Contribution to the Symposium: ‘Marine Socio-ecological Systems Symposium’

Quo Vadimus

Managing marine socio-ecological systems: picturing the future

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What do you get when a lawyer, a modeller, an economist, a social scientist and an ecologist talk about the ocean? Besides an interesting conversation, it is likely there will be some consideration of how to solve many of the problems facing marine ecosystems around the world. That is precisely what the MSEAS 2016 symposium on understanding marine socio-ecological systems aimed to do. From 30 May to 3 June in Brest, France, the symposium gathered over 230 participants from around the world and from multiple disciplines to discuss the challenge of explicitly considering the human component in producing synoptic assessments of marine social-ecological systems. The symposium fostered dynamic debates on the inter-disciplinary collaborations needed to support management of ongoing and anticipated growth in multiple ocean uses, with particular consideration of the triple bottom line of ecological, economic and social sustainability. Building on the illustrations produced by a professional cartoonist during the meeting, this graphic novel summarizes the key challenges ahead in understanding marine socio-ecological systems and draws a path for future research endeavours in this domain.
Managing marine socio-ecological systems: picturing the future.

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Abstract: What do you get when a lawyer, a modeler, an economist, a social scientist and an ecologist talk about the ocean? Besides an interesting conversation, it is likely there will be some consideration of how to solve many of the problems facing marine ecosystems around the world. That is precisely what the MISEAS 2016 symposium on understanding marine socio-ecological systems aimed to do. From May 30th to June 3rd in Brest, France the symposium gathered over 250 participants from around the world and from multiple disciplines to discuss the challenge of explicitly considering the human component in producing synoptic assessments of marine social-ecological systems. The symposium fostered dynamic debates on the inter-disciplinary collaborations needed to support management of ongoing and anticipated growth in multiple ocean uses, with particular consideration of the triple bottom line of ecological, economic and social sustainability. Building on the illustrations produced by a professional cartoonist during the meeting, this graphic novel summarizes the key challenges ahead in understanding marine socio-ecological systems, and draws a path for future research endeavors in this domain.
The Oceans offer many opportunities:

**Food Provision.**

- Ocean-based industries now! €1.5 trillion!
- In 2030 that'll be doubled!
- Wow, where can I buy shares in this very lucrative ocean?
- Let me tell you about the golden crab!
- It's time to apply a seas analysis!

Seabed mining and the development of offshore constructions.

**Tourism and cultural services.**

- Steering the Baltic diet! Wont' work!
- Because eating but if don't meat is eat algal bacon? for the sea!
- How we'll create a brave new world?!
- Seabed mining: huh! I like this!
- Futuristic ocean architecture

- Shark feeding: We feed them with tourists... Problem solved!
- Why? this is a great experience!
- This is a great experience!
or shipping, energy, and many other sectors …

But the Oceans also face many challenges.

Climate change.

pollution.

cumulative threats on ecosystem services.

The influence of nutrients on the shrimp in the Gulf of Mexico.

Ecosystem services (es) as a common currency?

A kilo of tuna — fish protecting, regulation laws please.

That will be 25,883 kilo!
All requiring integrated management beyond fish and fisheries ...

To address all these issues at once, we need to adopt an Ecosystem Approach, that is interdisciplinary, and that engages stakeholders.

[Image of cartoon characters discussing and working together]

- Bayesian Modelling of social factors in small fisheries (SSF)
- Anthropologist
- Natural Scientist
- Economist
- Psychologist

- Organise a workshop!
- Draft lines in Model!
- And then make a Conceptual model!
- But because it's conceptual!

- Ask local stakeholders to participate in the marine spatial planning process?
- Wrong!!!
- Mix types of stakeholders
- Even if any of the models?
Finding solutions to problems facing the ocean is complex and adventurous because of the range and nature of the issues involved. Particularly because humans are part of the ecosystem too.

Fishermen are human, often running a family business...

We have to protect the nature!

But, who is we?!

Who are we, you are we?

And scientists, policy-makers and other stakeholders are connected through social networks.

Managing marine resources like a remote control?!

Not! That's old fashioned!

We use an app on our iPhone!
The solutions also need to be integrated across multiple dimensions:

the economic dimensions,

the social dimensions,

the governance dimensions,
the political dimensions,

"It's very important to us too... to make policy with all relevant actors!"

Making policy:

"Ethics?? No, I think we didn't hear her well..."

"She probably said economics..."

and the ecological dimensions,

"It's a bit of a depressing story, bottle, isolate the economic integration in the Chesapeake us."

WE measured almost everything in the bag...

"But we forgot what it was all about."

But we find it back in the water!...

"Everything we do on the land..."

Such that all important drivers are captured.

...If a fish does not die within 24 hours the water is healthy?..."
All need to be considered in ways more than just the usual set of expert opinions.

Certainly there will always be challenges facing research on marine socio-ecological systems.

Even if just making sense of all the multiple objectives, and collecting sufficient and relevant data...
Data from the right places (geographically and disciplinarily)... and worth the effort.

Where such data can be converted into indicators

What do you want to measure?

Everything in all oceans!

Not... super high score at the totally self-over-confidence narcissism index!

How did you choose your indicators?

I just took some randomly and trusted on the power of serendipity!
that can inform decisions.

Goodnews: We have an Ocean Health Index of 71!

Great!

Ocean health index???

Badnews: We have an Ocean Health Index of 71!

Oh no!

Ocean health index???

I don't feel well since they put us in this well being matrix.

In the context of integrated maritime policies ...

Integrated maritime spatial planning:

Data? Data? Who cares about data?!! I care about policy!

Plot your sea
But as we seek to manage uses of the ocean, we can envision a future framework for future fishery pathways!

that will use a wide range of models.

...to keep it simple, we didn’t mention the influence of mood changes in our social ecological model!

he tries to capture nature... or an indicator for total madness...
Models that are highly coupled, and that include human behavior.

Since these models are so good, they perfectly predict our behavior. We stopped taking decisions ourselves. We just follow the models... easy does it!

Models that account for human diversity, and that are easy to develop and communicate.

Well well, 2 small fishers... Let’s put them in the same category: 2f3 = small fisher...

Hey! You should zoom in to see our differences!
Models that are trusted and used by stakeholders.

Here we've got a tool to predict uncertainties! Wow! Does it predict all uncertainties? That's uncertain, I suppose.

...And we had workshops in which stakeholders interacted with the model output.

while managing expectations...

People who are too enthusiastic about models:

WOW! Now we'll know everything!!!

Well well, it's just a model...

People who are too sceptical about models:

You! your stupid model builders! We'll never be able to understand anything!

Well well, it's just a model...

And models that are put into context.

I have been staring at this excel sheet for hours now...not a story!

Because you miss the social context! Go out! Experience!
This future will need to be highly interdisciplinary, with a wide range of expertise.

**New mixture of Expert:**

Social Science

Political Science

Economist

Environmentalist

Fisherman

Spatial Planner

Lawyer

All in the context of flexible and adaptive governance systems and legislation.

**Legislation, then now:**

In the old days it used to be all about us...

Now it's so complex with all these modern ocean functions and users!

That take a balanced view of individual versus collective outcomes.

**Importance of Holistic View:**

My boat! Try to focus more on nonmaterial values!
and of trade-offs between immediate and future outcomes.

Did you eat that whole cake?!!!

Suddenly saw myself confronted with an enormous steep discount rate... Burp!

Too much is at stake not to try to achieve such a future ...

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