

Issue PDF archive:  [MEAM35.pdf](#) ^[1]

Managing for resilient ecosystems: Faced with limited budgets, should we protect the healthiest or restore the degraded? ^[2]

When we say an ecosystem is *resilient*, we mean it is relatively able to resist change or recover from impacts - particularly the negative impacts caused by climate change. In the marine and coastal realms, such climate change-related impacts can include higher water temperatures and sea levels, lower ocean pH, and increasingly frequent and severe storms.

Generally, the more intact and less stressed an ecosystem is, the more resilient it should be (see the box at the end of this article [Ecosystem properties that confer resilience](#)). In that light, managing for resilience involves taking actions to foster intact, relatively unstressed ecosystems. There are two main ways of doing it: protecting ecosystems that are already healthy, and restoring degraded ecosystems to a state of better health.

However, in this era of decreased budgets and staffs for ocean and coastal management, prioritizing both of those strategies may not always be possible. Practitioners and agencies must focus instead on the activity that provides the higher return on investment.

To shed light on what to prioritize, MEAM polled several experts in the area of marine ecosystem resilience on this question:

Which of the following should be the top priority in planning for climate change resilience:

- (a) Protecting relatively healthy ecosystems; or
- (b) Relieving stresses on (and/or restoring) degraded ecosystems in the hopes of increasing their resilience?

We received a variety of responses, below. From these responses, two key themes emerged:

- Planners and managers need a portfolio of management actions that they can tailor to the needs and circumstances of specific locations. A critical aspect of this portfolio is finding and protecting/restoring climate refugia - habitats to which species can retreat, persist, and potentially flourish under changing environmental conditions.
- Planners and managers should focus on locations or systems that provide the most critical ecosystem services to society, and should protect/restore these locations to sustain these services. In many instances, the most degraded ecosystems (which are often estuaries) may provide the greatest number and/or level of services.

[Note on this article: In the context of resilience, we recognize that there are more than just two kinds of areas in the ocean (i.e., protected vs. in need of restoration). It is a continuum: some areas are relatively intact without being under active protection. However, in light of the budgetary tightness so many managers face, and the costs associated with protection and restoration, we wanted to see how resilience experts would prioritize them. Do you have thoughts on the poll question? Let us know in the comments section below.]

Create a portfolio of different management actions

By Emily Darling, David H Smith Conservation Research Fellow, University of North Carolina, US

In addition to the reality of limited funding, ocean planners must also confront the inherent uncertainty of when and where climate impacts will occur. Addressing climate change is like looking into a crystal ball for conservation and management decisions. Instead of picking "winners" or "losers", our top priority should be to build portfolios of different management actions for different places.

Identifying natural climate refugia (i.e., places that can escape the worst impacts of climate change) is critical to this portfolio approach. Within areas of climate refugia, we can prioritize marine reserves to relieve other anthropogenic stresses on high diversity and climate-sensitive assemblages, or spend money to restore and recover degraded areas. To date, there is evidence that the northern Mozambique Channel (<http://bit.ly/MozambiqueChannel> ^[3]) and sheltered bays of Palau (<http://bit.ly/PalauBays> ^[4]) provide refuge for climate-sensitive coral reefs in the Indo-Pacific. A key focus for future research should be identifying more refugia and investigating the connectivity of refugia across regional scales.

On the other hand, there will be many areas of our oceans that are not refugia and will be hit hard by climate change. Here, investing in marine reserves or restoration might be counter-productive as climate change continues to reorganize ecosystems and swamp the benefits of conservation and management efforts. In these areas, we can focus on the sustainable management of climate-tolerant resources and ecosystem services, as well as protecting healthy ecosystems that show signs of climate adaptation or acclimation.

In my view, the top priority for planning should be to build current and future climate impacts into our conservation and management actions. The heterogeneity of climate impacts will undoubtedly call for different actions for different areas of our oceans. Such portfolio approaches that account for the real impacts of climate change will hopefully provide the best possible outcomes for both ecosystems and stakeholders.

Four considerations to guide decisions

By Paul Marshall, Manager, Climate Change Response Programme, Great Barrier Reef Marine Park Authority

Balancing investment of limited resources is a perennial challenge for ocean planners. Four considerations can guide our decisions.

First, what are our objectives? If we are hoping to support ecological resilience to underpin long-term biodiversity conservation then we should pick the ecosystem/patch with the highest resilience, irrespective of its current state. But if we aim to maximize delivery of ecosystem services for local communities, then identifying and protecting intact systems will bring the best results on timeframes that matter to people.

Next, we have to think about why one area is "healthy" while the alternative is degraded. If this is just because of good luck (i.e., differences in exposure to largely random events, such as hurricanes), then it would pay to place our eggs in the healthy basket. But if one is degraded because of exposure to chronic stresses (such as pollution), then it would make sense to invest in reducing risk of damage to the more pristine ecosystem. It gets tricky when a patch is currently healthy but is predicted to face increasing risk of exposure to acute disturbances that managers can't control, such as thermal stress events or hurricanes. If the degraded site happens to be in an area with less future exposure risk, then the best long-term investment may well be to fix up the sources of chronic stress.

Third, let's get real about what we can and can't achieve with our intended "protection" regime. Too often we talk about protecting an area as if its declaration erases all stress on the chosen ecosystem/patch. Lines on maps don't increase resilience.

Finally, we have to think about relative cost effectiveness. Especially for restoration, we need to be sure the cost of actions, adjusted for probability of long term success, is built into our analysis of options.

The skeptic and the optimist

By Joachim Claudet, Researcher, National Center for Scientific Research, CRIOBE (www.criobe.pf)

There are two ways to tackle this question: a skeptical one and an optimistic one. Both tend to lead to the same conclusion.

The skeptic will first question the hypothesis underlying the poll question - namely, that protection can increase resilience to climate change (including resilience to thermal stress, species invasion, and ocean acidification). Evidence that protection could confer such benefits is very limited, and expected effects are still controversial in the literature. The skeptic would also question the specific benefits of protecting relatively healthy (often remote) ecosystems. In the great majority of cases, those places are healthy because they are not threatened. So what would they be protected from?

The skeptic would now tend to be cynical and think that we are more worried about climate change's effects on us (humans) rather than on natural systems. This would translate into prioritizing investment into conserving ecosystem services and therefore into protecting/restoring ecosystems that are already degraded because of our uses. The cynic wants the seawater to continue to buffer the negative effects of terrestrial run-off and sewage outfalls, and he wants to continue to bring his son to fish where his father brought him. All this should happen where it has always happened (at the temporal scale of a generation life span), which means where ecosystems are already degraded.

The optimist, based on his belief that climate change is reversible and that humans can change, will not question the fact that people and governments can reduce their ecological footprint, therefore limiting stresses that induce climate change. The faith he has in humanity and especially in the fact that humans are rational beings will make him invest his efforts into relieving stresses on degraded ecosystems in the hopes of increasing their resilience.

Benefit-cost ratios for protection and restoration

By Raphaël Billé, RESCCUE (Restoration of Ecosystems Services against Climate Change Unfavorable Effects) Project Coordinator, Secretariat of the Pacific Community

With budgetary crises hitting so many countries, it seems legitimate to look for the most efficient ways to protect marine biodiversity.

One simple approach is to compare the benefit-cost ratio of protecting vs. restoring a hectare of a given habitat: unsurprisingly, with few exceptions, protection comes out much cheaper than restoration. Marine and coastal ecosystem restoration is still in its infancy, but recent research shows that restoring coastal ecosystems such as coral reefs, seagrass meadows, estuaries, rocky shores, beaches and wetlands presents significantly smaller benefit-cost ratios than restoring most terrestrial ecosystems (<http://onlinelibrary.wiley.com/doi/10.1111/cobi.12158/abstract>). While little information is available on the cost of restoring deep-sea ecosystems, it will probably be several orders of magnitude higher than for shallow ones (www.nature.com/news/ecology-protect-the-deep-sea-1.14547) - if it is even feasible. However depending on the timeframe, costs and benefits considered, it is possible to demonstrate that both (a) and (b) actually pay for themselves. Therefore, in principle, costs and limited budgets should not be a problem.

But is the return on investment an appropriate criterion to favor any one option? In general, no, because marine conservation is a socio-political process undertaken by and for real people, not a scientific optimization protocol. Therefore wondering how best to prioritize spending in general is a theoretical question. Prioritization is about strategy, and strategy is necessarily context- and agency-specific. Tell me which agency has decisions to make and a strategy to develop, what means it has, and what its geographic or sectoral scope is, and we may be able to work out an answer to the poll question - including by using elements of costs and benefits.

Find ecosystems with capacity to survive, then manage them strictly

By Tim McClanahan, Senior Conservation Zoologist, Wildlife Conservation Society, Kenya

An immediate need of planners and managers is to find marine ecosystems that have the capacity to survive with minimal change in the coming era of increasing climate disturbances. Then they should apply the strictest forms of management that are socially acceptable in these locations. Other ecosystems with less capacity to remain unchanged need to be managed to reduce their vulnerability to losses of function and therefore maintain their sustainability for human resource use. These principles should be applied to all ecosystems - not just some on a triage basis.

Given the history of environmental change in the ocean, there are locations that have been refuges for species and ecosystems from past historical disturbances. It is likely that these same locations will provide similar roles in the future. These are often habitats with high species richness or regions containing rare taxa. It is likely that past and current stability of the environment has been critical in maintaining this refuge - current levels of biodiversity often reflect this stability but not always. Stability is, however, not just the lack of change but more a change that does not exceed far beyond the envelope of conditions that are deadly to many species. Some environmental variability that creates the potential for acclimation and adaptive responses is good, but change that is rapid and exceeds tolerable levels is bad.

Consequently, there is a need to examine the historical and current environmental variability and find locations with the properties of high species richness, uncommon taxa, and some but constrained environmental variability. Once found, all efforts should be made to insure human resource use does not undermine the irreplaceable potential of these biodiversity refuges.

Climate impacts will require active restoration

By Jeff Benoit, President, Restore America's Estuaries

My choice as top priority should be no surprise. We need to focus on relieving stresses on - and/or restoring - degraded ecosystems with the goal of increasing their resilience.

Sea level rise and increased temperature and acidification in coastal waters are among the most significant climate change impacts on coastal ecosystems. Addressing these impacts on coastal ecosystems requires a focus on your poll's second option (actively managing and restoring natural systems) as opposed to the first option (protecting relatively healthy ecosystems), which is also important, but is a more passive approach.

Funding large-scale restoration is challenging. As a way to attract private sector investment in restoration projects, Restore America's Estuaries is currently advancing the concept of Blue Carbon - i.e., using salt marshes, seagrass meadows, and mangroves to sequester atmospheric carbon and generate carbon credits. This wetlands restoration work will not only help to reduce greenhouse gas emissions; it will help shorelines adapt to changing conditions, including sea level rise, and will promote resilient coastal ecosystems.

BOX: Ecosystem properties that confer resilience

A recent publication in the *Annual Review of Marine Science* describes three ecological properties that underlie resilience, as well as management strategies for promoting each property:

Diversity, which increases the variety of responses to disturbance and the likelihood that species can compensate for one another. To promote diversity: limit overharvest and place reserves in areas of high species diversity and high habitat complexity.

Connectivity (including connectivity among species, populations, and ecosystems), which enhances capacity for recovery by providing sources of propagules, nutrients, and biological legacies (organisms and organic material that persist through disturbance and are incorporated into the recovering ecosystem). To promote connectivity: distribute extraction across trophic levels or limit extraction; create reserve networks; restore degraded habitats; limit land-based nutrient pollution; and protect climate refugia and areas with reproductive individuals that provide a propagule source.

Adaptive capacity, which includes a combination of organism-level adaptability, species range shifts, and rapid evolution of traits better suited to new conditions. To promote adaptive capacity: protect climate refugia and dispersal corridors; place networks of reserves along climate gradients; and protect landward edges of wetlands to facilitate landward migration.

Source: Bernhardt, J.R. and H.M. Leslie. 2013. Resilience to Climate Change in Coastal Marine Ecosystems. *Annual Review of Marine Science*. <http://blogs.brown.edu/leslie-lab/files/2009/09/Bernhardt-and-Leslie-2013.pdf> [9]

BOX: More sources on ecosystem resilience

Reef Resilience Toolkit

www.reefresilience.org [9]

Coastal Resilience Tool

www.coastalresilience.org [10]

Mumby, P.J., I. Chollett, Y.-M. Bozec, and N.H. Wolff. 2014. Ecological resilience, robustness and vulnerability: How do these concepts benefit ecosystem management? *Current Opinion in Environmental Sustainability*
www.sciencedirect.com/science/article/pii/S1877343513001838 [11]

Fujita, R., J.H. Moxley, H. DeBey, T. Van Leuvan, A. Leumer, K. Honey, S. Aguilera, and M. Foley. 2012. Managing for a resilient ocean *Marine Policy*
<http://bit.ly/Fujitaresilience> [12]

Tundi's Take: Can we ever hope to manage for resilience? [13]

By Tundi Agardy, Contributing Editor, MEAM. Email: tundiagardy@earthlink.net

In an ever-changing world, with a burgeoning human population and growing demands for goods and services, who could argue against maximizing the resilience of the natural systems on which we depend?

The real question is whether we can.

Managing for resilience is one of EBM's main goals. As our understanding of EBM has matured, this goal has encompassed not just ecosystem resilience but social resilience as well. We could not hope for more than to increase the ability of ecosystems and human communities to cope with the vagaries of climate change and other stressors. Resilience encompasses robustness, stability, and health. Pretty in its logic, resilience remains elusive nonetheless.

Here's the catch: even the most predictable systems - e.g., coral reefs and associated coastal communities - are hugely complex. Some of the most basic tenets of ecological understanding have been disputed and remain controversial. Are there alternative stable states, such that reefs under pressure permanently switch from coral-dominated to algal-dominated? If so, can we identify thresholds that should be avoided? These are not esoteric questions - they underlie much of the management planning, evaluation of trade-offs, and scenario development that form the basic elements of EBM today. The understanding of resilience is, paradoxically, getting more complicated as our knowledge increases, especially as we now (rightfully) consider not only ecosystem resilience but also social resilience to evaluate management actions.

Yet even without full understanding of ecosystem functioning and how all the moving parts of ecological and social resilience fit together, we know enough to know what we should be avoiding. This isn't rocket science! Pressures that cause particularly significant negative impact need to be alleviated, whether these pressures originate in the target environment or well outside it.

In fact the best use of scientific understanding of socio-ecological resilience may be to help identify priorities. In a recent paper (see Mumby et al. in the above box [More sources on ecosystem resilience](#) [14]), the authors present complicated notions of resilience, vulnerability, and robustness, tailored for effective management. In cases where there is a real danger of inhibited recovery from disturbance, they argue that using science to assess resilience helps avoid points of no return. But in systems that do not exhibit alternative stable states or clear thresholds, assessing vulnerability (a negative attribute) and robustness (a positive one) makes good use of science to identify the threats that need most urgent attention.

Do not stop with the low-hanging fruit

This issue of MEAM asks whether focusing attention on intact systems is preferable to focusing on degraded systems already in decline. While quick wins may be pragmatic, I would hope that we don't stop there, and that we use our science and understanding of what makes ecosystems and societies resilient to focus management attention where it is really needed. We can do that now, even with incomplete scientific understanding, especially if we tailor management so that it expressly generates useful information to fill the gaps.

In the vast mangrove complex that is Mexico's Marismas Nacionales, many questions about watershed and coastal hydrodynamics remain unanswered. But among the mosaic of pristine mangrove and saltmarsh, mixed with highly degraded lagoons and coasts, we can quickly identify which places provide - or could provide if restored - the most ecosystem services. These need to be priorities for management. And we already know what needs to be done to improve the health of the lagoons and prevent further mangrove die-back: ensure that adequate, good-quality water is delivered to the estuary, likewise ensure that appropriate sediments are delivered, reduce the dumping of feed into lagoon waters (meant to boost shrimp productivity), discourage ejidos (agricultural communities) from building earthen dams to irrigate, and redo some roads so that water circulation is improved. For the last, a targeted monitoring program could quickly fill gaps in hydrological understanding through low-tech, citizen science. No one would say the complicated situation in Marismas is a low-hanging fruit, but the management challenges are surmountable, especially if an integrated EBM approach is adopted.

Thus, instead of being seduced by the easy-to-pluck fruit, we should harness science to lower the fruit-laden branches that are tantalizingly out of reach. High-hanging fruits may present us with more of a challenge, and our attempts to practice good EBM may be rife with uncertainties, but we will never maximize resilience unless we point our attention to places and issues where management is needed most.

Letter to the Editor: Marine conservation and sustainable food production are not on a collision course ^[15]

Dear MEAM:

This letter is in response to Jake Rice's letter to the editor [MEAM 7:1](#) ^[16] and the torrent of replies [MEAM 7:2](#) ^[17]; [7:3](#) ^[18]. The themes that have emerged, though valid (e.g., fisheries management is complicated, without silver bullets), appear to be missing the central point.

Marine conservation and food security, I would suggest, are only on a collision course under limited conditions. In today's world of increasingly depleted fisheries resources, the two will more often be on a converging course; i.e., with similar, rather than opposed objectives. (Aquaculture may be a different story, but space does not allow for that discussion here.)

Marine food resources are under pressure like never before. As a result, most fish stocks are no longer being fished in a fashion that maximizes either food security or biodiversity and ecosystem services, no matter how it is measured (maximum sustainable yield [MSY], maximum economic yield, optimum sustainable yield, etc.). [Editor's note: The unabridged version of this letter discusses a few exceptions to this trend and is available [here](#) ^[19].]

Situations where stocks are fished beyond MSY etc. are not about food security at all, but rather ongoing *food insecurity*. Consider the very common situation where fish stocks are depleted beyond what they could ideally produce (often misleadingly labeled "fully exploited") but are still supporting fisheries in some fashion. In this common case, increasing fisheries catch would decrease the depressed stocks' production even further, thus further reducing both food security and conservation objectives. Therefore, both food security and conservation objectives are at this point more aligned than not. The "collision" is with the short-term economic security of those fishermen still managing to catch some fish and, in localized fisheries, with the provision of some food (at reduced levels) to the local population.

The above logic extends to the extreme example of stocks that are threatened or endangered. However, as we have seen with some tuna fisheries, that dire status has not stopped their continuing harvest. I would argue that it is short-term economic interests of a few, rather than food security for the many, at play.

This analysis is necessarily a simplification. While re-building fish stocks can (to some degree) address both food security and conservation, poverty alleviation requires different strategies, such as fair allocation, modifying fishing methods, re-training, etc. I do not wish to minimize or otherwise trivialize the multi-faceted considerations, and difficulty, of fisheries management today. However, to characterize these decisions as a trade-off between food security and conservation is, for the majority of cases, a false and misleading dichotomy.

Lastly, Jake alluded to the possibility that no matter how optimally conservation is implemented, it may not be enough to ensure global food security for Earth's burgeoning human population, particularly in a climate-changed world. I do agree that would amount to a collision course. Sooner or later Malthus - and his theory that the increase in human population will necessarily be limited by the means of subsistence - will be proved right. But when exactly that will happen has to date been elusive to predict. If some in our conversation here are predicting the end of the world, well fine, but in the meantime I think we should continue to try to better align fisheries with sustainability. Saying we have a problem is hardly news. Saying we can fix it, if we work with rather than against one another...well, that could be something worth reporting.

Jeff Ardron

Jeff Ardron is Senior Fellow at the Institute for Advanced Sustainability Studies, Potsdam, Germany. E-mail: jeff.ardron@gmail.com

Notes & News: Global Ocean Commission – Marine conservation movement – MSP survey – Climate change impacts – Marine planning – Coral Triangle EBM ^[20]

Global Ocean Commission produces ten position papers, solicits feedback

By mid-2014, the Global Ocean Commission will make a series of recommendations for restoring the ocean to ecological health and sustainable productivity. The high seas are the primary focus of the Commission's work, and the Commission has produced position papers in ten policy areas affecting the high seas. The Commission is now welcoming comments and ideas in these areas.

The policy areas include climate change, ocean acidification, and geo-engineering; elimination of marine pollution affecting the high seas; bioprospecting and marine genetic resources; deep seabed mining; eliminating harmful fisheries subsidies; MPAs: protecting high seas biodiversity; illegal, unreported, and unregulated fishing; reform of high seas fisheries management; and modernizing ocean governance. The papers, as well as opportunities to comment, are at <http://bit.ly/GOCpapers> ^[21].

Report on aligning the marine conservation movement

In competing for prestige, funding, or theory of change, NGOs in the ocean conservation community have, at times, undermined their ability to build on each other's efforts, according to a new report. The *Ocean Community Report: Building an Aligned and Supportive Ocean Conservation Community* released by the Aspen Institute, describes how the ocean community might coordinate its work and increase effectiveness of its efforts. The report is intended for policymakers within government agencies, ocean conservation advocacy groups, and funders of ocean conservation and advocacy.

Opportunities to improve the NGO sector's effectiveness include strengthening collaboration between conservation groups (and creating funder incentives to do so) and developing an information clearinghouse for the community through which efforts can be aligned. The report also highlights the importance of improving communications by reframing conservation within other priority issues such as economic development or food security, and training political and business leaders to become informed spokespeople for conservation. The report is available at www.aspeninstitute.org/policy-work/energy-environment/ocean-community-study-dialogue ^[22].

Global survey on MSP seeks your input (31 March deadline)

The United Nations Environment Programme and the Scientific and Technical Advisory Panel of the Global Environment Facility are conducting a global survey of MSP implementation experiences. The goal is to understand and share which approaches are best suited for different contexts and settings, particularly in developing regions.

Comprehensive multi-sector planning processes as well as simpler spatial management initiatives involving just a few sectors are of interest. Practitioners are encouraged to share their MSP planning and implementation experiences by filling out the online survey at www.surveymonkey.com/s/MSPinPractice [23]. The deadline for participation is 31 March 2014.

Report finds anthropogenic changes to oceans are more severe than expected

The International Programme on the State of the Ocean (IPSO) and IUCN have released a *State of the Ocean Report* on anthropogenic changes to the capacity of the global ocean to support life and human societies. According to Alex Rogers, scientific director of IPSO, "The health of the ocean is spiraling downwards far more rapidly than we had thought. We are seeing great change, happening faster, and the effects are more imminent than previously anticipated."

The international panel of marine scientists recommends reducing global CO₂ emissions well below current targets; ensuring effective implementation of community- and ecosystem-based management; favoring small-scale fisheries; and building a global infrastructure for high seas governance. The findings of the panel are available at www.stateoftheocean.org/pdfs/ipsos_report_051208web.pdf [24].

US Coast Guard publishes journal issue on marine planning

The Fall 2013 issue of *Proceedings of the Marine Safety & Security Council, the Coast Guard Journal of Safety at Sea* entitled "Marine Planning: Vision for the Future" features articles on the relationship of marine spatial planning to the US National Ocean Policy and to protection of the marine environment. It also describes how MSP could promote economic development, regional empowerment, and the development of data and planning tools. The issue is available at www.uscg.mil/proceedings/archive/2013/Vol70_No3_Fall2013.pdf [25].

EBM guidelines released for Coral Triangle Initiative

The Coral Triangle Initiative, a multilateral partnership to address threats facing the coastal and marine resources of Southeast Asia and Melanesia, has released a guide on ecosystem-based management. The publication is intended for local, district, provincial, and national governments, as well as resource managers and NGOs.

The guide *Toward Ecosystem-based Coastal Area and Fisheries Management in the Coral Triangle: Integrated Strategies and Guidance* describes a framework for EBM and integrated strategies for moving toward it. The publication also illustrates ways that management authorities can coordinate strategies and incorporate new activities into existing management plans. Several case studies are included. The guide is available at www.coraltriangleinitiative.org/library/guidelines-toward-ecosystem-based-coastal-area-and-fisheries-management-coral-triangle [26].

MSP in theory vs. reality: Preliminary governance findings of MESMA project [27]

In January 2014, an EU-funded study on the governance of marine spatial management in Europe was released. Undertaken as part of the Monitoring and Evaluation of Spatially Managed Marine Areas project (MESMA; www.mesma.org [28]), the study suggests that, for the 13 cases that MESMA examined, MSP in practice is very different from the ideals and theories typically recommended in MSP literature.

Key points from the study's summary document include:

- MSP in the case studies was more about integrated use than implementing ecosystem-based management. That is, the MSP was intended to provide for, or at least not obstruct, strategically important infrastructure development projects. Marine spatial plans either provided for strategically important infrastructure development projects, or they were "disconnected by design" from the decision-making platforms for such major projects.
- None of the case studies employed a step-by-step, participative, ecosystem-based marine spatial planning process of the sort recommended by Ehler and Douvrou (UNESCO, 2009, www.unesco-ioc-marinesp.be/publications [29]).
- A top-down approach was followed in all the case studies. While there may have been platforms for stakeholder participation at certain phases of the projects, these were often disconnected by design from the final decision-making platforms and processes.
- Some stakeholders who have been involved in participative MSP platforms expressed disappointment and frustration at the lack of influence of their input on policies and decisions, and there was a growing sense of apathy about the processes. Some stakeholders, particularly those related to strategically important infrastructure development projects and offshore fishing, adopted a strategy of circumventing such participative platforms, opting instead to wield influence at higher political levels.

The summary and full study results are downloadable at www.homepages.ucl.ac.uk/~ucfwpej/pdf/MESMAGovernanceFindingsOutline.pdf [30]. A special issue of the journal *Marine Policy* based on these findings is in preparation.

Note: An interactive chat with Peter Jones, lead MESMA governance researcher, will be held 1 April 2014 on OpenChannels.org. For the time of the chat and other details, as well as to participate in it, go to <https://www.openchannels.org/node/5875> [31].

For more information:

Peter Jones, University College London, UK. Email: P.J.Jones@ucl.ac.uk

Film sequel *Ocean Frontiers II* continues work to inspire action on marine spatial planning [32]

Green Fire Productions' *Ocean Frontiers* film series (<http://ocean-frontiers.org> [33]) presents stories of ocean stakeholders working together to benefit marine ecosystems and economies, namely through marine spatial planning. The second film in the series, *Ocean Frontiers II: A New England Story for Sustaining the Sea* released in September 2013, features insights on the US's first statewide ocean plan - the Ocean Special Area Management Plan for Rhode Island.

MEAM interviewed the films' producer Karen Anspacher-Meyer in our February-March 2013 issue (*Communications and marine spatial planning* [34]), MEAM 6:4). She spoke about the importance of stories in relating MSP to audiences. We caught up with her again to see how audiences are responding to the second film.

MEAM: What sort of response have you received to the new film?

Karen Anspacher-Meyer: We've had a tremendous response to *Ocean Frontiers II*. Boating groups, shellfish associations, the US Coast Guard and Navy, renewable energy companies, recreational fishing organizations, professors and teachers, representatives on the regional ocean planning bodies in the US, and several others are showing the film to promote discussion on marine planning. Through this outreach, they are helping to build awareness and support for marine planning.

MEAM: Can you see if this film is changing stakeholder behavior?

Anspacher-Meyer: *Ocean Frontiers II* has the potential to influence people who currently reject the notion of marine planning. At a recent meeting held to determine whether a region in the US was going to move ahead with forming a regional planning body, attendees had to decide whether they wanted to be part of such a planning body. Many voiced skepticism ahead of time. A screening of *Ocean Frontiers II* prior to the meeting provided an "a-ha" moment that appears to have changed their perception. The

discussion turned to the value of collaboration and the need for marine planning. Key people in the film were on hand to respond directly to questions with the result being strong interest in the establishment of a regional planning body.

According to surveys completed by people after they watch one of our *Ocean Frontiers* films, more than 90% are inclined to participate in or support marine planning.

For more information:

Karen Anspacher-Meyer, Green Fire Productions, US. Email: karen@greenfireproductions.org

Note: *Ocean Frontiers* is available in multiple lengths (80 minutes, 60 minutes, 22 minutes), as well as with Spanish subtitles and related guidance for educators. *Ocean Frontiers II* is available at a length of 45 minutes. Each film is free of charge to all who would like to use it in their work. A screening toolkit provides promotion templates and a step-by-step screening guide. Visit the website <http://ocean-frontiers.org> [33] to learn more. In the US, *Ocean Frontiers* will be broadcast on the national PBS television network starting in April - broadcast dates will be on the *Ocean Frontiers* website.

[Printer-friendly version](#) [35] [PDF version](#) [36]

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Links

- [1] <https://meam.openchannels.org/sites/default/files/meam/archive/MEAM35.pdf>
- [2] <https://meam.openchannels.org/news/skimmer-marine-ecosystems-and-management/managing-resilient-ecosystems-faced-limited-budgets>
- [3] <http://bit.ly/MozambiqueChannel>
- [4] <http://bit.ly/Palaubays>
- [5] <http://www.criobe.pt/>
- [6] <http://onlinelibrary.wiley.com/doi/10.1111/cobi.12158/abstract>
- [7] <http://www.nature.com/news/ecology-protect-the-deep-sea-1.14547>
- [8] <http://blogs.brown.edu/leslie-lab/files/2009/09/Bernhardt-and-Leslie-2013.pdf>
- [9] <http://www.reefresilience.org/>
- [10] <http://www.coastalresilience.org/>
- [11] <http://www.sciencedirect.com/science/article/pii/S1877343513001838>
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- [13] <https://meam.openchannels.org/news/meam/tundi%E2%80%99s-take-can-we-ever-hope-manage-resilience>
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