheries Science





Oceanography

The future discourse

(with a little help from my friends…)

Marine Affairs and Social Sciences

Framing questions

- What is causing the degradation of tropical coastal and nearshore marine environments and the decline of associated fisheries?
- Are management frameworks, that increasingly lean toward large MPA networks and ecosystem-based management, tenable and just?
- Who is forwarding the MPA agenda and why?
- Why do management processes break down over time?
- Is the current form and scope of research having the desired effect?

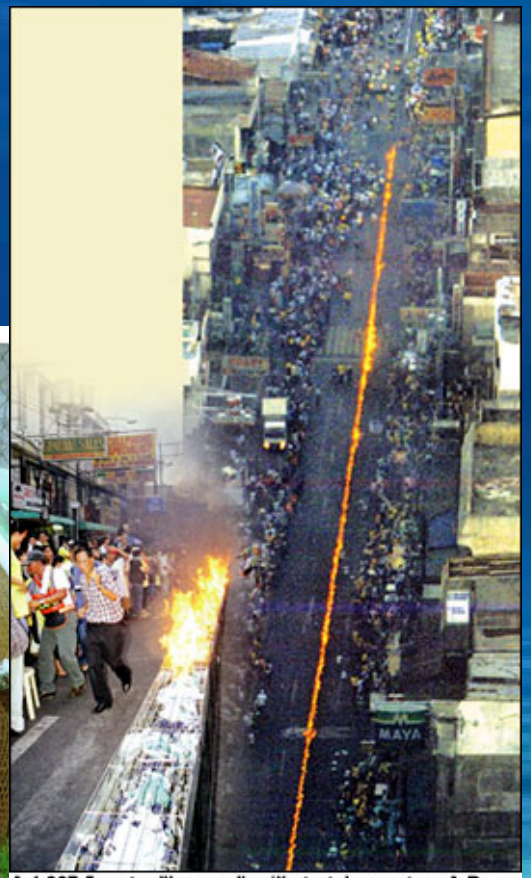
The Philippines

The Philippines

- **Land area**: 298,170 sq km
- **Coastline:** 18,000 km (3.8 x WA state's coastline)
- **Coral Reefs:** 27,000 km^2 (38% of WA state's area)
- **Food:** 50% of animal protein derived from marine fisheries and aquaculture
- **Population:** 86,241,697 (2004) (79 million in 1999)
- **Population growth rate**: 1.88% (2004 est.) 1.99% (2002 est.)
- **60% of population** lives along the coast
- **Population below poverty line:** 40% (2001 est.) (32% 1997.)
- **GDP growth rate: 4.5% (2004 est.)**
- **Gini index**: 48.1 (2000) (46 1997)
- **External Debt:** $57.96 billion (2004 est.) ($50 billion 2001)
- **Long colonial history**

http://www.cia.gov/cia/publications/factbook/geos/rp.html

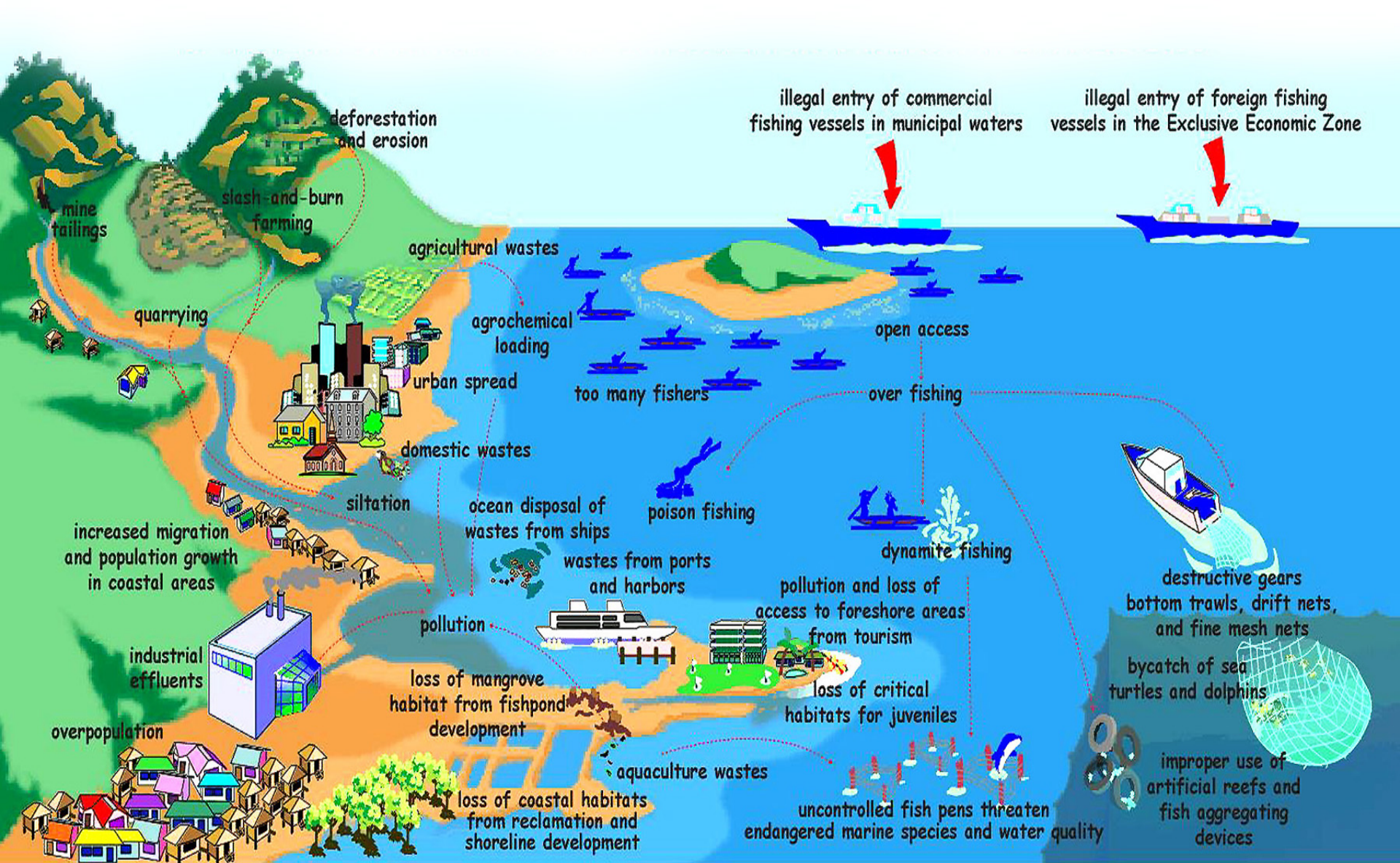
Philippine reefs: an important source of livelihood, food, culture…



A 1,007.5-meter "bangus" grill stretches out on A.B. Fernandez Avenue in Dagupan as the city tries to break the world record of 613 meters.
TOOTS SOBERANO/JOE ARAZAS, INS

Annual value of Philippine reefs is approximately $1.1 billion (WRI 2002)

Forces Impacting the Philippine Coastal and Marine Environment

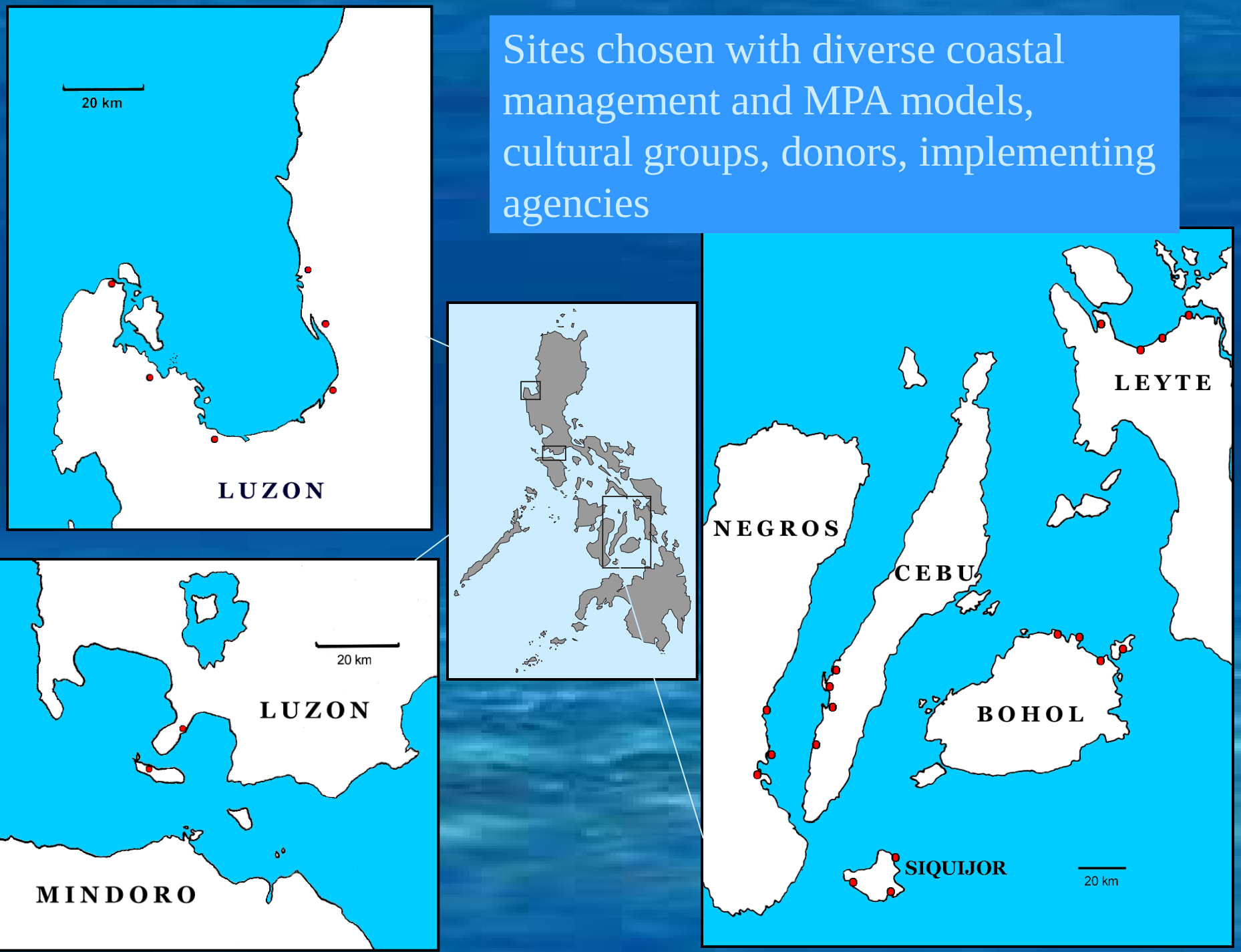


Global commerce of the worst sort…

Empirical Findings

- Co-Researchers: Pollnac, Pomeroy, White, Lowry, Hershman, de Leon, Eisma, Oracion, Miller, Fauzi, Bengan
- Funding:
  - David and Lucile Packard Foundation
  - National Science Foundation

Sites chosen with diverse coastal management and MPA models, cultural groups, donors, implementing agencies



Complementary Methods for Breadth and Depth

Quantitative Survey Research:

- 42 communities in 7 locations involved in 10 finished CM projects
- Informants: resource users, officials, project participants
- Output: broad understanding based on comparative research

2 Case Studies:

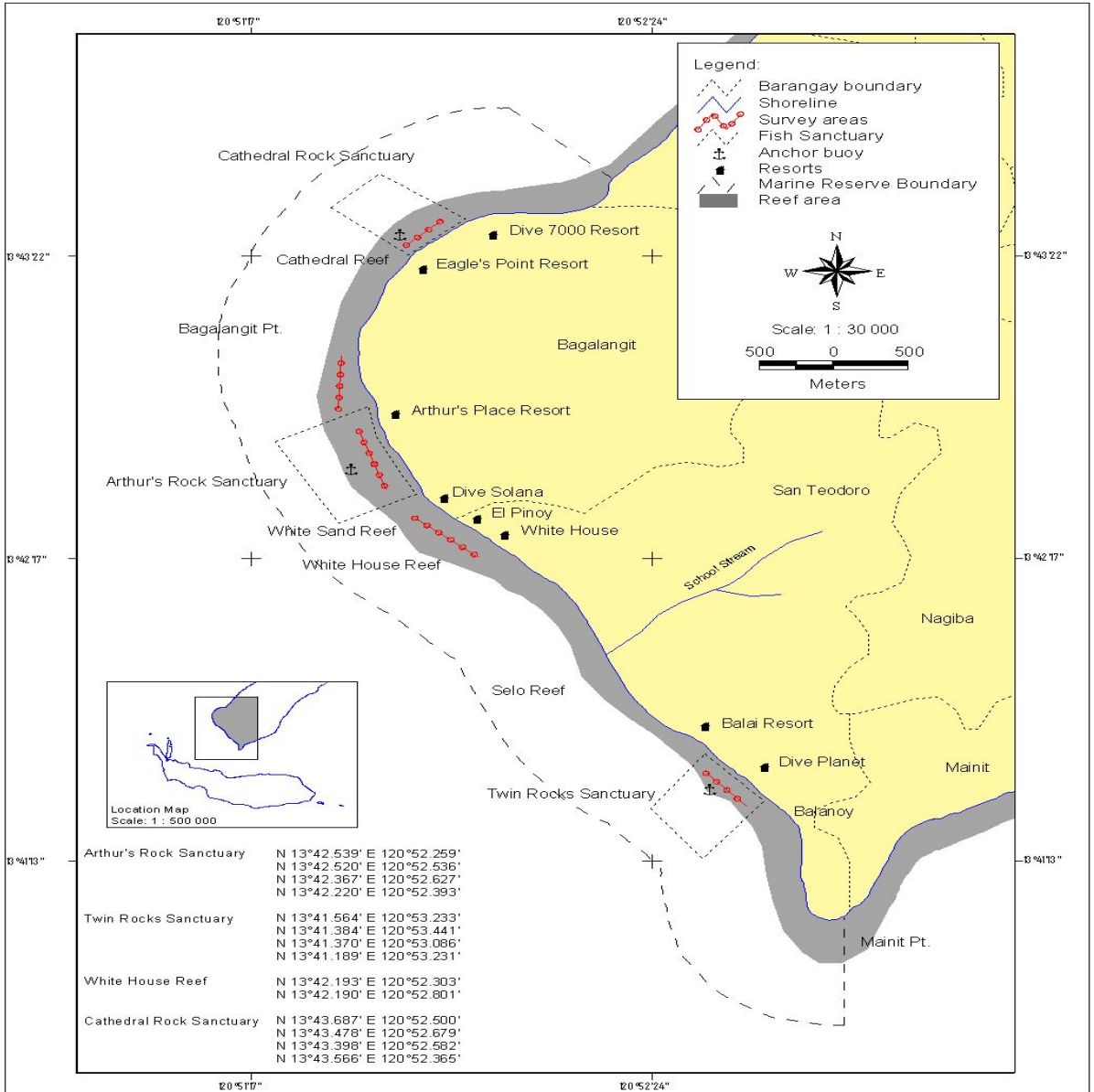
Qualitative/ Quantitative by legal, institutional, economic and bio-physical group

Output: complementary understanding

Is it possible for an MPA to be both a biological success and a social failure?

If so, what are the implications for long-term management success?

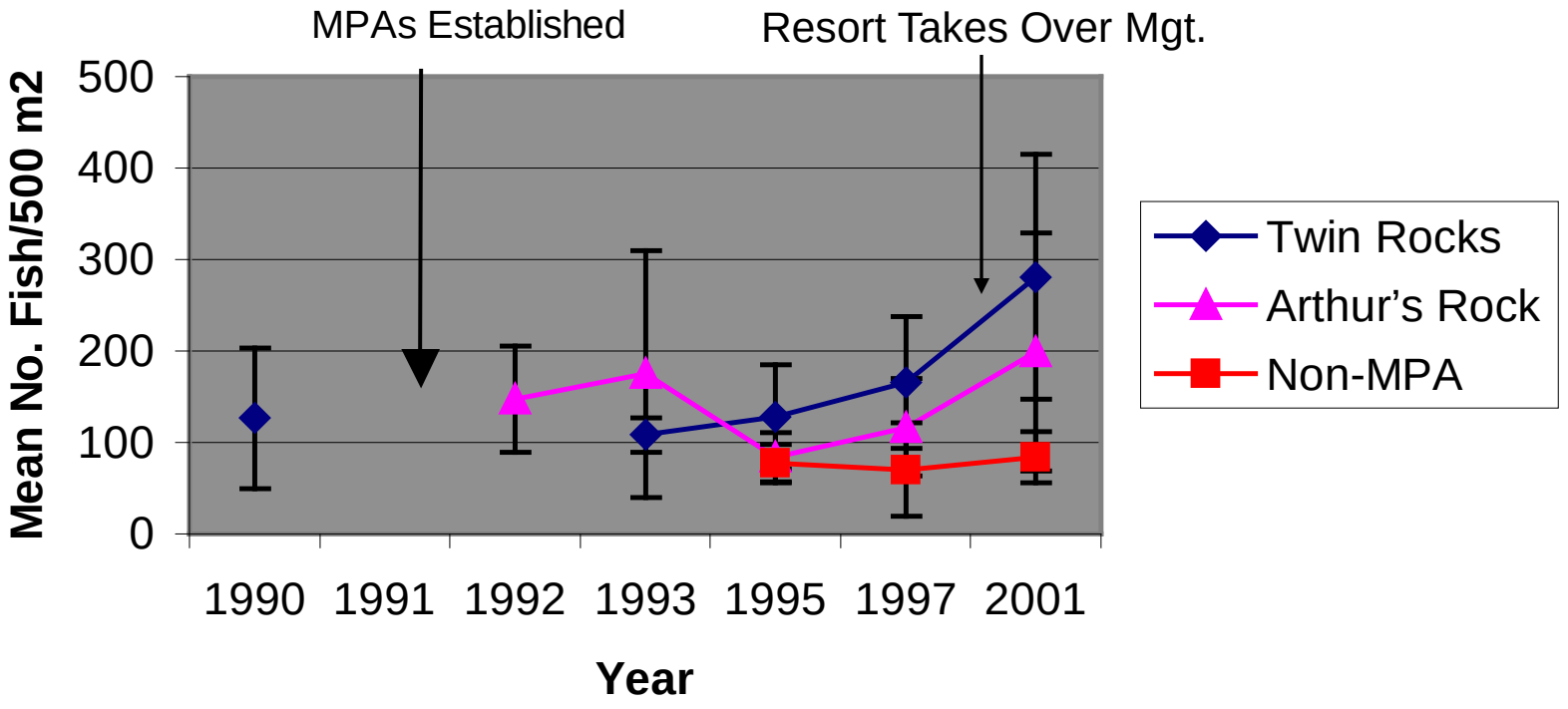
Anilao: Unmanaged Inter-Stakeholder Conflict



MPA Activities and Actors

	1991-2000	2000-present
Monitoring	Fishing community, Haribon and scientists	Scientists
Enforcement	Fishing community with Local Government Unit	Resort owners
Planning	Fishing community/ Haribon/LGU	Stopped

Target fish abundance change



Two-way analysis of variance for 1995 to 2001:
time, $p=0.065$; site, $p<0.05$; time X site, NS. $N>5$ per site.

Bio-Physical Conditions

- Coral cover generally stable or improving
- Fish abundance and diversity increasing in Twin Rocks which is strictly enforced
- Twin Rocks is a “biological success”, that could justifiably be attributed to resort owners’ vigilance

(Christie et al. 2003)

While Twin Rocks is appropriately characterized as a biological success, is it a social success as well?

ANALYSIS
STEPWISE MULTIPLE REGRESSION

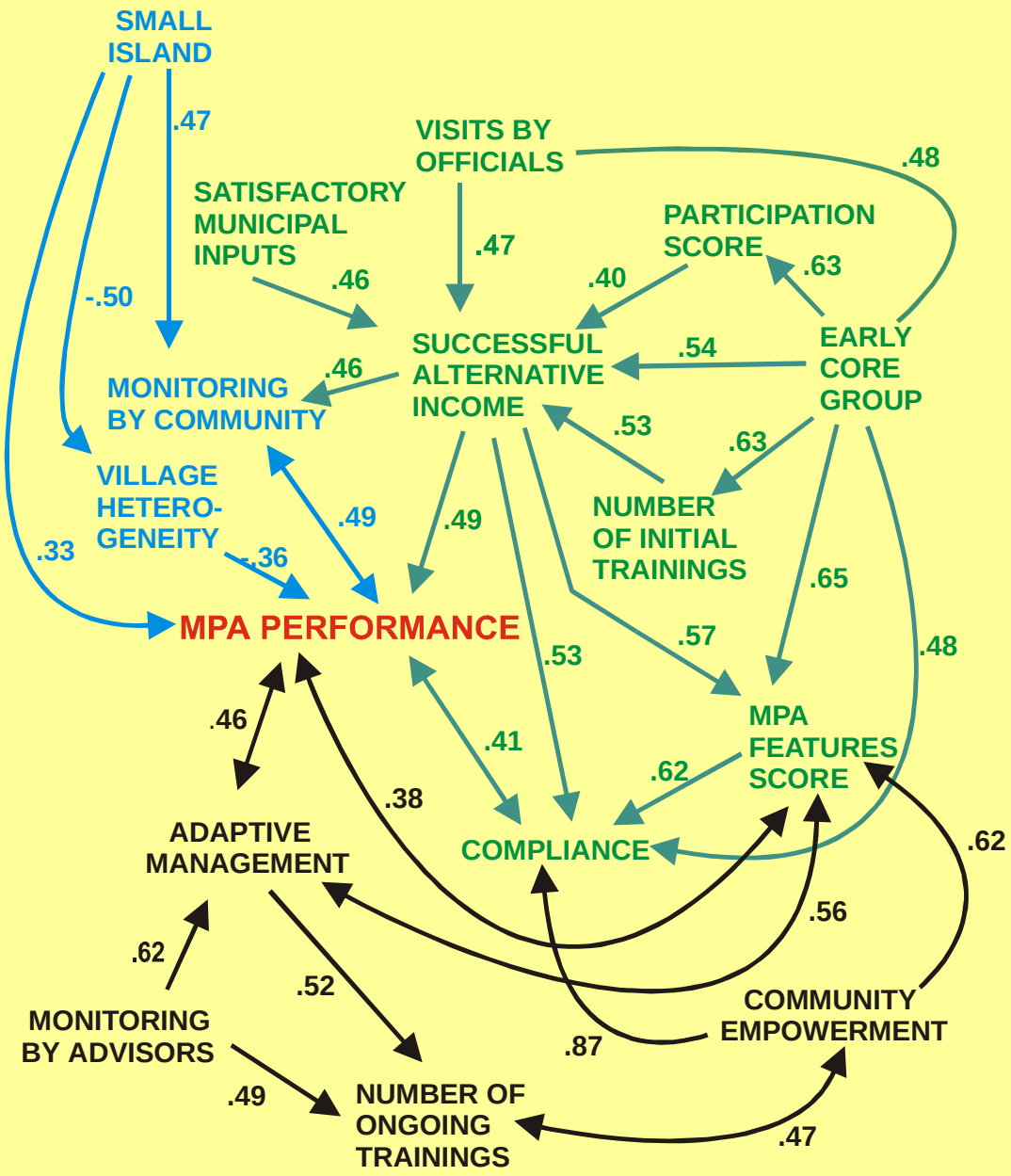
MPA SUSTAINABILITY

- **PARTICIPATION IMPACT** **0.14****
- **INCOME IMPACT** **0.07***
- **PROJECT INVOLVEMENT** **0.75****
- **PROJECT OUTPUTS** **0.20****

ADJUSTED R-SQUARED = 0.69, P<0.001

***P<0.05 **P<0.001**

(Pollnac and Christie in preparation)


SMALL ISLAND
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-.50
VISITS BY OFFICIALS
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SATISFACTORY MUNICIPAL INPUTS
.46
.47
PARTICIPATION SCORE
.40
.63
SUCCESSFUL ALTERNATIVE INCOME
.54
EARLY CORE GROUP
.46
MONITORING BY COMMUNITY
.53
.63
VILLAGE HETERO-GENEITY
.49
.49
NUMBER OF INITIAL TRAININGS
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MPA PERFORMANCE
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.41
MPA FEATURES SCORE
.62
.38
ADAPTIVE MANAGEMENT
COMPLIANCE
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COMMUNITY EMPOWERMENT
MONITORING BY ADVISORS
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NUMBER OF ONGOING TRAININGS
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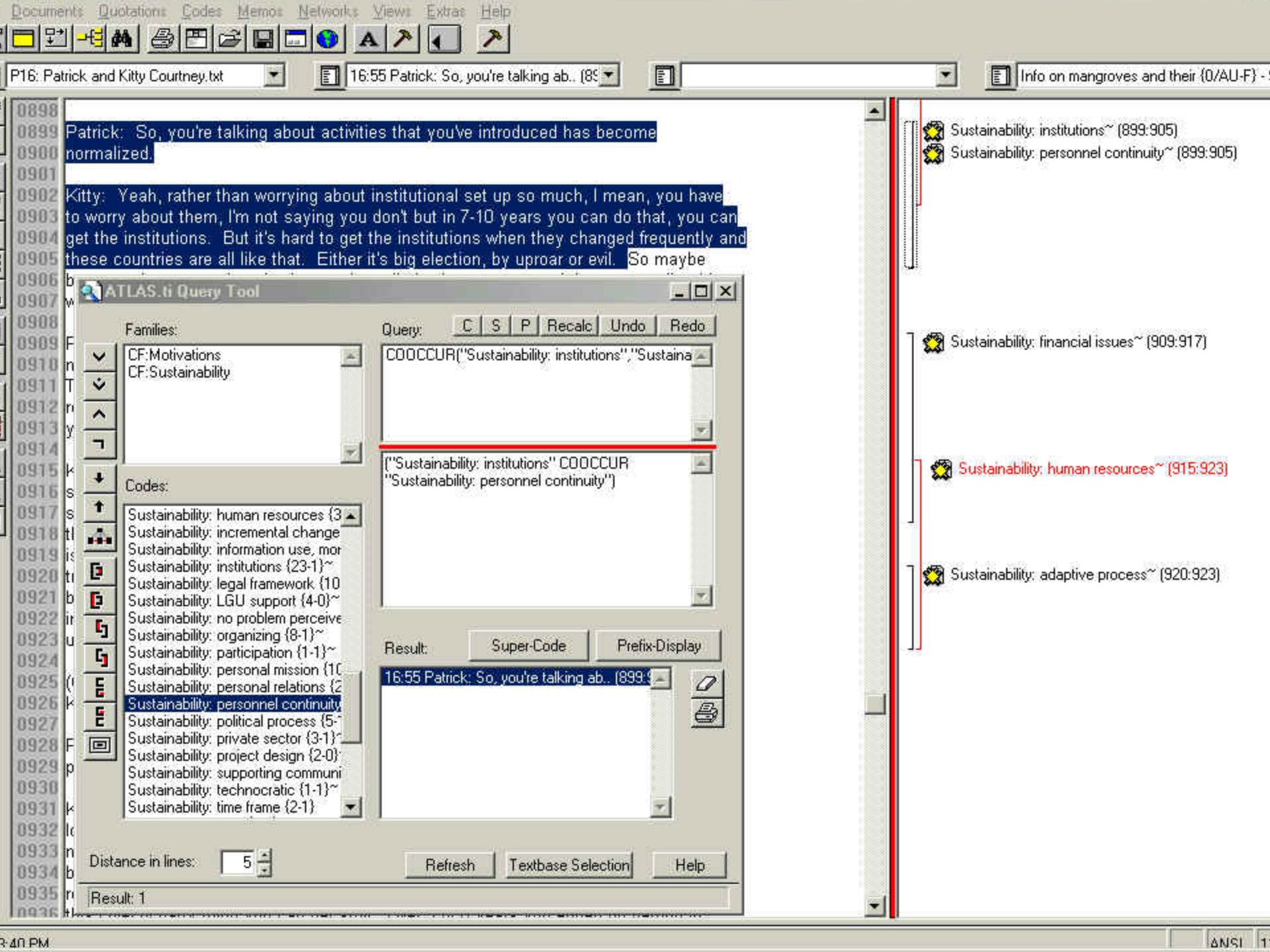
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P16: Patrick and Kitty Courtney.txt
16:55 Patrick: So, you're talking ab.. (89
Info on mangroves and their (0/AU-F) -
Patrick: So, you're talking about activities that you've introduced has become normalized.
Kitty: Yeah, rather than worrying about institutional set up so much, I mean, you have to worry about them, I'm not saying you don't but in 7-10 years you can do that, you can get the institutions. But it's hard to get the institutions when they changed frequently and these countries are all like that. Either it's big election, by uproar or evil. So maybe
ATLAS.ti Query Tool
Families:
CF:Motivations
CF:Sustainability
Query:
C
S
P
Recalc
Undo
Redo
COOCCUR("Sustainability: institutions","Sustaina
("Sustainability: institutions" COOCCUR "Sustainability: personnel continuity")
Codes:
Sustainability: human resources {3
Sustainability: incremental change
Sustainability: information use, mor
Sustainability: institutions {23-1}~
Sustainability: legal framework {10
Sustainability: LGU support {4-0}~
Sustainability: no problem perceive
Sustainability: organizing {8-1}~
Sustainability: participation {1-1}~
Sustainability: personal mission {10
Sustainability: personal relations {2
Sustainability: personnel continuity
Sustainability: political process {5-
Sustainability: private sector {3-1}
Sustainability: project design {2-0}
Sustainability: supporting communi
Sustainability: technocratic {1-1}~
Sustainability: time frame {2-1}
Result:
Super-Code
Prefix-Display
16:55 Patrick: So, you're talking ab.. (899:9
Distance in lines:
5
Refresh
Textbase Selection
Help
Result: 1
Sustainability: institutions~ (899:905)
Sustainability: personnel continuity~ (899:905)
Sustainability: financial issues~ (909:917)
Sustainability: human resources~ (915:923)
Sustainability: adaptive process~ (920:923)
ANSI

Actions of Resort Owner

Focus on Action Not Process

Resort owner 1: So, what is important for me is enforcement [of the sanctuary] …. That is still the issue. Social issues are divorced from actual impacting [biological] issues. For me those [social issues] are secondary…

Personal Commitment Resulting in Conflict

Resort owner 1: But what I'm telling the people in this community is, for the reef…we take care of it... [I spent] many sleepless nights [protecting the sanctuary]. I have to bear the burden of getting the ire of these people. That's okay, I don't care. As long as the fish are there... We will have to bribe people. I will resort to anything that will prevent any direct negative impact [to the sanctuary]…

How this is Perceived by Community Members

Struggle for Ownership

Community leader: Now, since the resort was established they (the hotel owners) are the ones who guard and protect the sanctuary. But I think they already took over the sanctuary and that's the problem now… Umm, they might hear my interview. They'll be angry with me…

Patrick: So, what's the difference, if they protect the sanctuary?

Community leader: It's the same, but the only thing is that the sanctuary is for the community. Now they (the resort owners) are already taking it over it.

Success Can have Unintended Consequences

Fisher: If there's good management , our coral reefs bloom. That's when divers came in. Resorts came in. But community-based management also vanished…

What happens when local people are marginalized in a community-based process?

1) disengagement
2) non-compliance/poaching
3) eventual environmental decline

Engage for the long term:

Same project, but different long term results

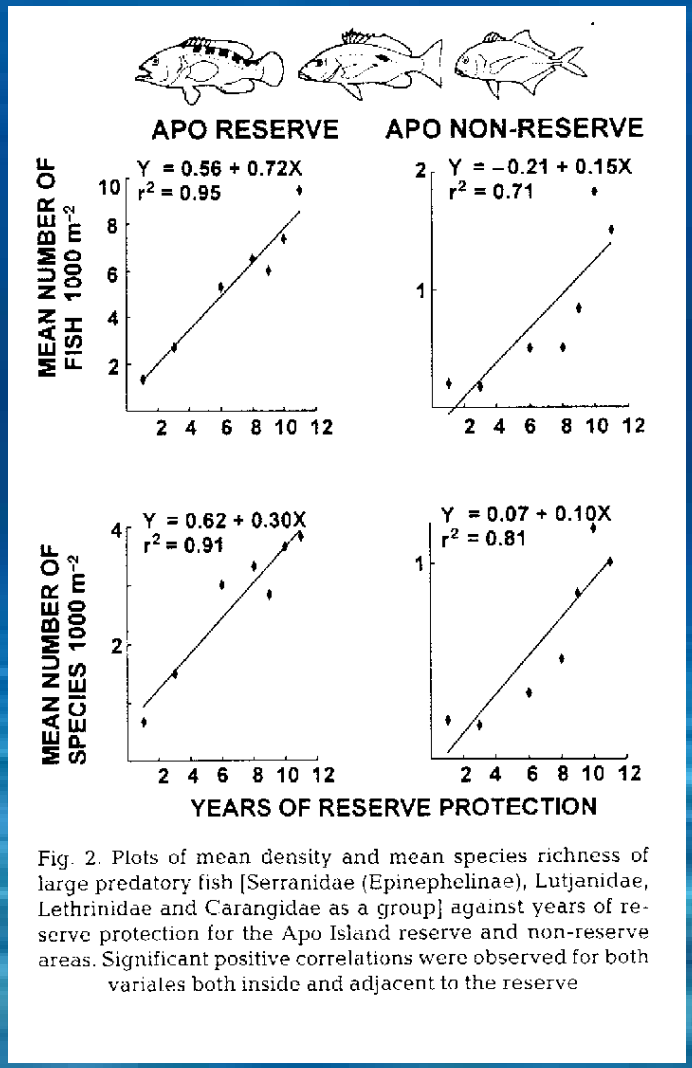
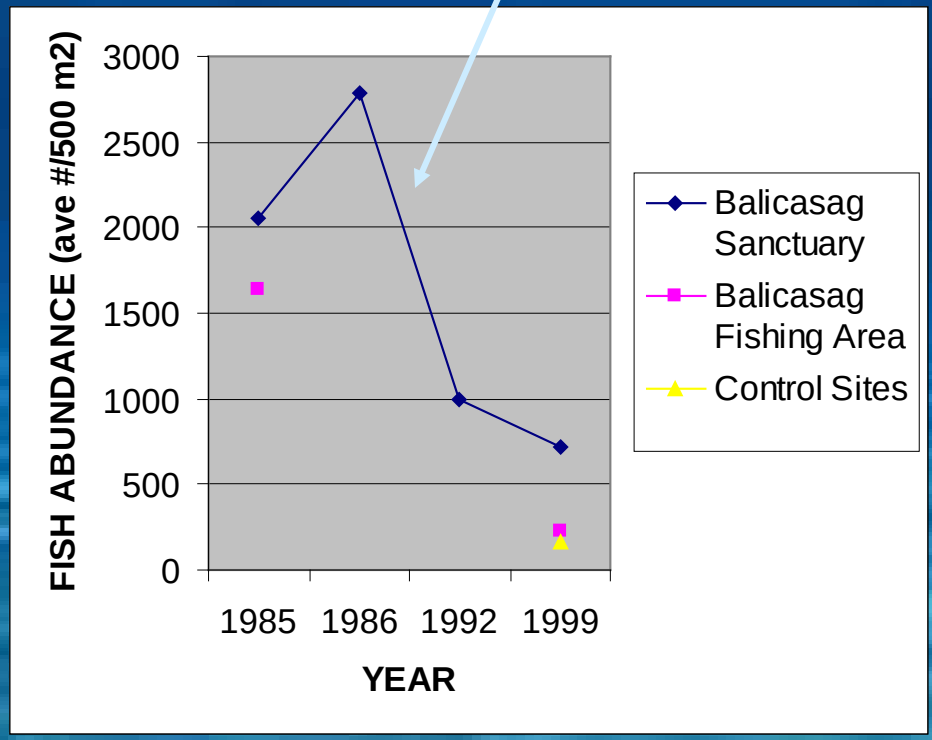


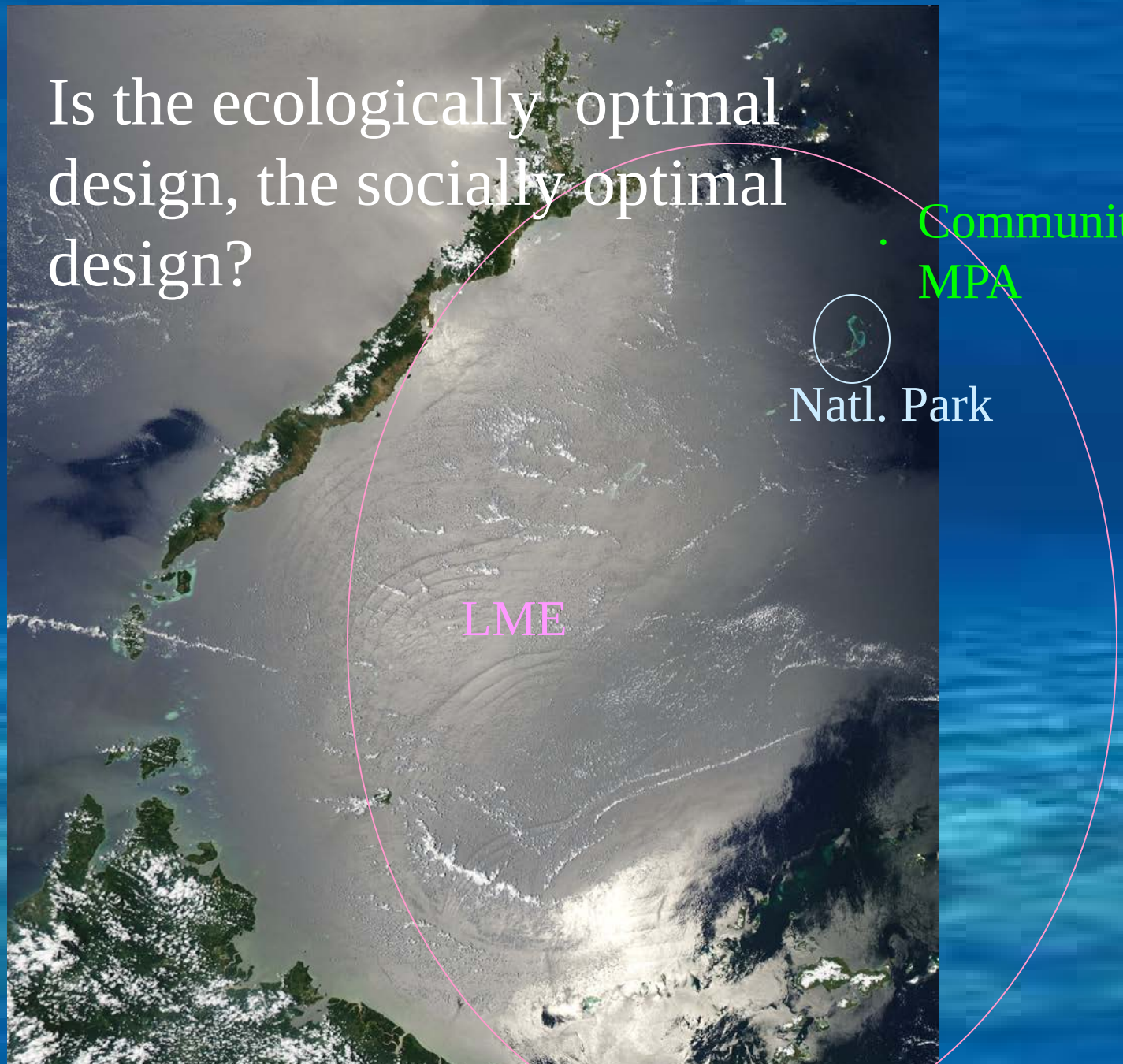
Fig. 2. Plots of mean density and mean species richness of large predatory fish [Serranidae (Epinephelinae), Lutjanidae, Lethrinidae and Carangidae as a group] against years of reserve protection for the Apo Island reserve and non-reserve areas. Significant positive correlations were observed for both variales both inside and adjacent to the reserve

Russ, G.R. and A.C. Alcala. 1996

Government takes over management from community



Christie et al. 2002


Is the ecologically optimal design, the socially optimal design?
Community MPA
Natl. Park
LME

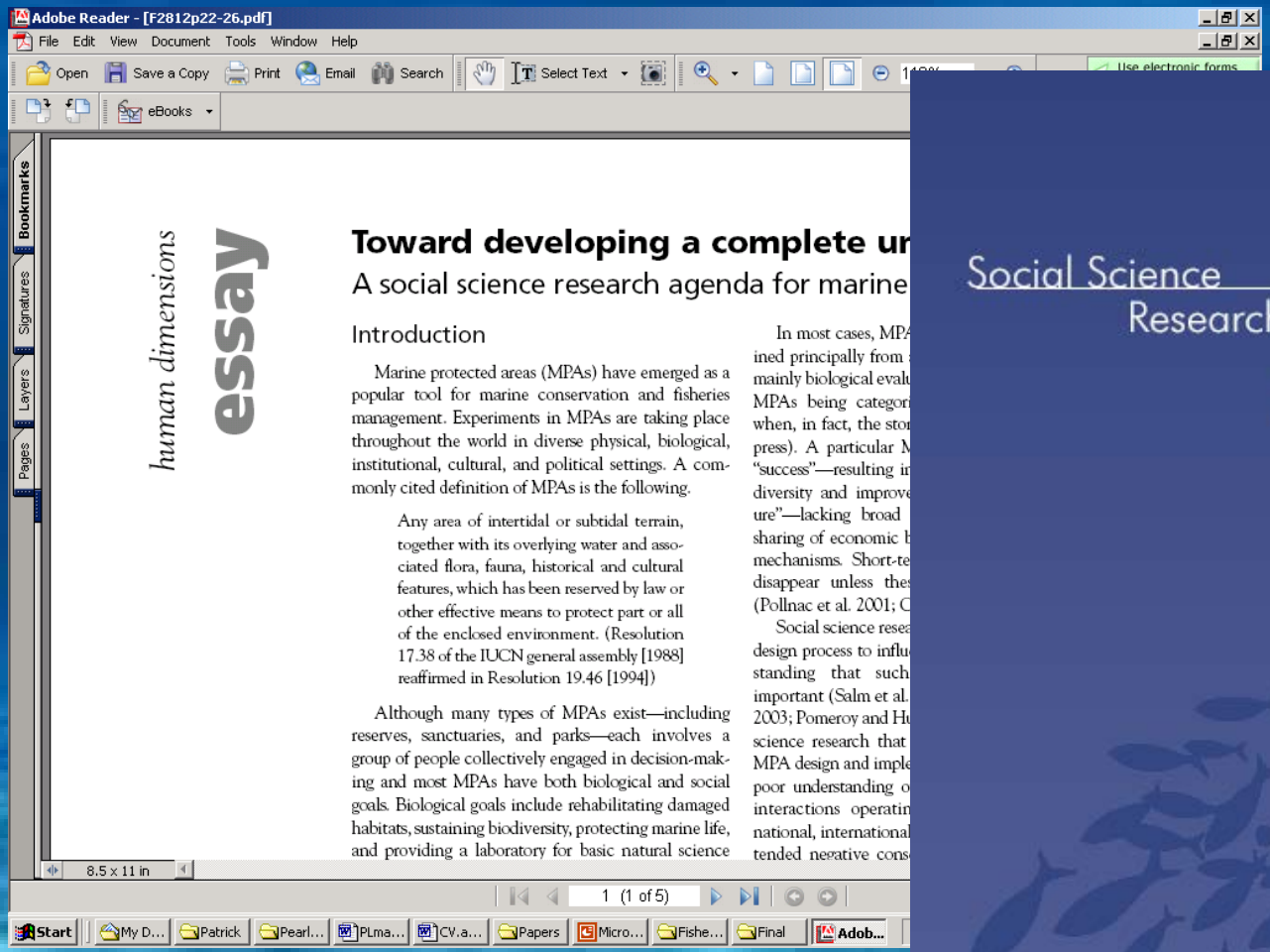
Social Design Criteria for MPAs

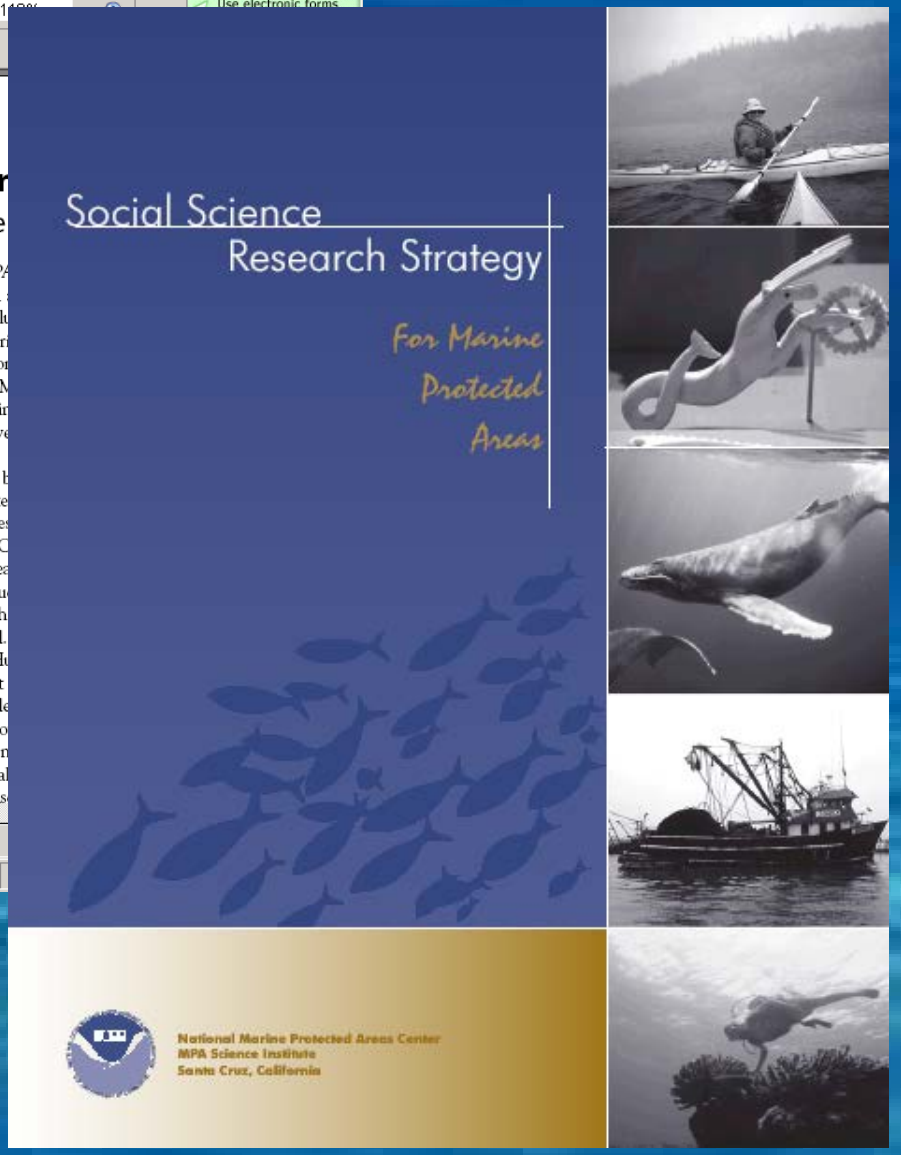
- Proceed with caution, you don’t get many shots
- Context is fundamental to defining which MPA model is likely to succeed
- Engage for the long term
- Partnership based on respect and trust
- The ecological optimal design is not necessarily the social optimal design
- Scale to humanly understandable and institutionally appropriate level

How is this relevant to MPAs in the US?

- While the context is distinct, constituency interactions, influenced by and cultural and historic conditions, are quite similar (e.g., NWHI, position paper of Northwest Indian Fisheries Commission)
- Desire to start community-based processes here (e.g., San Juans voluntary MPAs)
- Conflict (e.g., Channel Islands)
- High cost of ignoring human dimensions (e.g., Florida Keys NMS)
- The role of US organizations internationally in MPA discourse, technical assistance, and funding (e.g., NOAA and foundations)

Know your context: it's challenging, but interesting, work…





Future research questions…

- Conflict and MPAs: Maury Island
- Enforcement, coercion, and compliance: Tubbataha
- Appropriate biological and social scale: Philippines
- Identifying the epistemic communities supporting and resisting the MPA agenda:global

Research types

Mandate responsive

- How to design MPAs to maximize benefits
- Economic valuation to set visitor fees

Mandate independent

- Challenges MPA orthodoxies
- Ramifications of foreign NGOs, scientists, advisors, and donors promoting MPAs in tropical countries
- Consider the trade-offs associated with allowing dive tourism within MPAs while banning fishing

Research approaches

- Complementary quantitative and qualitative
- Complementary scientific and participatory