Integrated Coastal and Ocean Management (ICOM)

©Lucia Fanning
Marine Affairs Program, Dalhousie University, Halifax, Canada

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Format

1. Challenges and context of ICOM
2. ICOM objectives
3. Understanding Terminology
4. ICOM process and the SCS

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frontiers in Marine Science

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INSTITUT Veolia Environnement

Unravelling P Transformati

Christina Kelly, Geraint Ellis an*

School of Natural and Built Environment, Q

Coasts are dynamic socio-ec pressures that present compl marine governance systems. T of the marine environment, in management of coastal and ma responsibilities dispersed acro proposed in normative approac more sustainable outcomes. T tends to occur within existing issues such as path dependen to transformative marine gover which inhibit more holistic approaches to achieve effective integrated management. Using insights from two Irish case studies to show how the implementation of innovative local initiatives for sustainable coastal and marine management are constrained by persistent institutional problems, it is concluded that an alternative management paradigm is required to understand and address the complexities involved in the design and delivery of an integrated management regime.

Keywords: coastal management, marine governance, integration, coastal transitions, persistent problems, Ireland

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Edited by:
Di Jin,
Woods Hole Oceanographic Institution, United States

Reviewed by:
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Technion Israel Institute of Technology, Israel
Richard Burroughs,
University of Rhode Island, United States

Perspectives

Integrated Coastal Zone Management: four entrenched illusions

Raphael Billé

Institute for Sustainable Development and International Relations
IDDRI, 27 rue Saint Guillaume, 75337 Paris Cedex 07, France.

This paper is a revised version of an article originally published by VertigO-La revue électronique en sciences de l'environnement (Billé, 2006).

Abstract

The considerable efforts undertaken in all continents to carry out field experiments and refine the concept of Integrated Coastal Zone Management (ICZM) have resulted in its adoption as the key paradigm for the sustainable development of coastal areas. Having reached a first phase of maturity, ICZM should now be challenged by critical assessments if it is to advance both theoretically and operationally. In this perspective, our paper highlights four deep rooted illusions: the illusion that rational bids discussions can solve any problem, the coastal manager myth, the community illusion and the positivist illusion. It is argued that these illusions result from unproved conceptual over simplifications and lead to a misunderstanding of actions that often impedes ICZM implementation.

Keywords: Integrated coastal zone management, illusion, participation, coastal manager, local community, consultation, positivism, decision making

VOLUME 1 ISSUE 2 2008

). Bell [e,1], Patrick Christie [f],

demography and in several local and ty of coastal waters to sustain these nt are needed if the loss in provision anded use of marine spatial planning n ocean zones to accommodate con- tion of food security, livelihoods, and coastal resources will require major / to accommodate societal variations. ves of one fifth of humanity.

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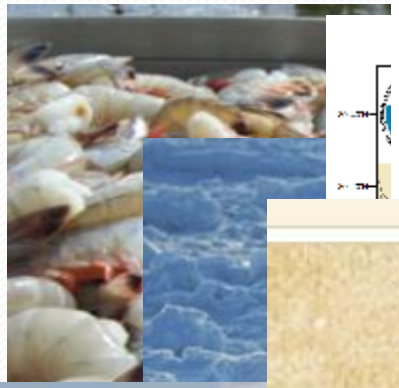
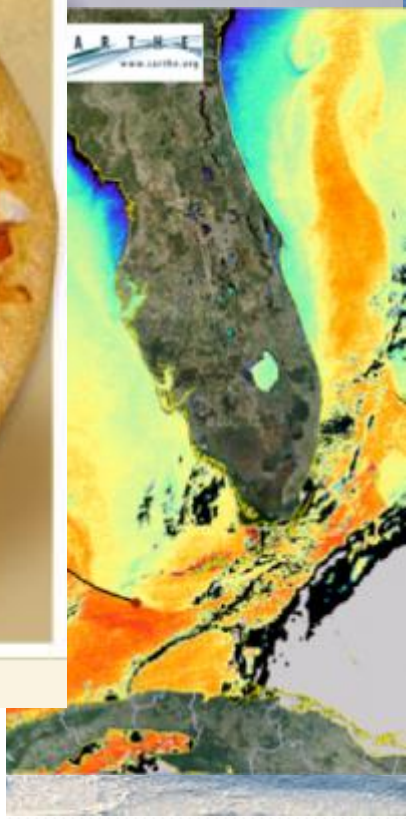
ions for marine on them. The easonably well ential shifts in ecent work has ocean will be may be more rvival of many change, with impacts on one hanges. Finally, ticularly fishing e and conserve vements to the identifying key changes in the g populations' will change and

hy, community tion dynamics,

ICOM starts with understanding connectivities and interactions!

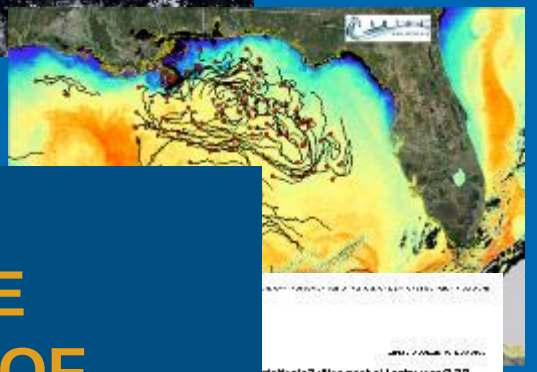




The Coastal and Ocean (C&O) Management System:

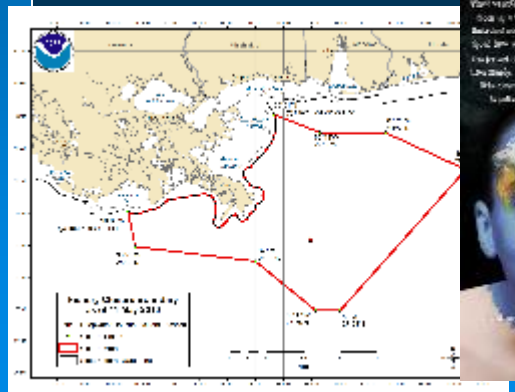
Cultural-I



aditional

THIS COMPLEX SYSTEM OF INTERACTIONS DETERMINES THE QUALITY, QUANTITY AND TYPES OF COASTAL and OCEAN RESOURCES and ENVIRONMENTS AND THE RESULTING POTENTIAL FOR CONFLICT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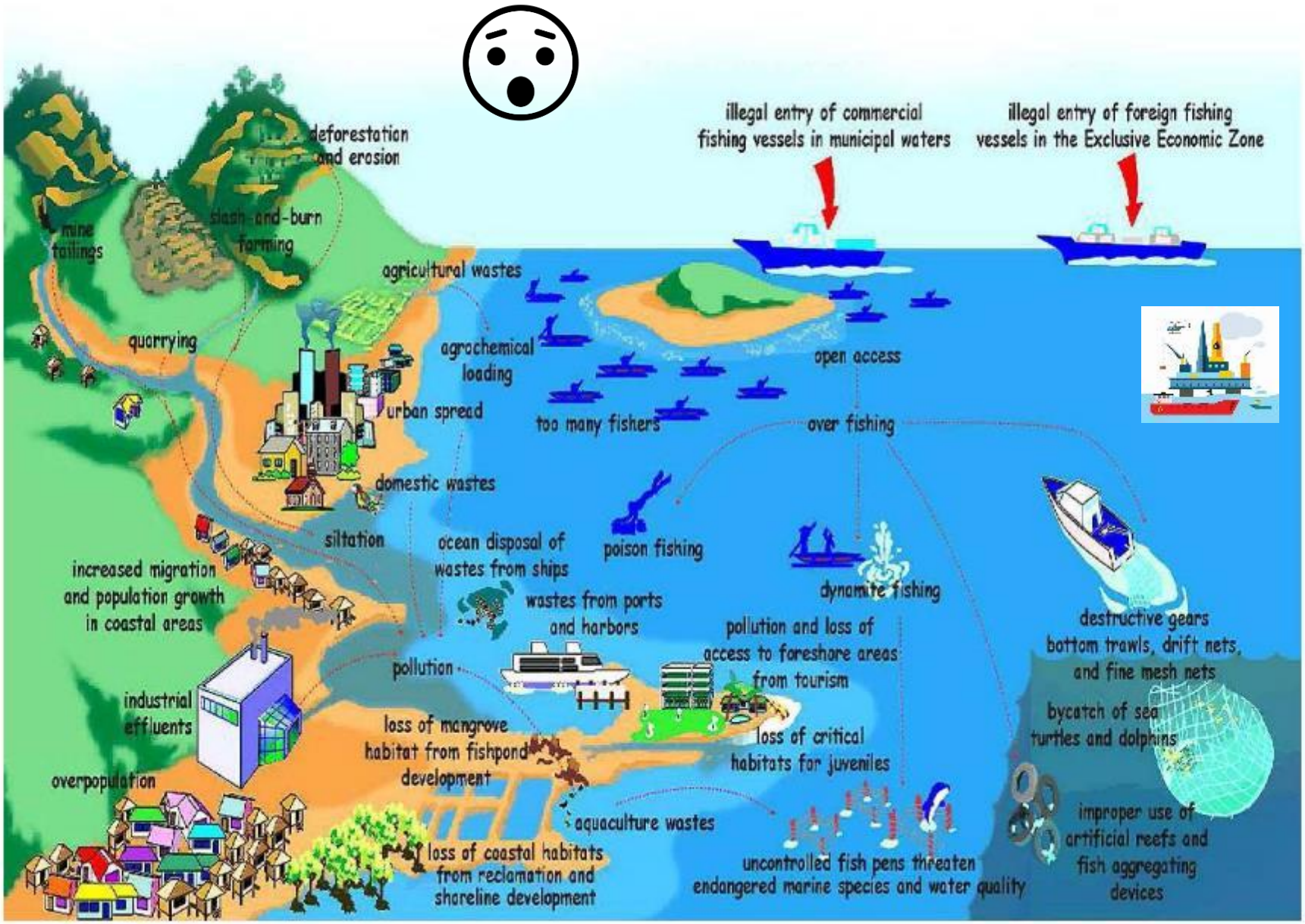
nternational

Adapted from
Orbach, 1995

ICM is about managing the integrated nature of coastal and ocean environments and people's interactions with them!



The #1 problem for coastal and ocean management is the problem of the dual mandate

The need to reconcile society's desire to preserve, restore, and rehabilitate natural ecosystems

while at the same time,

ensuring the provision of reliable, predictable, and stable supplies of goods and services

at a time of escalating demand

(Roe and van Eeten 2001)

CZ - Most contentious piece of real-estate on the planet!

- **Multi-resource system**
  - Provides space, resources and performs regulatory functions
  - No one agency has total control over all, or even most, of the inputs and outputs from one system
- **Multi-user system**
  - Involves many stakeholders with differing interests and capabilities
  - Involves many agencies at the sub-national and/or national level of government – who controls?
- **Transition zone**
  - coastal productive and defence functions linked to physical and socio-economic conditions far beyond its physical boundary
  - different coastal processes/systems interact in CZ
  - government authority changes abruptly
  - **very difficult to model cause and effect relationships and accurately predict impacts of proposed decisions**

So what are those **challenges** we need to address?

- Many jurisdictions, multiple users and uses
- Secondary responsibility of most; primary responsibility of none
- Traditional “silo” focus – fisheries, shipping, oil&gas
- Inadequate legislation and/or lack of enforcement
- Lack of agreed priorities
- Pursuit of economic and even political goals divorce from environmental and social goals & vice versa
- Failure to appreciate interconnections within coastal and ocean systems (natural and human)
- Lack of trained personnel, relevant technologies, equipment, etc.
- Little decentralization of power to lower levels of governance
- Many nations’ governance capacity severely constrained by deep divisions among their populations (e.g., race, religion, ethnic or linguistic group, socio-economic class)
- Willingness to work at multi-country/regional level can be constrained by real and perceived conflicts

2. What is ICOM?

ICOM is a continuous and dynamic process by which decisions are made for the sustainable use, development, and protection of coastal marine areas and resources.

(Cicin-Sain and Knecht, (1998)

Frameworks and international guidelines related to ICOM

Year	Organization	Framework and Guidelines
1992	UN	Agenda 21, Chapter 17
1993	OECD	Coastal Zone Management: Integrated Policies
	World Bank	Guidelines for Integrated Coastal Zone Management
	IUCN	Cross-Sectoral, Integrated Coastal Area Planning: Guidelines and Principles for Coastal Area Development
1995	UNEP	Guidelines for Integrated Management of Coastal and Marine Areas: With Special Reference to the Mediterranean Basin
1996	UNEP	Guidelines for Integrated Planning and Management of Coastal and Marine Areas in the Wider Caribbean Region
1997-2001	IOC	Methodological guide to integrated coastal management Steps and tools towards integrated coastal area management
1998	FAO	Integrated Coastal Management and Agriculture, Forestry and Fisheries
1999	UNEP	Conceptual Framework and Planning Guidelines for Integrated Coastal Area and River Basin Management
	EC	Towards a European Integrated Coastal Zone Management (ICZM) Strategy: General Principles and Policy Options
	Council of Europe	European Code of Conduct for Coastal Zones
2000	CBD	Review of Existing Instruments Relevant to Integrated Marine and Coastal Area Management and their Implementation for the Implementation of the CBD
2004	CBD	Integrated Marine & Coastal Area Management Approaches for Implementing the CBD
2006	IOC	Measuring the process and outcomes of integrated coastal and ocean management
2009	IOC	Hazard assessment and risk mitigation in integrated coastal and ocean management
2002/12	UN	**Rio+10 (Cape Town) and Rio+20 (Rio de Janiero)**

Why ICOM? The Context for ICOM

- World **population** expected to grow to 8 billion by 2025
- >50% of world's population live within 60km of the shoreline; expected to increase to 75% by 2025
- Pace of change of population and associated demands for economic growth create environmental and social costs
- Increasing natural hazards and **Climate Change** impacts
- Environmental and societal degradation outweigh development and modernization benefits globally
- Goods and services threatened by **overexploitation** of renewable resources; **conflicts**; insidious damage from cumulative impacts
- Coastal and ocean resource problems not simply one of the poor over-exploiting the resources – oftentimes profits actually generally accrue only to small number
  - Leads to costs of **unsustainable practices** being transferred to those least equipped to bear the burden

What is the fundamental goal that ICOM seeks to address?

Aim: to increase the efficiency and effectiveness of coastal & ocean decision making and its implementation to maximize benefits while minimizing conflicts, being guided by principles of sustainable development

(World Bank, 1993)

How can we better manage the range of activities and their consequences that occur in the area we define as the "coastal zone"?

- What activities are occurring?
- What determines these activities?
  - Human and natural factors
- When and where are these activities taking place?

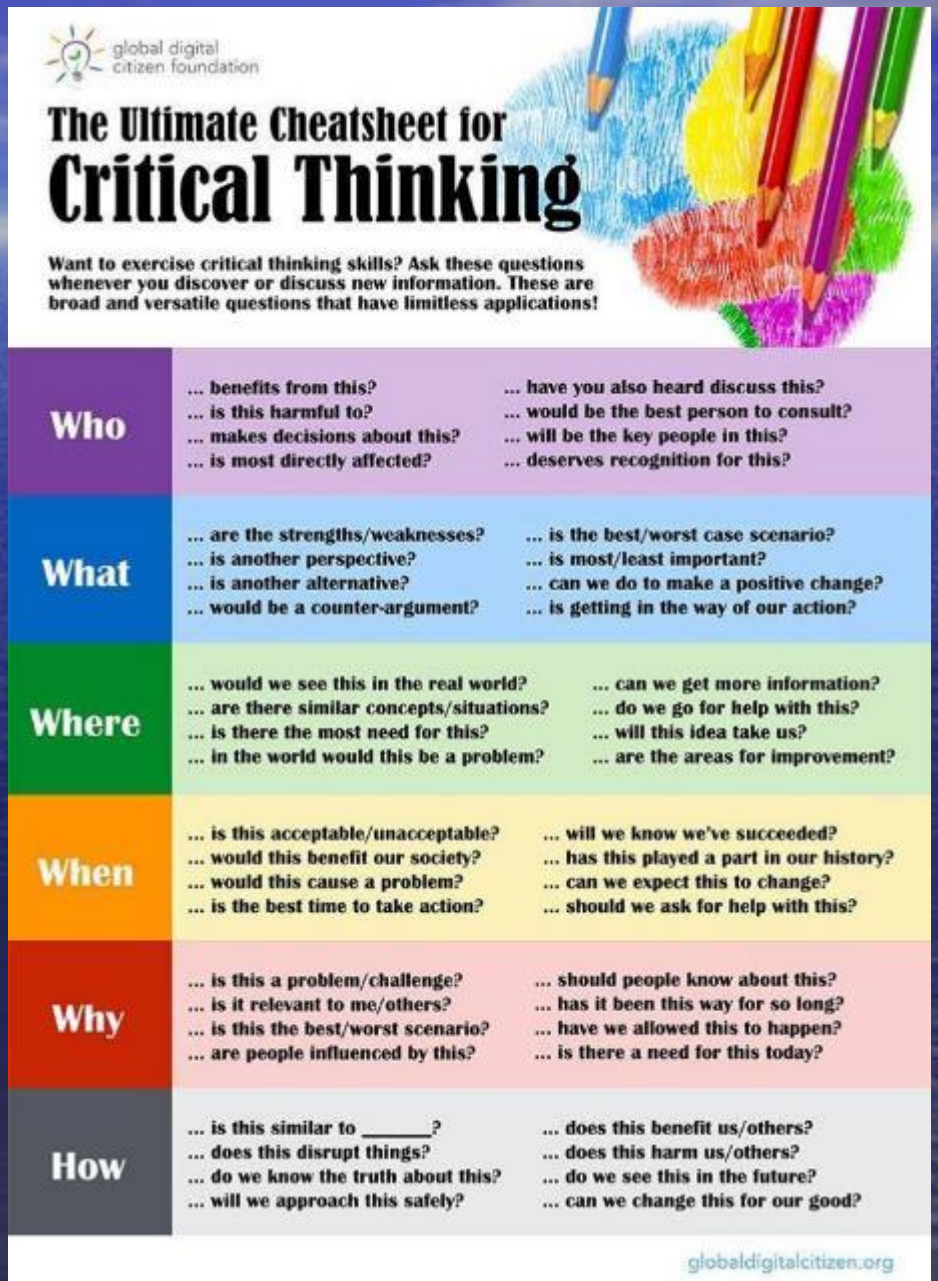
- What are the impacts of these activities
  - On social and natural system
- Who/what affect and are affected by these activities?
- What are the resulting consequences?
- What can be done to improve/mitigate these effects?

- What is the area to be managed and how is it determined?

What is Management?

- **Management is the act of getting people to accomplish desired goals and objectives using available resources efficiently and effectively.**
  - **Who sets those goals?**
  - **How are they set?**
  - **Who benefits from those goals?**
  - **What process is used to accomplish these goals?**

NEED TO REFLECT AND THINK CRITICALLY ABOUT THIS!!



Testing the water: Understanding stakeholder readiness for strategic coastal and marine management

Mason et al, 2015

"One way of encouraging a shared social identity and thus facilitating cooperation and coordination between the different coastal and marine user groups is to **highlight their shared values and interests**."

Table 2
Perceptions of out-groups.

Out-groups identified	Attributions
Government	Biased towards economic interests and popular opinion, making decisions about coastal and marine management without the right information or a genuine commitment to balancing all values
Oil and gas	Big and powerful marine user, activities potentially devastating in their impact on the marine environment
Researchers	Pursuing own agendas rather than needs of coastal and marine stakeholders, insensitive to local protocols and conditions
Community	Easily influenced, not well-informed but ultimately important in terms of how they value the different coastal and marine uses
Seafloor exploration and mining companies	Only care about making money, activities likely to have a destructive effect on important coastal and marine values if they are allowed to go ahead
Recreational fishers	Large numbers of recreational fishers in the NT creates significant pressure on fishing stocks, impact not measured, politically influential

ICOM Process- Four "entrenched illusions"

Billé 2008

1. Round-table as a panacea – Coordination, Consultation, Consensus
   - Minimizes real antagonism existing between different uses, interests and representation
   - Understanding conflict, balance and power relationships critical

2. Coastal manager myth – "all powerful coastal entity"
   - One person or agency over-simplifies issues and solutions

3. Community illusion – homogeneous, environmental, defined
   - Community defined by objectives not consensus
   - Subsidiarity does not equate to local level decision-making

4. The "positivist" illusion – more knowledge = better decisions
   - Uncertainty is the name of the game!
   - Acquiring data disconnected from decision-making
   - Not what data is needed but what decisions can best be made with the available data

Human Dimensions of Marine Natural Resource Management

While ecological considerations are essential, the successful implementation of sustainable coastal management depends on, and is driven by, societal values.

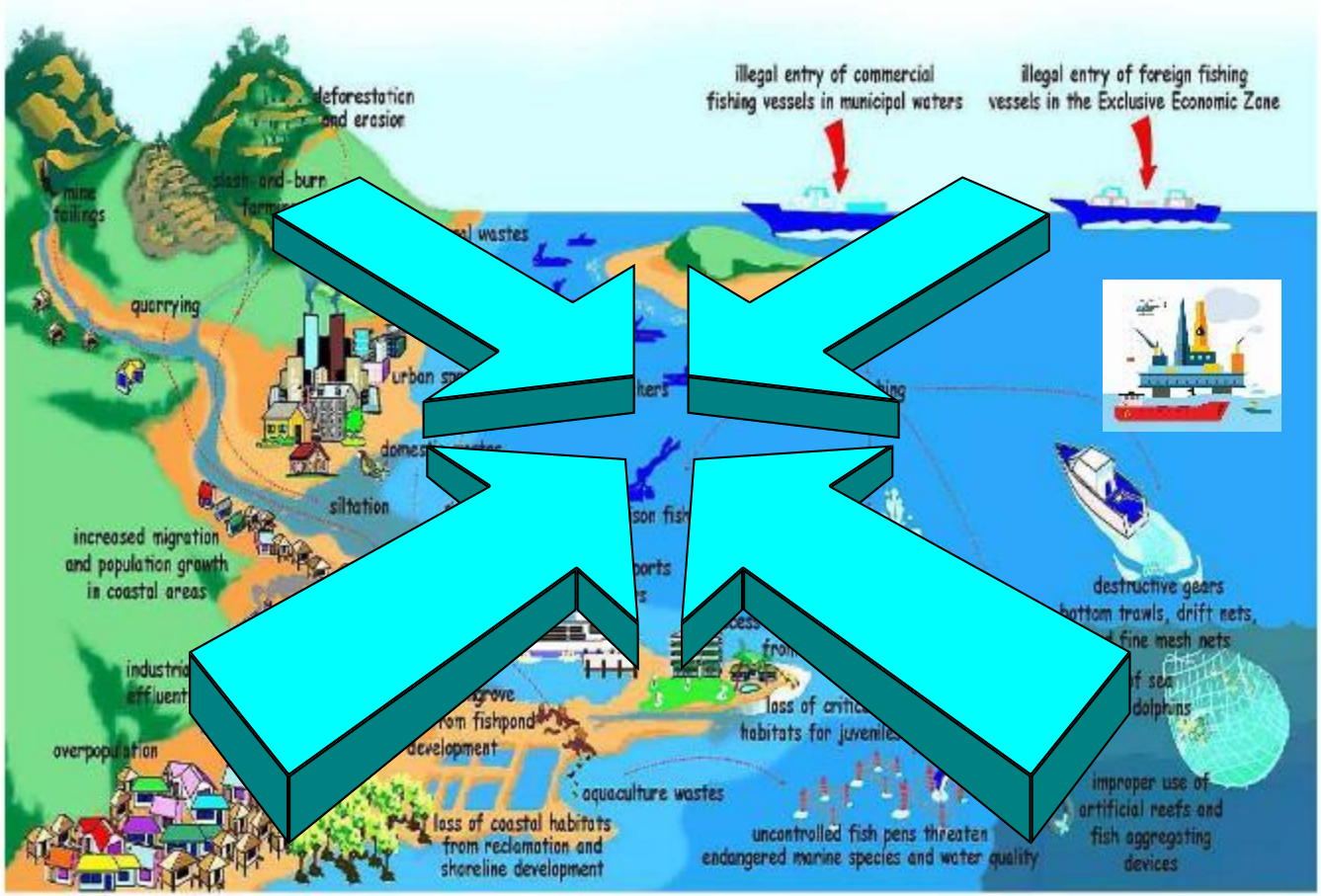
These values are manifested as environmental laws, congressional budgets, volunteering, voting behavior, and management decisions, and largely determine the fate of the natural systems that sustain societies.

(Weinstein et al., 2007)

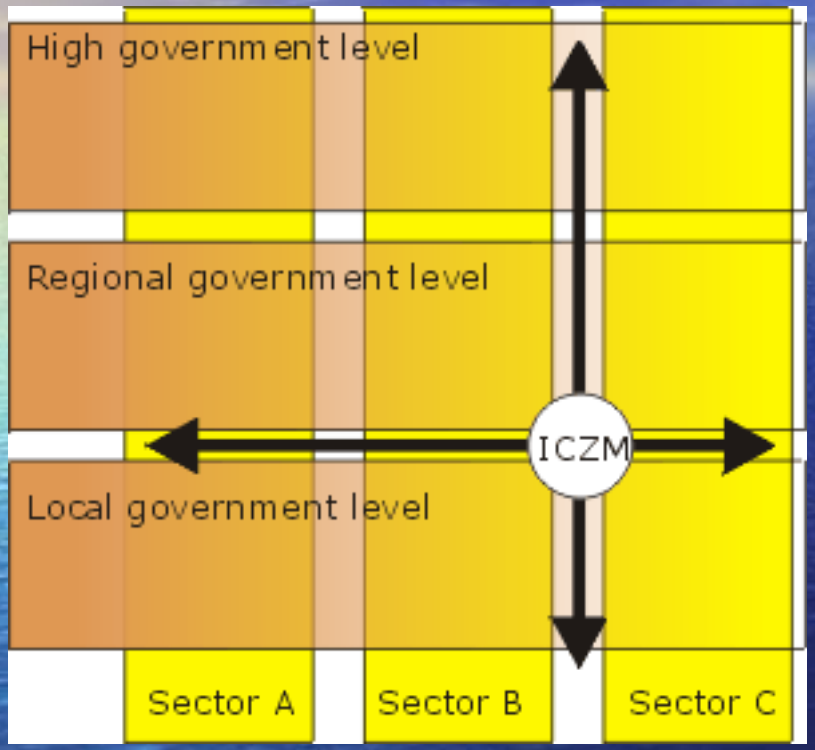
In a nutshell

- Humans depend on the world's coasts and oceans for living space, extractable commodities, and economic growth and influence.
  - Effectively managing how people share resources and space with each other and other biota becomes the great challenge of the 21st century
- Conflict mitigation, consensus building, trade-offs, sacrifice, and compromise will become the norm for sustainable coastal and ocean management
- A sustainable future will also depend on balancing both ecology and commerce management of coastal and ocean resources

So let's think through this from an ICOM perspective - What needs to be integrated?



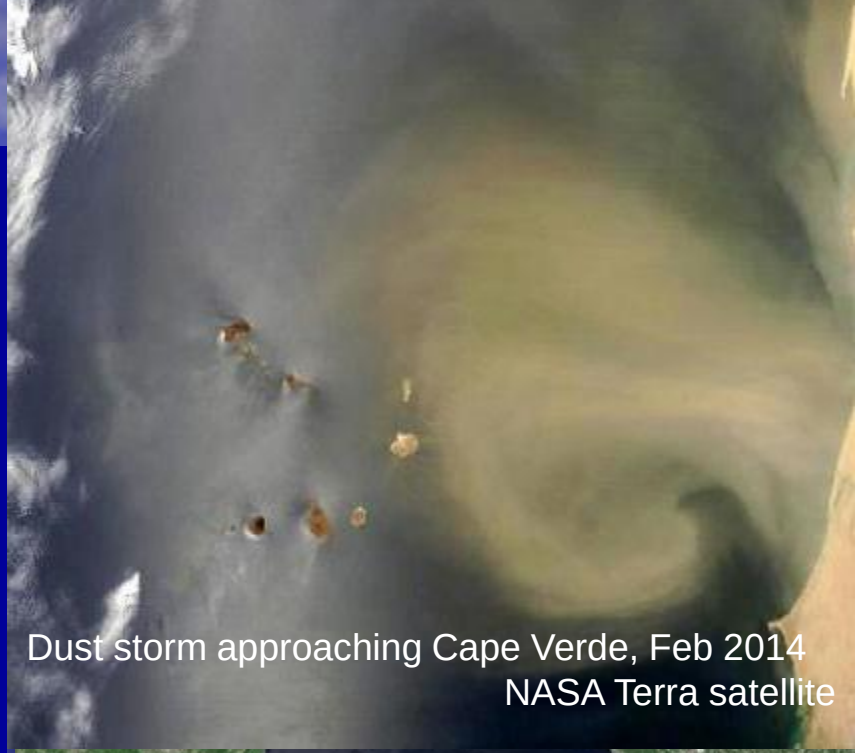
Integration in ICOM - Horizontal and Vertical



- **Inter-sectoral**
  - Among different coastal and marine sectors
  - Between coastal and marine sectors and land-based sectors
  - Among government agencies in different sectors
  - Between government agencies and other stakeholders in different sectors
- **Intergovernmental**
  - Among different levels of government, all of whom play different roles, address different public needs and have different perspectives

Other Types of Integration

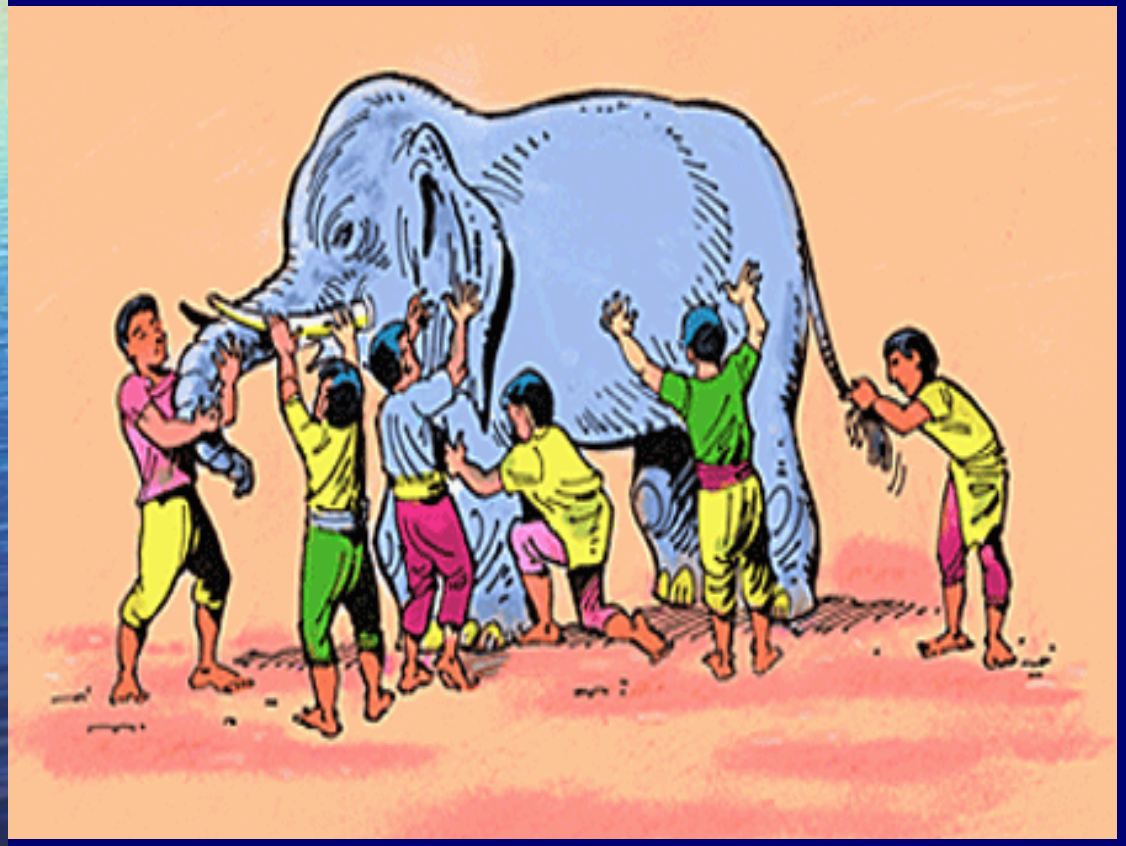
- Spatial integration
  - between inland areas, coastal lands, coastal waters, offshore waters and high seas as well as air space
- International integration
  - to address transboundary issues, etc.
- Science-Management integration
  - among different scientific disciplines and management
  - different methodologies and time frames
  - need to move from knowing individual characteristics of the system to understanding multiple dynamics of the socio-ecological system to comprehend the reason for the changes that are occurring



Dust storm approaching Cape Verde, Feb 2014
NASA Terra satellite

3. The many "pieces" playing a role in ICOM

- Terminology changes with knowledge and fashion.



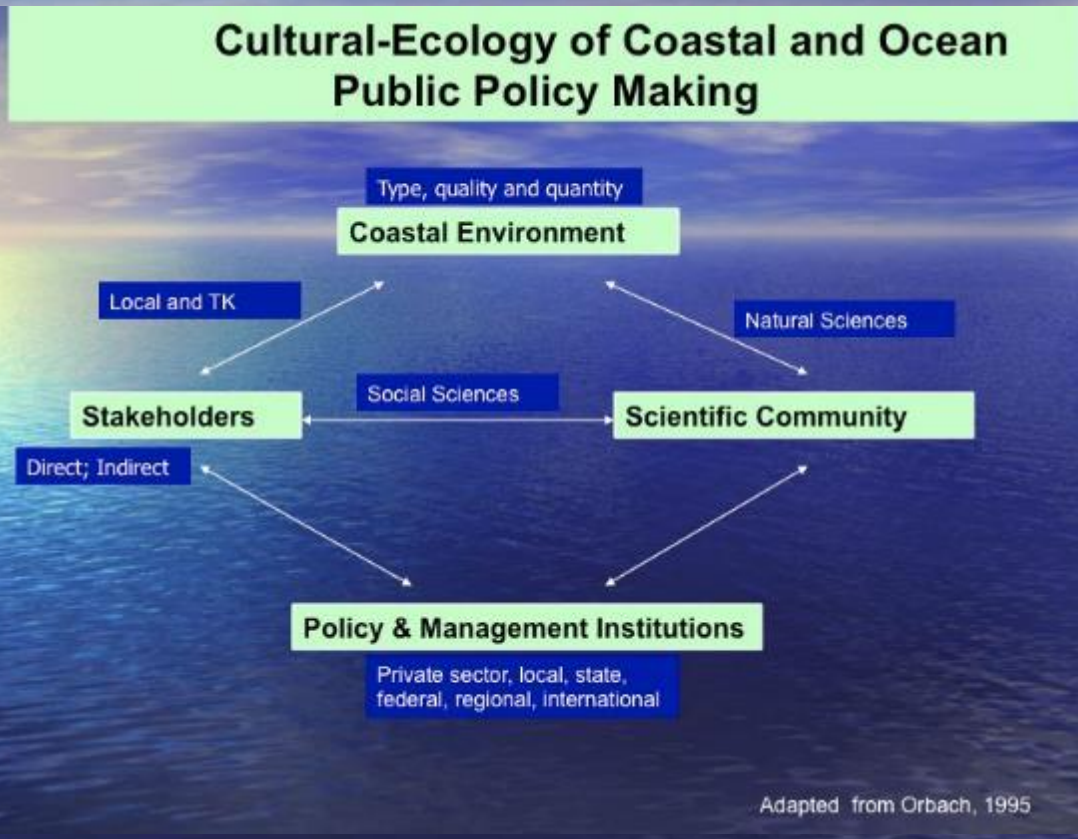
Parable of the 6 blind men: One's subjective experience can be true but fails to account for other truths or a totality of truth.

"The simple reason is that our sensory perceptions and life experiences can lead to limited access and over-reaching misinterpretations"

How can a person with a limited touch of truth turn that into the one and only version of all reality?

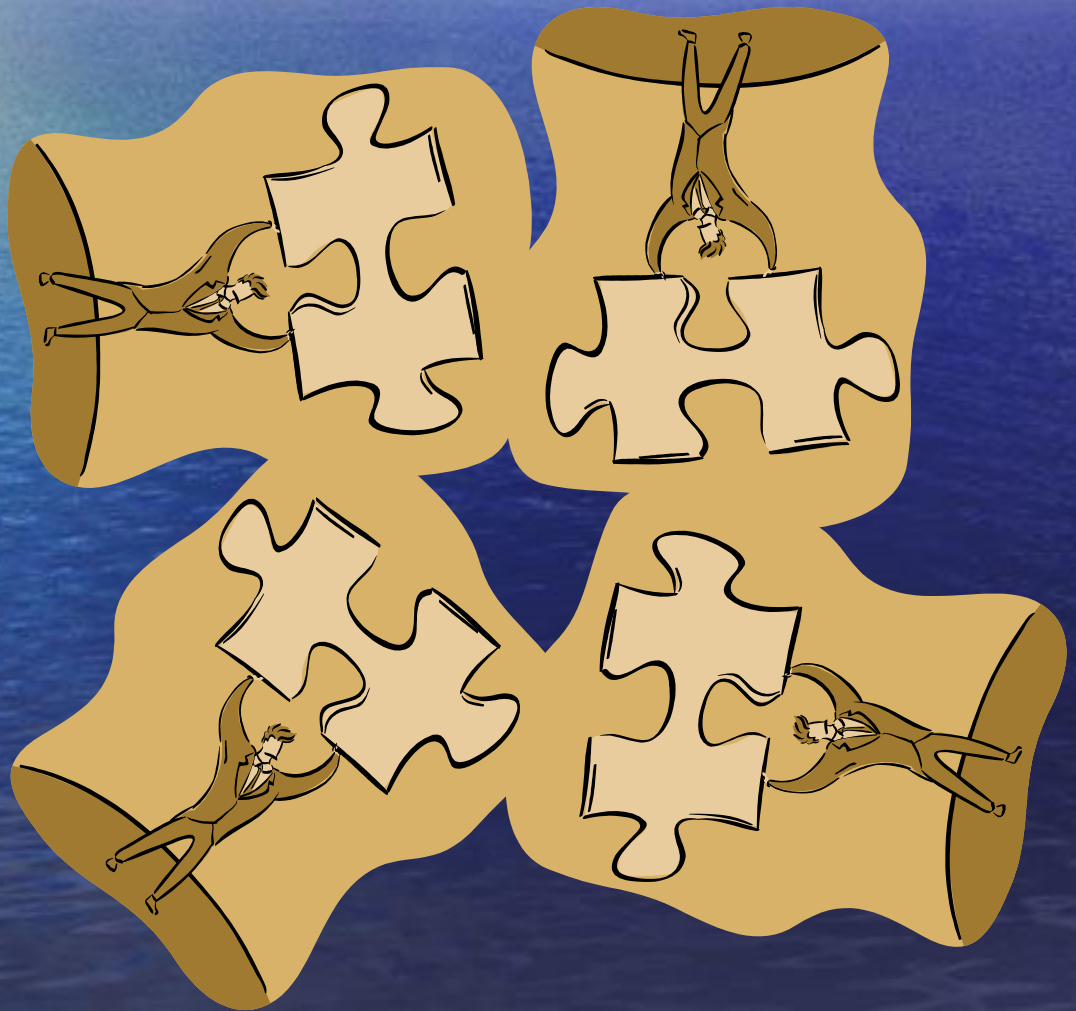
Understanding Terminology

- In ICOM planning, 3 major areas need to be commonly understood
  - The environment
    - Natural system, functions, time scale, how changing
  - The interactions of man with the environment
    - Activities, impacts
  - Management objectives
    - Our attempt to control activities and impacts



Terminology

The ICM Jigsaw



Let's discuss what the following words mean and decide collectively which one or more of the following categories it describes

Term	Environment	Interaction with Environment	Management Objectives
Pollution control			
Set back			
Aquaculture			
Storm surge			
Maritime boundary			
Sustainable use			
Coastal communities			
Climate change			
Red tide			
Beach seining			
Zoning			

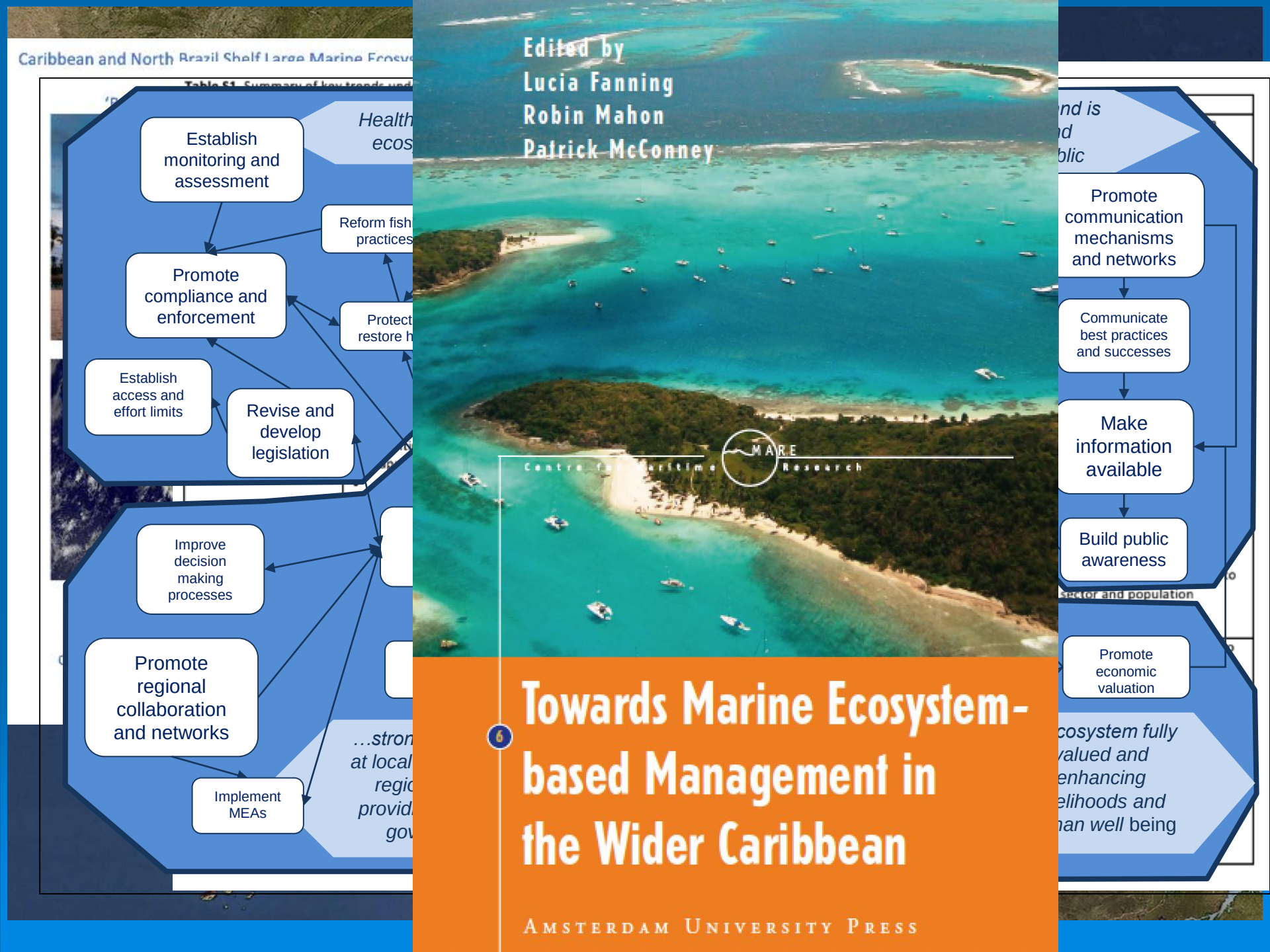
4. How can a manager make sense of current uses and issues and plan for emerging issues and a better future?

Group Projects – How can ICOM help?

Group Work - Major areas of focus:

1) Anticipated changes in the South China Seas by 2050
   - **"Business as Usual"?**
2) Preferred future for the South China Seas in 2050
   - **Where do we want to go?**
3) What needs to be done to achieve the preferred future
   - **How do we get there?**

Fig. 1 Map of the South China Sea (SCS). Note that the Gulf of Thailand is included as part of the SCS in this study. *Source* U.S. Energy Information Administration (2013)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Lucia Fanning
Robin Mahon
Patrick McConney
MARE
Towards Marine Ecosystem-based Management in the Wider Caribbean
6
Amsterdam University Press
Establish monitoring and assessment
Reform fish practices
Promote compliance and enforcement
Establish access and effort limits
Revise and develop legislation
Improve decision making processes
Promote regional collaboration and networks
Implement MEAs
Promote communication mechanisms and networks
Communicate best practices and successes
Make information available
Build public awareness
Promote economic valuation

Key Lesson Learnt

When perceptions of a problem vary broadly,

When there is uncertainty in the scientific assumptions and outcomes that underlie the process,

When stakeholders have different values and levels of influence

consensus on trade-offs is difficult to achieve.

Weinstein et al., 2007

Who are the stakeholders in the SCS?

- Different groups have diverse economic, social and political interests associated with resource use in the coast and ocean environment.
- Need to understand who the “users” of the space and resources are and the dimensions of their interest in particular “uses” of the resources of a given locality
- Need to understand the potential for **CONFLICT** and how to **MANAGE** it

Example stakeholder analysis

Table 1: A stakeholder Analysis was done prior to the beginning of the project to identify interested parties, and asses their roles in the project, the expectations they would have for the project, and any reason they may object to, or support the project.

Stakeholder Analysis				
Stakeholder Group	Tasks & Roles	Expectations	Fear for the Project / Objections	Support for the Project
Federal Government	·Provide funding for project ·Support project through SARA and Canadian Wildlife Act ·Enforcement	·Open Communication ·Progress Reports ·Timeline of project	·Waste of money if project is ineffective ·Loss of voter support if project is ineffective or people do not view it as important	· Project Compliments SARA and Canadian Wildlife Act
Provincial Government (Department of Natural Resources)	·Provide funding for project (conservation plates) ·Enforcement ·Support project with provincial policies and bylaws	·Open Communication ·Progress Reports ·Timeline of project	·Waste of money if project is ineffective ·Loss of voter support if project is ineffective or people do not view it as important	·Conservaiton plates provide funding for Pipling Plover conservation projects ·Conservation plates adversite importance of protecting Piping Plovers in Nova Scotia ·Project compliments provincial bylaws and
Conservation Groups + Birding Communitiy	· Provide data on Piping Plovers · Promote website	· Credit for data · User friendly website / system	·Improper use of their data ·Could lead to increased traffic in Piping Plover nesting areas	·Increased sightings ·Website encourages responsible use of habitat ·Potential for reduction in human-plover interactions
Dog Owners + Beach users	·Respect and follow provincial and federal legislation ·Be aware of and informed about human threats to Piping Plovers ·Be aware of Piping Plover nesting beaches	·Clear signage at beaches with website URL ·User friendly website / system	·Loss of area for walking dogs ·Loss of area for recreational activities ·They may not care about Piping Plovers and will oppose the project entirely	· Could promote new designated off-leash areas
Scientists (Ecologists)	·Provide data on Piping Plovers ·Provide expert advise and opinion	·Credit for Data ·Progress Reports / Project updates	·Improper use of their data ·Lead to increased traffic in Piping Plover area	·Project supports conservation efforts ·Piping Plovers have an intrinstic value
Municipal Government	· Enforcement · Promote website ·Coordinate with federal and provincial governments	·Open Communication ·Progress Reports ·Timeline of project	·Waste of money if project is ineffective ·Loss of voter support	· Potential for increased voter support

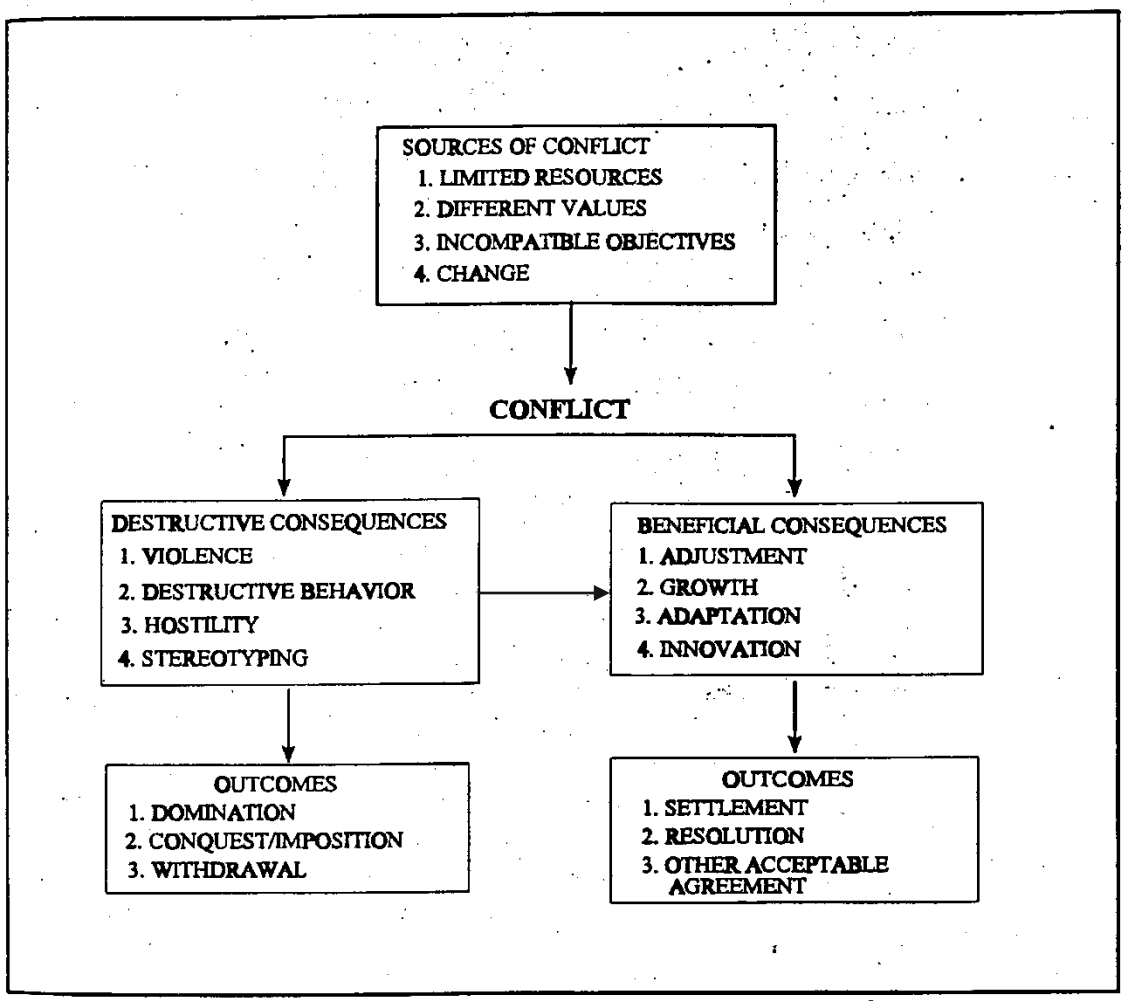


Figure 2. Conflict and Conflict Consequences (after Parsons, 1993)

Conflict Management Approaches – Assertive/Cooperative graph

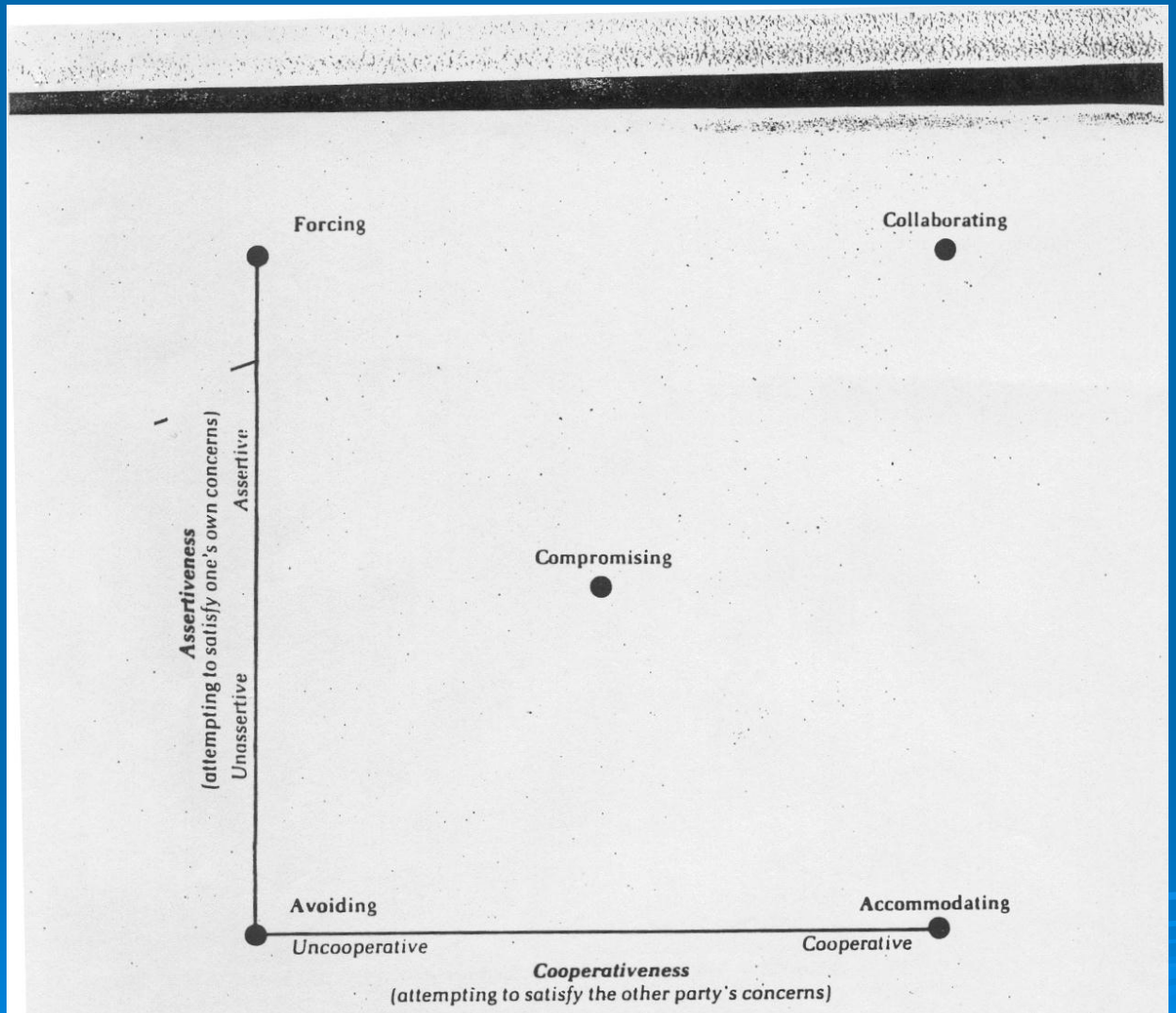


FIG. 15-4. Two-Dimensional Model of Conflict Resolution Behavior (adapted from Cooze 1989).

Response of Managers to Conflict

- Avoid the issue
- Take sides
- Leap into battle
- Find a quick fix
- King Solomon's trap – lose/lose outcome

Alternative response

- Act as the facilitator
- Focus on problem-solving
- Parties meet face to face to work out differences
- Parties help shape process
- Decision reached by consensus if possible

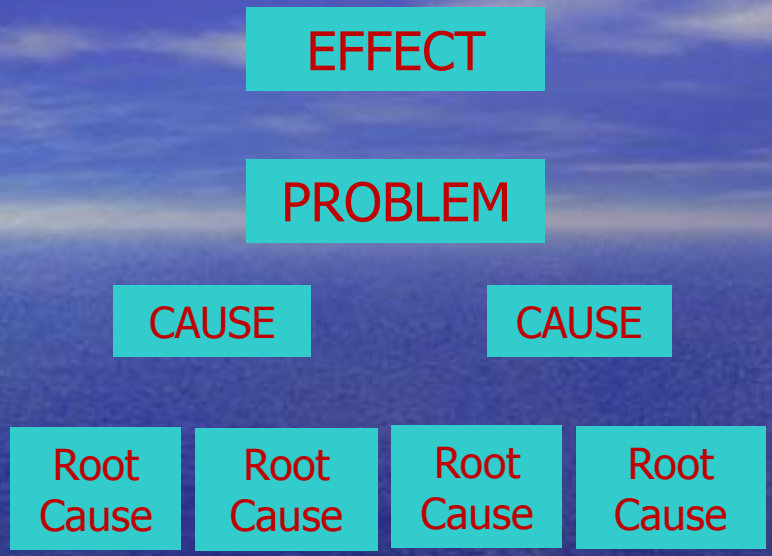
Principles for Effective Conflict Management

- **Recognize conflict is a mixture of procedures, relationships and substances**
- **To find a solution, must understand the problem**
  - Critical thinking, interdisciplinary/transdisciplinary approaches essential
- Take time to plan a strategy with built-in flexibility
- Progress demands positive working relationships
- Negotiations begin with constructive definition of problem
- Parties help design process and solutions
- Lasting solutions based on interests not positions
- Process must be flexible
- Think through what might go wrong and do no harm

Some ideas for discussion in your group

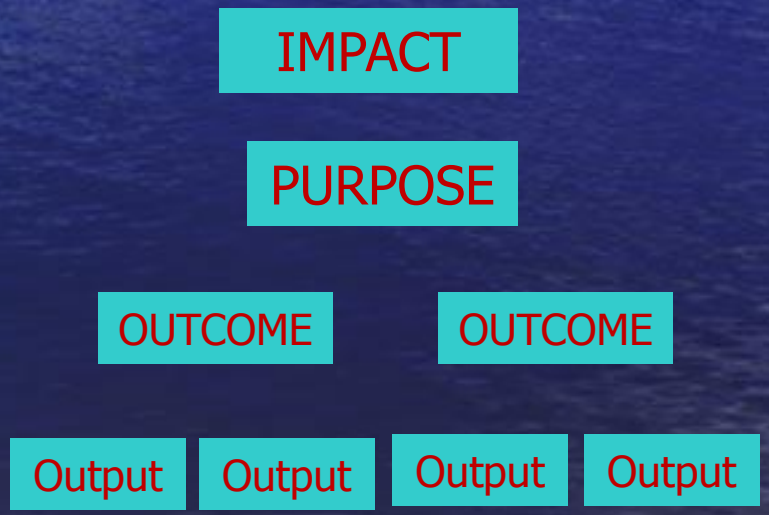
Identifying the problem:

What is a problem you have identified from BaU in the SCS in your group?
Why has this problem arisen?
What is the effect of having this problem continue to 2050?



Identifying the solution:

What are you proposing to do about it, i.e. what is your purpose?
How would you achieve it, i.e what are the outcomes?
What would be the resulting impacts from having achieved those outcomes?



ues in the SCS

Teh et al. 2017

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DOI: 10.1080/00908320.2010.499300

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Regional Cooperation in Marine Environmental Protection in the South China Sea: A Reflection on New Directions for Marine Conservation

ALDO CHIRCOP

Marine & Environment Law Institute
Schulich School of Law
Halifax, Nova Scotia, Canada

Despite ongoing conflict management and confidence-building efforts in the South China Sea (SCS), there is still no clear path to the resolution of the complex multilateral sovereignty and the maritime boundary disputes. Intergovernmental Panel on Climate Change assessments for the region forecast significant climate and ecological change to the detriment of the region's coastal inhabitants, ecosystems, and economies. SCS states need to place marine conservation cooperation at the center of all development activity in order to enhance the prospects of adaptation to climate change. This article explores and argues for more effective SCS Large Marine Ecosystem cooperation through transboundary networks of marine protected areas.

Keywords Large Marine Ecosystem, marine protected areas, Particularly Sensitive Sea Areas

- Intense pressure from heavily populated coastal communities
- Biodiversity and habitat loss; perverse economic subsidies; climate change impacts
- SCS mangroves, coral reefs, and seagrasses estimated to provide around USD 5B , USD 1 B , and USD 87 million each year respectively

- Population – 2 billion 2015; 6% growth by 2045
- SCS countries – fastest growing

Ambio 2017, 46:57–72
DOI 10.1007/s13280-016-0819-0

KUNGL. VETENSKAPS-AKADEMIEN

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REVIEW

What is at stake? Status and threats to South China Sea marine fisheries

Louise S. L. Teh, Allison Witter, William W. L. Cheung, U. Rashid Sumaila, Xueying Yin

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Abstract Governance of South China Sea (SCS) fisheries remains weak despite acknowledgement of their widespread overexploitation for the past few decades. This review incorporates unreported fish catches to provide an improved baseline of the current status and societal contribution of SCS marine fisheries, so that the socio-economic and ecological consequences of continued fisheries unsustainability may be understood. Potential fisheries contribution to food and livelihoods include 11–17 million t in fisheries catch and USD 12–22 $\times 10^9$ in fisheries landed value annually in the 2000s, and close to 3 million jobs. However, overfishing has resulted in biodiversity and habitat loss, and altered ecosystem trophic structures to a 'fished down' state. The present situation reiterates the urgency for fisheries policies that simultaneously address multiple political, social, economic, and biological dimensions at regional, national, and local scales. Importantly, improved cooperation between SCS nations, particularly in overcoming territorial disputes, is essential for effective regional fisheries governance.

Keywords Fisheries sustainability · Governance · Marine fisheries · South China Sea

Singapore, Vietnam, Thailand, and Cambodia (Fig. 1), whose combined population totalled almost 2 billion in 2015, and is expected to grow by 6 % by 2045 (UN 2015). SCS countries are some of the fastest growing developing economies of the world (The World Bank 2015). As they industrialise, anthropogenic pressure on the natural environment inevitably rises, resulting in region wide concerns about food insecurity and biodiversity loss. Marine fisheries, which forms an important source of national revenue and a crucial component of regional food security (Pemsetta and Bewers 2013), underscore the conflict between humans and the environment.

Fishing has, and continues to be, a core economic activity for coastal communities in the SCS, providing employment, livelihoods, and products for trade (Funge-Smith et al. 2012; SEAFDEC 2014). For example, around 30–60 % of households in coastal Philippine towns are dependent on fisheries for employment (Cruz-Trinidad et al. 2009). Fishing also generates indirect economic benefits from fish processing, boat building, ice manufacturing, and other fishing-related services (FAO 2005, 2010; AFCD 2015). Moreover, marine fish are an important

- **How to do this? Sale et al. (2014), Transforming management of tropical coastal seas to cope with challenges of the 21st century**
  - 3 Scenarios, reef degradation on fishery production (BaU; medium, large improvement of reefs)
  - Marine protected areas rarely do a good job of addressing threats to coastal ecosystems stemming from pollution, land use or invasive species, and they can increase user conflicts rather than abate them
  - MPA success criteria - need to be: big (greater than 100 km2), (2) old (established for 10+ years), (3) no-take (not allowing fishing of any type), and (4) remote.
  - Role for Marine Spatial Planning (MSP)
  - Management Actions:

(i) Maximize benefits,

(ii) Limit –'ve interactions,

(iii) Capitalise on synergies,

(iv) Adapt to climate change

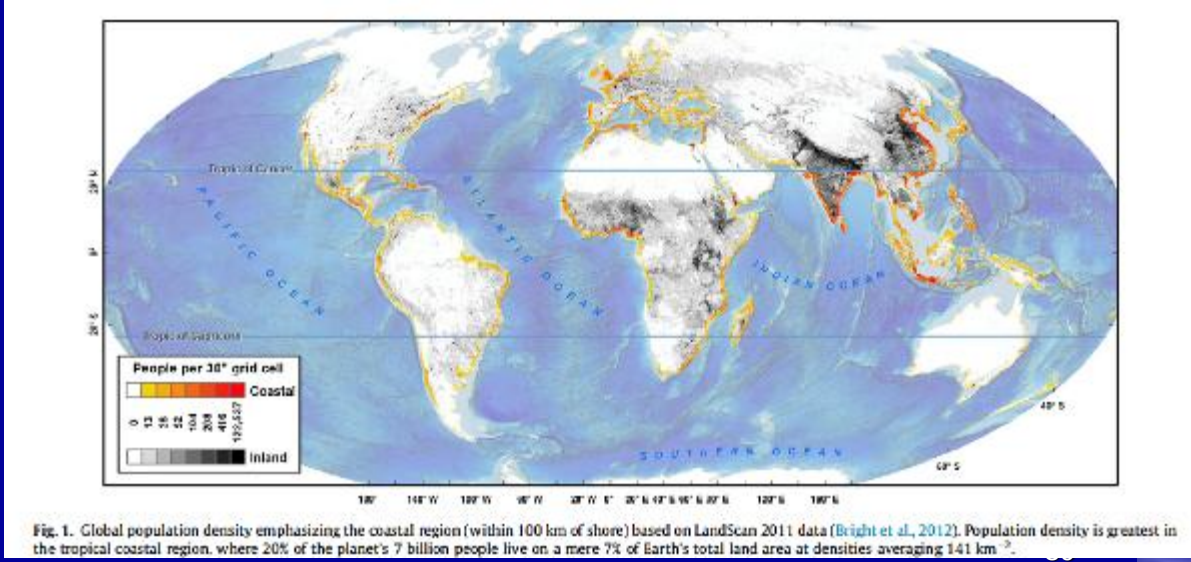


Fig. 1. Global population density emphasizing the coastal region (within 100 km of shore) based on LandScan 2011 data (Bright et al., 2012). Population density is greatest in the tropical coastal region, where 20% of the planet's 7 billion people live on a mere 7% of Earth's total land area at densities averaging 141 km $^{-2}$.

Brodie and Pearson (2016), Ecosystem health of the Great Barrier Reef: Time for effective management action based on evidence

- **Despite the focus on Climate Change impacts**,

"poor water quality from land-based run-off, impacts from coastal development, and some remaining impacts of fishing remain the major threats to the future vitality of the Great Barrier Reef"

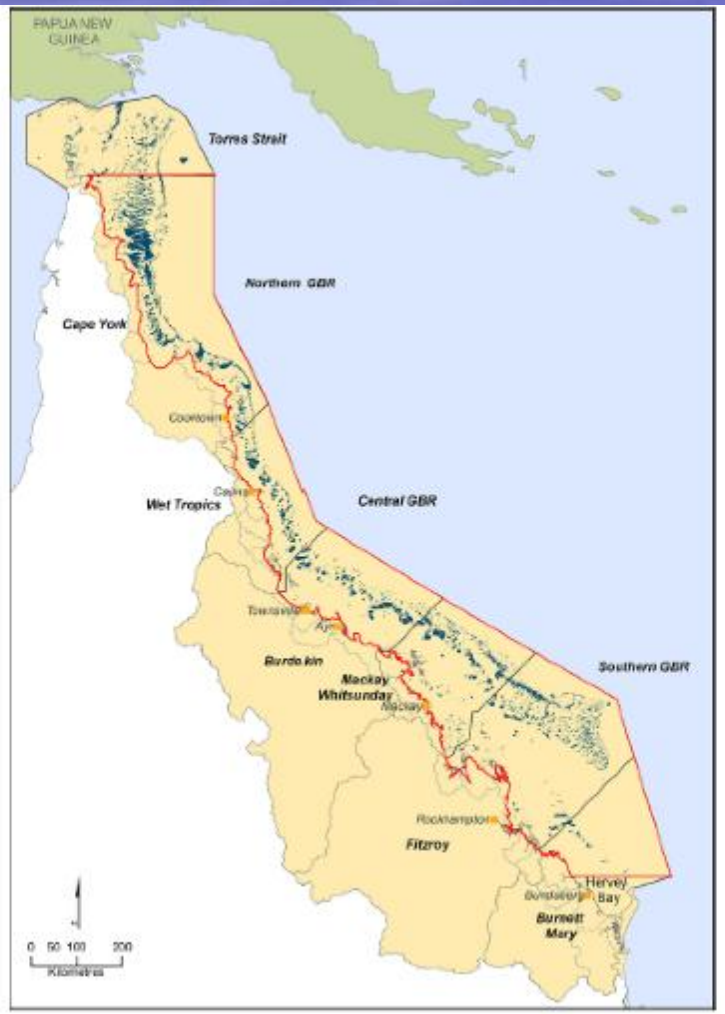


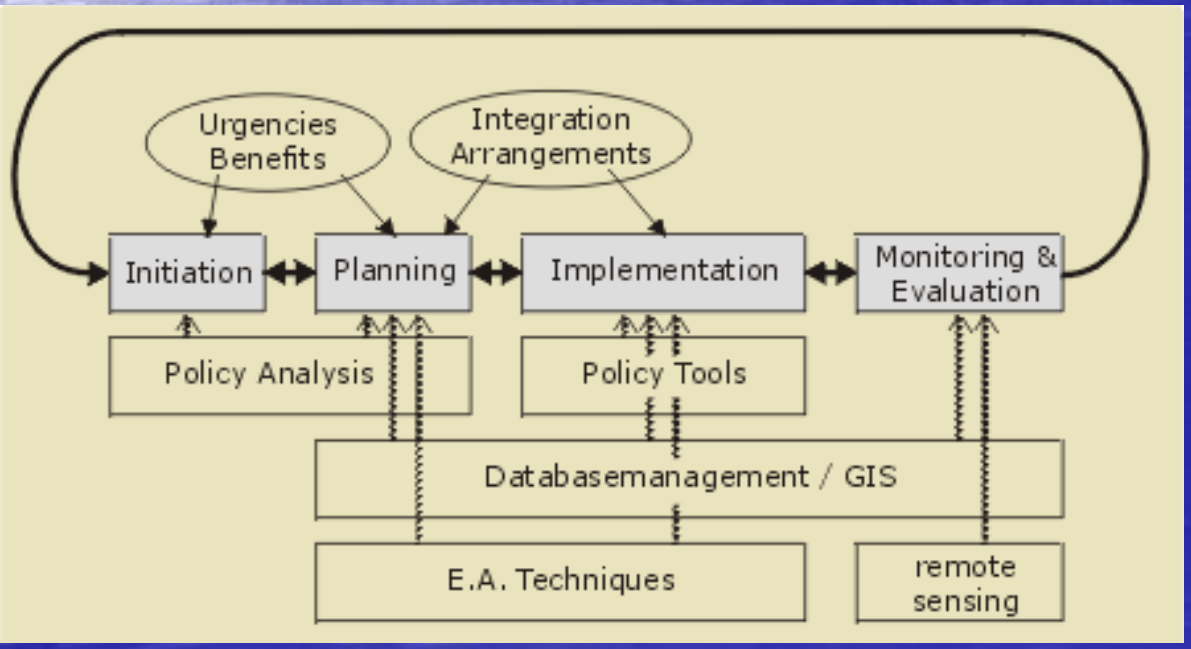
Fig. 3. Proposed boundaries of the Greater GBR. The area inside the red line is the GBRWHA while the entire area shaded yellow is the proposed Greater GBR management area, including the GBR catchment area, the GBRWHA, Torres Strait and Hervey Bay. Map prepared by J. Waterhouse, TropWATER. Data for the GBR provided by the Great Barrier Reef Marine Park Authority.

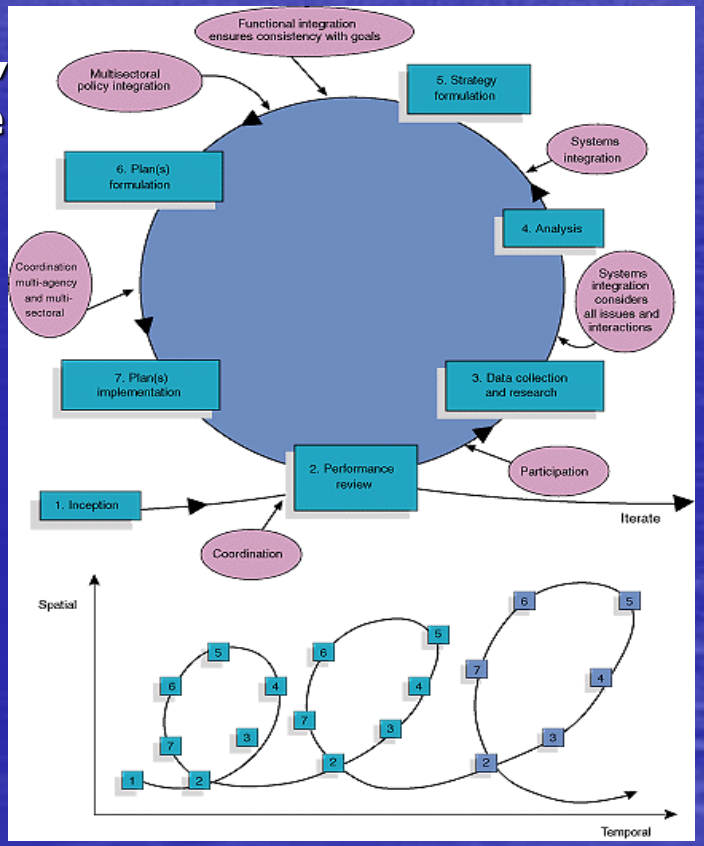
ICOM Process

Stages of the ICOM Process

- **Initiation** – evidence of a problem with existing approaches
- **Planning** – what is it, why do we need it, what would it do, who supports it, etc.
- **Implementation and Operation** – formal adoption, funding, legislation, communication, coordination, etc.
- **Monitoring & Evaluation** – hypothesis testing,

How has context changed: priorities, state, governance





Discuss what might be the Terms of Reference for your SCS project?

Geographic boundaries?

- **Administrative?**
- **Functional integrity of area?**
- **Issues-driven?**

Time scale?

- **Short term**
- **Long-term**

Specific issues to address? (Q.1)

Goals and objectives? (Q.2)

How to achieve specific targets? (Q. 3)

Fig. 1 Map of the South China Sea (SCS). Note that the Gulf of Thailand is included as part of the SCS in this study. *Source* U.S. Energy Information Administration (2013)

ICOM Management Plan Components

An ICOM Plan should include:

- description of area to be managed
  - social, political, environmental, economic, legal, cultural
- description of problems and opportunities, goals, objectives and targets for addressing the problems
- stakeholder identification and analysis
- statement of principles and policies to guide the program
- timeframe
- statement of management actions to be taken
- description of required institutional arrangements, laws and policies, responsibilities, support needed
- funding and staffing requirements
- actions needed to adopt plan and timetables for action

謝謝
Thank you
ขอบคุณมาก
Terima kasih
អរគុណ
Salamat
cảm ơn bạn
ຂອບໃຈ
chei-zu tin-bar-te

Fig. 1 Map of the South China Sea (SCS). Note that the Gulf of Thailand is included as part of the SCS in this study. *Source* U.S. Energy Information Administration (2013)