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MANAGEMENT – Transitioning from single-sector management to ecosystem-based management: What can marine protected areas offer?

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Past perspectives



In 1883 while the american bison and the homing pigeon were near to the extinction, fish seemed to be still so abundant that Thomas Huxley declared "I believe that fishing of cod, herring, and tuna and, maybe, all marine resources will never have and end. That is nothing of what we do can seriously affect the number of fish"

Fisheries are declining

PAST

PRESENT

Formerly abundant species are now rare

Food webs are altered

Coastal ecosystems are polluted and degraded

Invasive species and diseases are proliferating

Oceans are warming

The failure of many traditional fisheries management approaches



.....Many of the world's fish populations are overexploited, and the ecosystems that sustain them are degraded.....

- existing fisheries management practices are failing to protect individual stocks and ecosystems,
- (2) fisheries agencies should transition to EBFM from single species management.



Anderson et al. 2011



🔲 Low Impact (1.4-4.95) 📒 Medium High Impact (8.47-12) 📕 Very High Impact (>15.52)







Hughes et al. 2011

Habitat degradation



Beck et al. 2011

A complex scenario driven by multiple stressors



Douvere et al. 2007



Norwegia

Ottersen et al. 2011



Crowder et al. 2006

The solution: Ecosystem Based Management

EBM seek to manage an ecosystem holistically and to preserve the goods and services they provide

EBM is an integrated and interdisciplinary approach that considers all ocean sectors and aspects of an ecosystem, including humans.

People are viewed as a key component of the ecosystem, relying on the goods and services they provide and altering ecosystems through their use, and sometimes abuse

Ecosystem Based Management: The solution?

- Data availability
- Governance structures
- Time constraints





Raja Ampat, Indonesia Puget Sound, Washington, USA

Examples of successfull applications



In Kenya from McClanahan et al 2008

New Zealand and Alaska have never experienced significant overfishing

Great examples from California (see IMCC beyond obituaries)





Worm et al. 2009

Managing marine biodiversity and human uses with marine protected areas



the starting point for EBM at the initial scale.

MPAs protect a range of
resources and can address both
conservation and fisheries goals
if properly designed, moving
beyond a single-sector focus to
address a suite of ecosystem
characteristics, as EBM does.

MPA planning should incorporate from the outset key EBM concepts, such as cross-system management actions and explicit recognition of the link between social and ecological system



Marine Protected Areas and EBM

Holistic focus of EBM represents an important distinction from the typical approach and intent of MPAs.



MPAs primary objectives: sustaining fisheries and enhancing conservation, preserving areas of cultural significance, protecting the aesthetic integrity of the system for recreation, tourism, or existence value, or promoting research and education







Marine Protected Areas and EBM: spatial extent of stressors

- When the dominant stressors to a system are local scale and spatial in nature, then MPAs are capable of mitigating those stressors and can be an effective management tool,
- As stressors become larger scale or nonspatial, MPAs alone will not be able to ensure the sustainable delivery of ecosystem services from a region or address the full range of uses, and therefore will be unable to meet all EBM goals.

Marine Protected Areas and EBM







But

- the absence of systematic guidelines for EBM in different ecological, social and cultural contexts,
- the chronic jurisdictional dissociation between the land and sea in coastal zones,
- the lack of baseline knowledge about processes shaping natural coastal communities.

The effects of multiple stressors

All Mediterranean Model (SST: Average Annual)



http://globalmarine.nceas.ucsb.edu/mediterranean/ Micheli et al. in prep.

The majority of the Mediterranean Sea is under intense pressure from multiple activities and stressors

But....again the Mediterranean Sea





60% of sites examined lack well-developed algal canopies, a critically important habitat in the Mediterranean and rocky reefs worldwide, and established invasive species at 67% of sites

Are we ready to implement EBM? Moving forward in the face of present limitations

On a global or regional scale, existing MPAs Are not playing a significant role in advancing EBM because there simply are not enough, in number or in size, to ensure the long-term sustainable delivery of the full suite of marine ecosystem services.

Globally, MPAs comprise only 1.6% (and no-take reserves, 0.2%) of the area within exclusive economic zones. Half of all ecoregions have less than 1% of their waters protected, and only 18% of ecoregions have MPA coverage that exceeds 10%

Short term vision

Good science (...."science is not the bottleneck")

 More specific on international agreements and national legislation to make more effective the legislative frameworks

Appropriate objectives and the costs

Long term vision

Using MPAs within the context of EBM (rather than implementing MPAs in isolation)

Contribute to a shift from the current sectoral and geographically-fragmented approach to marine management towards an ecosystem-based and spatially-integrated management system