

Thank you for inviting me to talk with you about Ecosystem-based ocean governance



In the 21st century, new views are reshaping rights and rules for the seas. The oceans are no longer opaque to human view. Scientists like Barbara Block (picture on right) are tagging and tracking highly migratory tuna and billfish and giving us a dynamic, 3 dimensional view of sealife and the ocean tracking network is using sound to locate species and identify movement of many species throughout the oceans.

Scientists probing vents and deep ocean canyons are discovering, naming and studying new species. In the photo on the left, Nautilus Minerals samples the quality and quantity of minerals that might be extracted from deep sea vents in the EEZ of Papua New Guinea. With these new views, there is new thinking about ocean management that includes new spatial management tools – from networks of MPAs to marine spatial planning and ocean zoning.

But the ability to see and mine the oceans in new ways also creates new discourses for ocean governance. For the next few minutes, I invite you to rethink ocean governance as I share with you ideas from our NCEAS group on EB ocean management.



Let me begin with a brief outline of my talk.

Outline

- Diagnoses of the problem you know the real problems of the sea, overfishing, pollution, cumulative impacts, decline of top oceanic predator species, destruction of benthic habitat by trawling, etc.) – but we as lawyers and policy experts need to diagnose the underlying governance problems.
- 2. Briefly discuss property rights in the sea

Who owns the oceans?

What is the role of government?

3. Suggest solution lies in

Place-based approaches to Ecosystem-Based Management

- MSP and Ocean Zoning
- 4. Finally, illustrate how some jurisdictions are already transitioning to placebased management?

POLICYFORUM

SUSTAINABILITY

Resolving Mismatches in U.S. Ocean Governance

Problems in ocean resource management derive from governance, not science. Ocean zoning would replace mismatched and fragmented approaches with integrated regulatory domains.

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That the oceans are in serious trouble is no longer news. Fisheries are declining, formerly abundant species are now rare, food webs are altered, and coastal ecosystems are polluted and degraded. Invasive species and diseases are proliferating and the oceans are warming (1). Because these changes are largely due to failures of governance, reversing them will require new, more effective governance systems.





Our NCEAS group provided a diagnosis of the problem, not as one of needing more biophysical science to understand ecosystems, but rather as a failure of governance.

I think we are all aware of the serious problems in the oceans. --- The literature has labeled some of these problems with terms such as loss of top predator species and subsequent trophic cascades, fishing down the food chain, shifting baselines, We recognize all of these problems but treat them as the symptoms, not the underlying cause of ocean problems.

And we diagnose the problem as one of governance systems that are fragmented and that don't match ecosystems, in time or space.



- <u>Fragmentation</u> of management authority
- <u>Spatial mismatches</u> between scale of governance and ecological system.
- <u>Temporal mismatches</u> between governance and ecological processes.

Our diagnoses of the problems are summed up in these three points. Note that there are both fine scale and large scale mismatches. Often governance mechanisms have political boundaries that don't fit the ecosystem, sometimes these are too large scale, and sometimes too small scale for an effective fit. Our governance systems often aren't able to detect gradual changes that occur slowly, or can't foresee very rapid ecological shifts (or system flips). Voting cycles and terms of office are usually too short to create incentives to plan for the long-term or even be concerned about long term change.

Our governance systems need to FIT ecological systems that are DYNAMIC and NON-LINEAR. Our existing sector-by-sector management system in which one agency deals with fishery management and another with location of oil and gas leases, still others with dredge and fill projects, etc. increases the chances that marine managers will not anticipate and deal with cumulative impacts, not identify emerging problems, fail to provide early warnings of impending system flips. Our current path is leading to declines in fish, loss of species diversity, displacement of human populations, and increased conflict

What we term mismatches are captured in the IDGEC lexicon as "problems of FIT"



This shows an example of existing zoning in southern California, and illustrates the fragmentation of government authority within the Southern California Bight.

Management of this ecosystem is carved up by separate sector-by-sector laws and regulations.

As this map illustrates,

oil and gas leases, fishing closure zones, National Marine Sanctuaries, shipping lanes, pipelines and cables have all been approved through sectoral management schemes, often without regard to the habitat types and ecosystem concerns and without an overall plan for separating incompatible uses.

Outline of Talk

Diagnoses of ocean governance problem

• Place Based Solutions:

- Ecosystem-Based Management
 - Marine Spatial Planning
 - Ocean Zoning
- How do we transition to place-based management?

In order to address problems of fragmentation as well as spatial and temporal mismatches within a common property rights framework, we need to find new tools that provide a better FIT between ecosystems and governance systems.

The PEW Oceans Report and the US Commission on Ocean Policy called for ecosystem-based management, And a consensus statement (signed by over 200 scientists) defined and described EBM – emphasizing that it is PLACE-Based management.

Scientific Consensus on Marine Ecosystem-based Management (2005)

www.compassonline.org EBM:

- protects ecosystem composition, structure & functioning
- is *place-based*, focusing on specific ecosystems
- addresses connections among air, land & sea
- integrates ecological, social, economic & institutional perspectives

Sectoral management managing one thing in many places



Place-based management managing many things in one place



Source: NOAA Fisheries webpage on recreational fishery surveys for top 3 photos Far left below: dredging from Belgium? Most from Mass.

Some Advocate an Ecosystem Approach to Managing Sectors



Ecosystem-based fishery management Science 305: 346-347

E.K. Pikitch, C. Santora, E.A. Babcock, A. Bakun, R. Bonfil, D.O. Conover,
P. Dayton, P. Doukakis, D. Fluharty,
B. Heneman, E.D. Houde, J. Link,
P.A. Livingston, M. Mangel,
M.K. McAllister, J. Pope &
K.J. Sainsbury (2004)

Some have advocated an "Ecosystem-APPROACH" to managing the existing sectors such as an ecosystem approach to fisheries management.



Others have taken land-based planning tools and applied them to marine areas. China, for example has created an ocean zoning plan for its territorial sea, but the plan is not based on knowledge and understanding of the ecosystem.



What we are recommending is a place-based approach to ecosystems in which there is an overall plan for specific marine spaces, a plan guided by our knowledge of biophysical processes and human activities in that place.

Ecosystem	Ecosystem-based
Approach to	Management
Management •Sector-based, activity-by- activity •Brings ecosystem thinking to sectoral management	 Place-based: manages all sectors in each specified place Brings comprehensive planning to ocean space
 Each sector has one	 Each place has one
management authority Incremental improvement;	management authority Fundamental improvement;
not a paradigm shift Can't solve the problems	a paradigm shift Can solve the problems

Defining Places to Manage

A 3 part process that considers:

- Biophysical conditions and identifies core areas
- Human activities
- Political and jurisdictional realities and boundaries

Boundaries of ecosystems are difficult to define, but easier to characterize at their centers than at their edges.

Movement across boundaries must be recognized and treated as externalities

Boundaries can be distinct but seldom relate to spatial structure of biophysical or human activities.



The terms we use are not interchangable synonyms. This chart explains the hierarchy of terms.

Ecosystem-based management is the goal. To achieve it, we need marine spatial planning which provides a basis to develop comprehensive ocean zoning plans. The zoning plan may be implemented with and supplemented by permits, public education, codes of practice and other management tools.

We generally envision a small number of zones (4-6) defined by objectives (not activities). Within each zone, some activities will be excluded, others will be permissible as of right, other will be permitted only with a permit.

Great Barrier Reef Marine Park	Australia
Florida Keys National Marine Sanctuary	United States
Eastern Scotian Shelf	Canada
Master Plan for Belgian Part of the North Sea	Belgium
Integrated Management Plan for North Sea	The Netherlands
EEZ and Territorial Sea Planning	Germany
Irish Sea Pilot Project	United Kingdom
Territorial Sea Zoning	China

many jurisdictions in the US and Europe are already engaged in Marine spatial planning.

Most of these are not yet comprehensively zoned. China is the one country that is implementing a comprehensive zoning system throughout it's territorial sea, but China's offshore zoning is not so much ecosystem based as driven by the need to separate incompatible uses and to stimulate economic development. But it does also include marine protected zones.

Germany, the Netherlands, the UK, and especially Belgium are far ahead of the US in comprehensive marine spatial planning. In the US, Florida and Massachusetts are leading by extensive mapping of habitats and uses.



As marine spatial planners for Belgium's EEZ have demonstrated, marine spatial planning enables decision makers to view map of ocean space and consider alternative scenarios and trade-offs between activities. MSP allows a closer look at compatible and incompatible uses and cummulative impacts.

Some Important Things Happen Only in Certain Places





A Simple Zoning System

- Full protection (e.g., seabird nesting colonies) no go zone (exception for research)
- Marine reserves that prohibit all extractive and other harmful uses
- Conservation zones that allow extractive uses that do not degrade habitats
- General use zones that allow a wide range of activities (probably a plurality of the area)

Just to give you an idea of what we mean by zoning by objective. Here is a system that would divide marine space into 4 zones. Generally, the full protection zones cover a tiny area that would be useful for baseline scientific purposes or to protect special resources such as seabird nesting colonies.

Marine reserves provide extensive protection of species and habitats by preventing all harmful uses or extractive activities.

Conservation zones would be less restrictive allowing for fishing and other extractive activities that don't harm habitat.

Most of marine space would be within the general use zone.



Zoning spectrum for multiple use										
ACTIVITIES GUIDE (see Zoning Plan for details)	General I.	Provential	Conservatione Conservation	Buller ₂₅	Resorting	Marine Malino	Presenting			
Aquaculture	Permit	Permit	Permit 1	×	×	×	×			
Barnewing	*	*	*	~	~	~	~			
Boating, Diving, photography	~	*	~	~	× 2	*	×			
Crabbing	v	*	¥ 2	×	×	×	×			
Harvest fishing for aquarium fish, coral and beachworm	Permit	Permit	Permit ¹	×	×	×	×			
Harvest fishing for sea cucumber, trochus, tropical rock lobster	Permit	Permit	×	×	×	×	×			
Limited collecting	✓ 4	× 4	× 4	×	×	×	×			
Limited impact research	~	~	~	✓ 5	~	15	Permit			
Limited speanishing (shorker only)	*	~	× 1	~	×	~	×			
Line fishing	√ 6	√ 6	✓ 7	×	×	×	×			
Netting (other than pait netting)	*	*	~	×	~	~	~			
Research (other than limited impact)	Permit	Permit	Permit	Permit	Permit	Permit	Permit			
Shipping (other than in a designated shipping area)	~	Permit	Permit	Permit	Permit	Permit	×			
Tourism program	Permit	Permit	Permit	Permit	Permit	Permit	×			
naduonal use of mannetesources	- C	0	+ 0	- C	- C	- 9	Xe			
Trawling	~	×	×	×	×	×	×			
Tolling	v û	v 0	V Û	V 0,0	~	×	×			

GBRMP has seven zones. Within each of these this table shows which activities are permitted by right (see check marks), which are not permitted in a particular zone (note the Xs), and which activities must get a permit to be allowed in the zone.

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How do we transition to ecosystem based, sea use management?



As with any spatial planning, we need to map the space with both biophysical features and human activities or uses.

Mapping of human uses as with other socio-economic studies must begin simultaneously with the mapping of habitat types in order to be ready to consider interactions between human uses and ecosystems.

(Of course it is useful to have legislation mandating agencies to develop MSPlans and ocean zoning, but many jurisdictions probably already have in place a structure through which these initial steps can begin.)



Mass is leading the way by developing high-resolution seafloor habitat maps. The Undersea landscape includes a diversity of habitats:....



These include

- sand, kelp forests, sponge fields, cobble and gravel, mud. Eelgrass meadows, boulder and reef.
- By the way, California's mapping for MPAs in the central coast was quite similar.



Massachusetts

- Created Geodatabase in 2005 to house human use information (seasonal component/dimension of environment)
- Currently collecting data layers; and
- Adding these data layers to the GIS to see how uses interact



NEXT, they asked industry and experts what types of seafloor and/or water depths are needed for different technologies; which areas are appropriate for windfarms in 20 years, as commercially viable technology becomes realistic-



And produced GIS map showing potential wind turbine sites based on wind velocities and bathymetry and other factors.

These maps are available on the website of the Mass office of CZM



The private non-profit foundation sector is playing a new role in ocean governance through private/public partnerships.

In Massachusetts, leaders created a non-profit Ocean Partnership Fund (with private foundation funding) that brings together stakeholders from the nonprofit and for-profit business sectors as well as government to move forward in creating a coherent marine spatial plan. The state's Coastal Zone Management office

conducted a survey of public attitudes and completed an economic evaluation of marine resources.

California's MLPA called for called for creation of a network of MPAs in state waters. Since the state had no money to implement the law, private, non-profit foundations stepped in to fund science, data gathering and meetings of the science panels and stakeholder working group. The Governor appointed a Blue Ribbon Task Force to vet the proposals for alternative MPA networks and forward one to the state's Fish and Game Commission for adoption.

Ocean EBM Needs Stakeholder Participation

- Who should participate in the process (stakeholder analysis)?
- How can stakeholders be involved at all stages of the management process?
- How can participation be sustained over time?



I want to end with the important role of stakeholders in EBM of our oceans.

I know you understand how critical Stakeholder involvement is. Without stakeholder involvement, we are not likely to see creation of MPAs, let alone implementation of MSP and ocean zoning. Stakeholders need to be involved from the outset and in all stages of the creation of a plan, implementation, monitoring, enforcement, evaluation and adaptation.

But stakeholders can be unwieldy. Creating a process for stakeholder involvement that is perceived as fair is critical.

The MLPA process in California illustrated the need for effective bridges between the science panel and the stakeholder panel. A critical examination of that process could be quite useful to those tasked with creation of a process for EB Sea Use Management.



ELLIOTT NORSE SUSCINCTLY CAPTURES THE ESSENCE OF THE PROBLEM.

But what are we to do about it.



Place Based Sea Use Management deploying marine spatial planning and ocean zoning can provide a better fit between governance systems and ecosystems,

By defining zones and the rights of access and use within them, MSP and OZ clarify rights and separate incompatible uses. All access and use is defined within a larger context.

Zones with straight, easy to monitor boundaries are increasingly used to define marine reserves and marine parks. Using aerial monitoring, requiring vessels to have vessel monitoring systems tied to GPS enhances monitoring, enables detection of violators, and discourages poaching. Connection of stakeholders involved in creating and implementing Place based management is likely to increase compliance and facilitate self-monitoring by use groups.

Marine Spatial Planning requires stakeholder processes and extensive communication among scientists and a wide range of user communities, increasing information flow.

In Belgium, planning included scenario building (visioning alternative management options). Planning for spatial management of 3 dimensional space in the oceans may be more challenging than land use planning, but like land use planning, it requires an ongoing process involving a wide range of interests. If MSP can avoid capture by economic elites, it offers a system that by being ecosystem-based and highly participatory, enables management to detect both changes in use and ecosystem changes and enable adaptation and response.

Hopefully, this discourse on place based ocean management provides you with a

Thank you for listening!

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Outline of Talk

- Diagnoses of ocean governance problem
- Property rights in the sea
- Solutions:
 - Place-based Approaches
 - Ecosystem-Based Management
 - Marine Spatial Planning
 - Ocean Zoning
- How do we transition to place-based management?

First, it's important to understand the basics of property rights in the sea.



People talk about ownership in the sea without questioning who actually owns the sea and whether and how oceans are appropriate resources to privatize.

What is the legal basis for permanently mooring a floating hotel or day use tourist facility

on the Great Barrier Reef? Can a private party own ocean space?

Can a government sell, transfer or give away marine resources under its jurisdiction?



When a nation declares a National Monument in the sea or a Marine Protected Area such as the Bowie Seamount Area,

is it exercising rights as an owner of public property in the sea or only exercising its authority to regulate ocean resources?

This question is fundamental to creating the legal framework within which new uses of the ocean may operate.



Investors in deep sea vent mining, tidal energy, and offshore aquaculture want security for their investments. New technologies for extractive industry and renewable energy increase pressure for privatization of the seas.

In my recently published article, I explored these questions.

Ownership in the sea differs fundamentally from ownership on land.

Key distinctions

- Imperium exercise of authority
 - Under US Constitution, the federal government exercises rights under the commerce clause
- *Dominium* property rights
 - Under the US Constitution, the federal government exercises rights under the property clause

Many scholars and policy makers tend to ignore the fundamental distinction vital in ocean governance between imperium and dominium.

... between the exercise of government authority to make rules and regulations (IMPERIUM)

And the rights and obligations that flow from property rights (DOMINIUM).

This fundamental distinction matters in a time of increased claims to ocean space. Nation-states primarily govern through allocation rules and regulatory authority. Government has the authority to allocate access to resources (through permits, leases, and concessions) as well to regulate various activities.

On land, the US government owns considerable PUBLIC property (management of public lands is divided among a number of federal agencies, e.g.). On public lands (such as National Park land, BLM, Forest Service land). Salt ponds around SF Bay are publicly owned by a municipal Water District), On these properties, the government has both imperium and dominium. Congress, under the property clause of the US Constitution, has the authority to transfer public land to private ownership, for example through land exchanges with Alaska Native tribes, as well as to grant concessions to private interests. Scholarly and lay literature often fail to distinguish between IMPERIUM (governments authority to regulate) and DOMINIUM. The term "ownership" (which implies property rights) is frequently used inappropriately, and concepts of private rights creep into ocean space.

{If question re whether leases and permits create property rights: In principle these instruments have provisions that make them cancelable, but in practice, they quickly

Property rights

- **Private property** bundle of rights belongs to identifiable owner (legal person)
- **Public property** bundle of rights belongs to the government or state
- Common property bundle of rights belongs to a group

In the oceans, title or ownership generally belongs to a wider community. Ocean property is predominately common property. The government manages common property as a trustee for the citizens (or relevant community) and cannot alienate it (sell, exchange, or give it away), because the government is NOT the owner – WE ARE.

What is important to remember is that ocean space, the water column, resources, even the seafloor and subsurface are COMMON PROPERTY (not private property, not public property).



My research is now available (hot off the press) in Univ. of Oregon's JELL, I discuss in international law, domestic US law, and a set of Supreme Court Cases to show how confusion over the distinction between imperium and dominium arose and how it has led to muddled thinking and analysis. The paper clarifies the important distinction between these concepts .



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