

MARINE ECOSYSTEMS *and* Management

News and analysis on ocean planning and ecosystem-based management

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Check out our live blog of the International Marine Conservation Congress, as well as our upcoming webinars on OpenChannels.org

Dear reader,

In what may be a first for our field, OpenChannels live-blogged the 2014 International Marine Conservation Congress from start to finish. The live blog — available at <http://openchannels.org/chat/imcc-2014> — features our team's notes from the sessions we attended as well as high-graded tweets from the conference's Twitter stream (#IMCC). In all, it provides a relatively breezy running commentary on the four-and-a-half-day meeting (14-18 August in Glasgow, Scotland) for people who could not attend in person.

Please let me know what you think (email: editor@meam.net). We believe such a service expands the knowledge-sharing potential of conferences, making them more accessible to people who can't afford (or don't want) to travel. We are open to providing this live-blogging service at future conferences and to improving it.

Upcoming webinars on OpenChannels.org include:

- **Marine Wilderness 10+10 Project: Bringing Back the Wild**
Thu., 11 Sept 2014 at 1 pm EDT / 10 am PDT / 5 pm GMT
- **Using SeaSketch for Collaborative Design of Ocean Management Plans**
Thu., 25 Sept 2014 at 1 pm EDT / 10 am PDT / 5 pm GMT
- **A Cultural Resources Toolkit for MPA Managers**
Thu., 9 Oct 2014 at 1 pm EDT / 10 am PDT / 5 pm GMT
- **A Guide to Tools for Landscape Conservation Planning**
Tue., 21 Oct 2014 at 1 pm EDT / 10 am PDT / 5 pm GMT

For more details on these and other upcoming events, go to <http://openchannels.org/upcoming-events-list>



John B. Davis
MEAM Editor / OpenChannels Supervisor

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Improving ocean management by addressing population and human health concerns: Insights from Madagascar and the Philippines

Ecosystem-based management leads practitioners to consider whole ecosystems (their structure, function, dynamics) rather than single species or issues. Humans are considered part of the ecosystem. As such, economic factors — particularly how various groups use the ocean, and how different management options could impact these groups economically — are typically included in marine EBM approaches.

However, people are more than just economic factors. Other human considerations — like health, food security, population growth, and more — can impact marine management, too. Just as an over-fished ecosystem can lead to insecurity and hardships for local populations, the reverse can also hold true: coastal communities struggling to feed their growing families are apt to place increasing pressure on marine ecosystems.

In recognition of the links between ecosystem and human health, a small number of broad-based initiatives have been established in biodiversity hotspots in developing nations. Called population, health, and environment (PHE) programs, these are generally small-scale, community-based projects. They address concerns about public health and unmet family planning needs while also working to improve ecosystem health and biodiversity conservation. (As part of these PHE programs, the subjects of sustainable livelihoods, food security, poverty alleviation, women's empowerment, water and sanitation, and/or climate change concerns may be addressed as well, depending on the local context and needs.)

This holistic approach — aiming to support effective coastal resource management and build more

continued on next page



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resilient communities — offers a variety of benefits. It can increase community buy-in for marine conservation through comprehensive attention to priority local needs. Increased access to reproductive health services allows couples to achieve their desired family size, thereby reducing anthropogenic pressure on marine and coastal resources. These services can also

enable greater participation by women in economic and resource management activities.

Despite these potential benefits, there are relatively few such integrated programs in practice. In this issue of MEAM, we speak with PHE experts to find out why so few integrated programs exist and the potential for expanding them.

A. Integrating voluntary family planning services with coastal resource management in Madagascar: Interview with Alasdair Harris

[Editor's note: Alasdair Harris is founder and executive director of Blue Ventures, an NGO that works with some of the poorest tropical coastal communities to develop approaches for sustainable, locally led marine conservation. Blue Ventures works in places, including Madagascar, where the ocean is vital to local people and economies, and where there is a fundamental need to support human development.]

MEAM: Please tell us about Blue Ventures' work in Madagascar.

Alasdair Harris: Blue Ventures has been based in Madagascar for over a decade, supporting traditional fishing communities in the development of locally managed marine areas (LMMAs) – large areas of coast and ocean managed by villages and groups of villages working together to improve the sustainability of fisheries. We have recognized that improving fisheries management alone is not enough to tackle the numerous and interrelated drivers of marine environmental degradation. For this reason, we take an integrated approach to supporting communities within these LMMAs. Alongside our “conventional” conservation efforts, our work encompasses building locally-owned aquaculture businesses (sea cucumber and red seaweed), and providing educational scholarships and community-based health services.

In Madagascar, we work with some of the world's poorest and most isolated communities whose access to health services is severely limited. The unmet health needs of the country's semi-nomadic Vezo fishing communities are particularly acute, with clinics located up to 50 km away from some villages. In coastal western Madagascar, the fertility rate is nearly 7 births per woman. Fewer than 10% of Vezo women have access to contraceptives, despite up to 90% wanting to be able to plan their pregnancies. With the population doubling every 10-15 years, Vezo communities are finding it increasingly difficult to provide for their growing families. And overfishing and destructive fishing practices pose significant threats to the marine ecosystems upon which their livelihoods depend.

Our community health program, called Safidy (<http://goto.blueventures.org/health>), meaning “the freedom to choose” in Malagasy, has been operational since 2007. Safidy was established in direct response to the unmet family planning needs of Vezo communities. It upholds reproductive rights by offering couples the information and contraceptive options they need to freely choose the number and spacing of their births. Results from this program have been published in both conservation (<http://bit.ly/Safidy1>) and public health journals (<http://bit.ly/Safidy2>).

Integrating these services with our conservation efforts addresses the interconnected challenges of poor health, unmet family planning needs, environmental degradation, and food insecurity in a comprehensive way. This enables coastal communities to manage their fisheries and marine ecosystems more sustainably, both now and for the future.

MEAM: What results have you seen?

Harris: We now provide community-based health services to around 20,000 people and are scaling up across two additional LMMA zones. Within the 40 communities that we serve in and around the Velondriake LMMA in southwest Madagascar, the Safidy program has led to an increase in the proportion of women using contraception from under 10% to 55% in just six years. This has averted over 800 unintended pregnancies, leading to a decrease in the region's general fertility rate by 40%. We know that addressing unmet reproductive health needs within this kind of context can also reduce maternal and child mortality by up to 30%.

We're witnessing how combining reproductive health services with conservation activities can enable communities to live more healthily and sustainably alongside their marine ecosystems. Integrated educational messages broaden community engagement: for example, by informing men about reproductive health and involving women in coastal resource management. This approach is proven to produce greater impacts than if either issue were tackled in isolation, and maximizes cost efficiency through the coordination of activities and staff between projects.

MEAM: Can this work be expanded to other areas?

Harris: The combined challenges of unmet family planning needs, unsustainable fishing, and marine environmental degradation are by no means unique to the communities we serve in southwest Madagascar. Coastal population growth in many parts of the developing world — often driven in large part by a severe lack of access to basic reproductive health services — continues to contribute to unsustainable exploitation of marine resources. Over one billion people live in coastal tropical regions. This population is expected to grow by 45% to 1.95 billion by 2050.

The rationale for taking a more integrated approach to marine conservation and addressing unmet family planning needs should be self-evident. Our PHE model could be readily replicated in numerous remote, highly biodiverse areas, including tropical coastal regions. With so many conservation organizations working in such zones, the addition of reproductive health services can and should become a fundamental part of how we engage with underserved communities. This doesn't require developing the capacity of conservation organizations to provide such services themselves; it can easily be achieved through partnerships with health agencies such as Marie Stopes (<http://mariestopes.org>), as demonstrated by our work in Madagascar.

Yet despite the critical need for expansion of integrated programming throughout many priority marine

More sources on integrated PHE programs

Population, Health, and Environment Toolkit, produced by Knowledge for Health project of USAID. www.k4health.org/toolkits/phe

"Lessons From the First Generation of Integrated Population, Health, and Environment Projects", by John Pielemeier (2011). www.wilsoncenter.org/sites/default/files/Focus_12.pdf

Environment, Population, and Health research programs, East-West Center. www.eastwestcenter.org/research/research-program-overview/environment-population-and-health

conservation regions in the tropical developing world, our sector is all too often blind to the wider reality in which our programs operate. Although there are of course exceptions, our general failure to take meaningful steps to consider demographic and social issues (including lack of access to reproductive health services) has meant that even in some of the world's poorest and most biodiverse coastal regions, marine conservation efforts rarely stray beyond the realms of protected areas. Surely in such contexts it can no longer be acceptable for us, as conservationists, to face the ocean with our backs to these communities. Yes, protected areas are of course part of the solution, but we cannot assume that they will ever be viable alone if the underlying needs — and basic human rights — of communities are not met.

“It can no longer be acceptable for us, as conservationists, to face the ocean with our backs to these communities.”

B. Increased biodiversity and income where population and conservation are integrated: Interview with Heather D'Agnes

[Editor's note: Heather D'Agnes is an environment foreign service officer with the US Agency for International Development (USAID) and former Population, Health, Environment Technical Advisor for USAID's Office of Population and Reproductive Health.

MEAM: Why should population and health be considered in tandem with environmental issues and conservation?

Heather D'Agnes: In certain circumstances, population growth is a long-term threat to marine and coastal ecosystems. The circumstances I'm speaking of are in countries such as in Africa and a few areas in Asia that are experiencing rapid population growth coupled with poor access to good healthcare. This occurs particularly in remote coastal areas and when it comes to health services like family planning and reproductive health care. These countries tend to have coastal communities that are very naturally resource dependent, and large family size and rapid population growth in coastal communities can lead to food

security challenges and reductions in livelihoods in the short as well as longer term.

PHE programs integrate population and health activities into marine conservation activities in communities that struggle with these multiple development challenges. Just working with these communities to protect their coastal environments, reduce fishing pressure, and improve fish catch will not result in long-term gains unless the underlying causes of environmental degradation, such as population growth and poverty, are addressed. In addition, there are benefits from integrating these activities: communities prioritize access to basic health services over conservation, so health can serve as an entry point to working with these communities and gaining their trust and commitment.

There are good examples of this. I'm thinking in particular of a WWF project in Northern Kenya where an MPA was established with very little community buy-in. Communities were opposed to its existence and did not abide by its rules and regulations. When the PHE

project was initiated [by WWF], communities realized that WWF was just as interested in their health and well-being as it was with the MPA, and after several years, communities became willing partners for conservation.

MEAM: What results have you seen coastal-marine PHE programs have?

D'Agnes: One of the best-studied and -documented PHE projects, the IPOPCORM Project in the Philippines (www.pfpi.org/ipopcorm.html), demonstrated improved family planning acceptance and use as well as biophysical improvements for coral and fish densities in project MPAs. It also showed an increase in income levels at sites where population and coastal conservation were integrated. They hypothesize that this is because of the combined benefit of improved fish catch as well as improved community health.

As I mentioned previously with the Kenya example, there are benefits in the form of increased community commitment because PHE projects address communities' most basic needs for good health services. There is also a benefit of engaging more women in coastal and marine conservation activities. PHE projects target both women and men; women because they are usually the targets for health services (especially family planning) and men because they are traditionally involved in natural resource management activities in coastal communities. By reaching

out to both men and women with an integrated package of services, PHE projects ensure that men are more engaged and interested in the health and well-being of their families, while women are more involved in decisions that impact the resources they depend upon.

MEAM: Why do you think there aren't more of these types of programs?

D'Agnes: One reason there are not more of these types of programs is that it takes two very different areas of expertise — in health and marine conservation — to implement PHE programs in an integrated fashion. It is difficult to find one organization with this diverse set of technical expertise, and it is difficult to encounter conservation and health organizations that actively want to work together on these types of programs. Also, health organizations tend not to focus on the remote coastal areas that marine conservation organizations target. In the instances where these programs are successful, it is usually because a conservation organization has realized the importance of integrating health and population and they have reached out and sought out partnerships with willing health organizations.

Another reason there aren't more PHE programs is because of the funding. It is hard to find donors who are willing to fund two distinct issues in one place. Successful PHE programs have often brought together two different funding streams: one focused on health and the other focused on marine conservation. ■

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To comment on this article:

<http://openchannels.org/node/7413>

Notes & news

Priority environmental threats identified for Small Island Developing States

The UN Environment Programme has released a report identifying priority emerging environmental issues of concern to Small Island Developing States (SIDS). The report covers a wide array of threats — invasive species, overfishing, reaching the limit of land capacity, and more — but the greatest issue of concern is climate change. Global warming is causing trillions of dollars of damage to coral reefs, which are critical to protecting island coasts from storms, promoting fisheries by serving as nursery habitats, and attracting tourism revenue.

"These 52 [SIDS] nations, home to over 62 million people, emit less than 1 percent of global greenhouse gasses, yet they suffer disproportionately from the climate change that global emissions cause," said Achim Steiner, head of UNEP. From climate change, some islands are expected to become uninhabitable while others are faced with the potential loss of their entire territories. The report *Emerging Issues for Small Island Developing States* is at www.unep.org/pdf/Emerging_issues_for_small_island_developing_states.pdf.

UNEP releases overview of deep sea mining and policy implications

UNEP has released a brief overview of deep sea mining, including its prospects, ecological and socioeconomic considerations, and policy implications. Global prices are rising for valuable metals, including the kinds predicted to be found in deep sea areas (in sea-floor massive sulphides, cobalt-rich ferromanganese crusts, and polymetallic nodules). Advancements in technology are making deep sea mining increasingly possible. Although no commercial deep sea mining operation has occurred yet, plans to open deep sea mines have been announced and mining companies have leases to explore margin sediments for minerals off the coasts of several countries.

The paper calls for strengthening governance mechanisms for international waters and the seabed, adaptive management of deep sea mineral extraction, and use of a precautionary approach to avoid potentially destructive mining practices. The briefing paper "Wealth in the Oceans: Deep sea mining on the horizon?" is at www.unep.org/pdf/GEAS_May2014_DeepSeaMining.pdf.

Tundi's Take: Is the link between ocean health and human health the sleeping dragon?

By Tundi Agardy, MEAM Contributing Editor (tundiagardy@earthlink.net)

The link between the condition of marine ecosystems and the human condition is deep and opaque, like the sea itself. It is probably safe to say that the majority of us believe that marine degradation will broadly affect humankind, but exactly how, and to what degree, is not well understood.

This we know for sure, however: degraded ecosystems are less productive and more prone to instability than healthy, diverse ecosystems. Declining ocean health thus stresses humankind by affecting livelihoods, threatening food security, increasing the potential for conflict, and taxing our spiritual and emotional health. Marine environmental degradation also affects humans more directly: bathing in polluted waters or eating tainted seafood can cause sickness and death. And disease outbreaks are more frequent and more pronounced when marine ecosystems lose biodiversity or when global warming effects occur – and especially when biodiversity loss and climate change effects occur simultaneously.

But even more alarming is what we don't yet know about the links between stressors, ocean condition, and human health/public health. Take for example the largest recorded marine disease outbreak ever: sea star wasting disease, currently affecting invertebrates along the Pacific coast of the USA. Why the sea stars are dying, and what this portends for human health for those who are exposed to the same ocean and coast and its resources, is totally unknown (though a soon to be published *Science* article by Drew Harvell and colleagues may shed some light on this mystery).

Scant attention paid to the ocean health / human health link

But for all the interest in recognizing the value of, and safeguarding, marine ecosystem services and all the emphasis on the economic costs of degradation (see for instance the recent UN report on the billions of dollars of costs borne to global society by microplastic pollution of the sea: www.unep.org/pdf/ValuingPlastic), there has been scant attention to the ocean health / human health link. We seem terribly preoccupied with overfishing – though this is a relatively simple threat to tackle. And we seem quick to establish very large marine “protected” areas, often without tackling the main stressors that affect the health of those protected ecosystems. Pollution is hard to deal with, especially when we are dealing with non-point source toxins, and cumulative stressors are harder still.

Controlling run-off, removing combined storm and sewer outflows, preserving wetlands, and using less fertilizer, pesticides, and herbicides in industry and at home – these are the hard things. Take the recent mess in Lake Erie (in the US), where a drinking water crisis for the city of Toledo, Ohio, has resulted from an algal bloom fed largely by agricultural fertilizers. It is simple to point the blame for ocean decline at the fishing industry; easy to propose vast hard-to-manage MPAs far from our shores; and convenient to raise the specter of the mystery of ocean acidification as the cause of our impending doom. This is perhaps why the wealthiest and most technologically advanced countries in the world seem unable to restore their most polluted and unhealthy marine areas. Given that a recent study found that over half the aquatic systems in Europe were highly contaminated by toxins, it is not surprising that the sink areas for all those rivers and streams, such as the Baltic, would be suffering so mightily.

And when the alarm bells really ring loud, some are quick to point the blame for everything on overpopulation. But the link between sheer numbers of people living on and using the coast and the condition of those coastal and marine ecosystems is not linear. Without factoring in consumption and behavior, our attempt to point the finger of blame on rapidly growing populations (especially those in the developing world) is misguided. Unless we articulate the true drivers of environmental degradation, prioritize the threats that most affect ocean health, and tailor our solutions to address those threats, we remain in peril. Declining ocean health may just be the sleeping dragon that takes us most by surprise. ■

“Unless we articulate the true drivers of environmental degradation, prioritize the threats that most affect ocean health, and tailor our solutions to address those threats, we remain in peril.”

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New study: Economic growth, more than population growth, is main driver of China's coastal degradation

Since China instituted sweeping economic reforms in 1978, the country's economy has grown by orders of magnitude. A new study in the journal *Scientific Reports* concludes that this economic growth has been the main driver in the significant degradation of China's coastal ecosystems, as measured by habitat loss, declining biodiversity, harmful algal blooms, pollution, and more. In a twist on previous research elsewhere on coastal degradation, the study's authors argue that population growth in China's coastal areas has not been a significant driver of the ecosystem declines. The study is available for free at <http://bit.ly/ChinaCoastStudy>. A blog post by the study's lead author Qiang He is at <http://bit.ly/ChinaCoastBlog>.

Perspective: Managing new Central Arctic Ocean fisheries in an era of global warming

Editor's note:

Alf Håkon Hoel is research director for Arctic and international affairs at the Institute of Marine Research, Tromsø, Norway.

By Alf Håkon Hoel

Global warming has reduced ice cover in the Arctic and facilitated the northward extension of fish stocks such as capelin and cod. This has brought speculation that commercial fisheries might be possible in the Central Arctic Ocean. Globally significant fisheries already exist in the seas surrounding the Arctic Ocean with the Barents Sea cod fishery being one of the largest fisheries in the world.

For a fish stock to extend its range into new areas, it needs the right water temperatures, food, suitable bottom topography, and spawning grounds that are not too far away. These conditions are not in place in the deep Central Arctic Ocean for groundfish like cod or haddock. Pelagic species like polar cod, which live in the water column, might be able to spread into these deep water areas, however. This has brought concerns that vessels from distant water fishing nations might initiate an unregulated fishery in the high seas beyond the 200-mile zones of the five coastal states (the Russian Federation, the US, Canada, Denmark/Greenland, and Norway).

In the middle of the Arctic Ocean, there is an area beyond the jurisdiction of the five coastal states of 2.8 million km², about four times the size of the state of Texas. It is expected that summer ice in this area will continue to decrease, and a potentially fishable area in the Arctic high seas can thereby emerge in the years ahead.

Management discussions to date

These concerns have brought discussions of how to manage potential future fisheries in the area beyond national jurisdiction (ABNJ). The existing international legal framework for the oceans, the 1982 Law of the Sea Convention, and the 1995 UN Fish Stocks Convention oblige states to cooperate on resource management in the high seas beyond the 200-mile zones.

A meeting of government officials from the five coastal states was held in Oslo in 2010. The outcome of this meeting was a request to marine research institutes to assess the situation regarding fish stocks in the Arctic Ocean and relevant research. A meeting of scientists in Anchorage in 2011 concluded that commercial fisheries are not likely to emerge in the Central Arctic Ocean in the short term. It also pointed to a continued need for research in this area.

Another meeting among government officials took place in Washington D.C. in spring 2013, requesting

additional information from scientists, in particular regarding the probability of commercial fisheries in the areas beyond national jurisdiction in the Central Arctic Ocean. It also discussed measures to prevent potential unregulated fisheries. A second meeting of scientists was held in Tromsø in October 2013, assessing existing arrangements for surveying the marine ecosystems in the Arctic Ocean and providing recommendations in this regard.

Government officials met again in Nuuk in February this year (2014) where they agreed that more scientific research to better understand the living marine resources of the Arctic Ocean is needed, that interim measures to prevent the development of illegal, unregulated, and unreported (IUU) fishing in the area beyond the 200-mile zones in the Central Arctic Ocean should be introduced, and that a broader process involving more countries will be initiated. This process could have a binding international agreement as its outcome. To date, Norway is the only country that prohibits vessels flying its flag to fish in unregulated waters, including those of the Central Arctic Ocean.

Fisheries in ABNJ in Central Arctic Ocean still not likely

Even with a continued reduction in ice in the Central Arctic Ocean, potential future fisheries are likely to be mainly within the 200-mile zones of the five coastal states. These states are all major fishing nations and have extensive management regimes for their fisheries. Where fish stocks are shared between two countries, bilateral arrangements for cooperation on their management, such as the Norway-Russia fisheries commission, are in place. What the process described above adds to this established system is a commitment on the part of the five coastal states to prevent vessels flying their flag to engage in unregulated fisheries on the high seas in the Central Arctic Ocean, should such a situation emerge in the future. Also, an intention is stated to initiate a broader process to involve more states, as are continued efforts in scientific research.

In a larger perspective, the more important aspect of this process is that the five coastal states take scientifically based, precautionary measures to reinforce and further develop the existing legal-political order in the region. ■

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To comment on this article:
<http://openchannels.org/node/7415>

Letter to the Editor: Combining approaches to address scale challenges

[Editor's note: The following is Peter Jones' response to two articles in the June-July 2014 edition of MEAM: "Mismatches between the scale of ecosystems and the scale of management" and "Tundi's Take: Are we too preoccupied with scale?". Jones is author of *Governing Marine Protected Areas: resilience through diversity*, published by Routledge (2014), in which he addresses the scale-challenge question across 20 case studies.]

Dear MEAM:

The challenges of scale mismatches are discussed by some in terms of 'scale challenges', which they argue can be negotiated amongst actors at different spatial scales and at different institutional levels through horizontal and vertical linkages (see this 2006 paper by Cash et al. —

www.ecologyandsociety.org/vol11/iss2/art8). Their emphasis is very much on bottom-up approaches through place-based self-governance, involving facilitated negotiations as a basis for reciprocated cooperation amongst people in different places (i.e., MPAs).

This way of thinking about how to address scale mismatches is currently de rigueur, including in MPA circles. I am not entirely convinced, particularly given the tendency for many wider-scale human and ecological inter-connections in our seas. Can the challenges, competitions and, let's face it, conflicts raised by these human and ecological inter-connections between MPAs really be addressed by negotiations and cooperation, with no policy/legal coordination mechanisms?

In my studies on MPA governance, I consider the answer to this question to be 'no'. I focus instead on what I term a co-evolutionary hierarchical governance approach, which involves the "coming together of top-down and bottom-up approaches" (as Tundi puts

it in her as ever insightful 'take' on scale mismatches), in order to provide for the governance of individual MPAs to address the human and ecological inter-connections between networks of MPAs. This does not mean:

- An entirely bottom-up approach, with faith placed in negotiations through horizontal and vertical linkages to address scale-challenges, with all the associated problems of minority capture, parochialism and short-termism;
- Nor an entirely top-down approach, with faith in the wider-scale remit of higher level policies and agencies, with all the associated problems of fortress conservation and imposition.

Instead, it means combining top-down and bottom-up approaches, along with economic, awareness-raising and knowledge-sharing approaches, so that the weaknesses of one approach are addressed by strengths of the others, in order to achieve the strategic, wider-scale, longer-term objectives of each MPA and the network within which each forms a component.

This is a way of "letting a thousand flowers bloom into the garden we want and need" (as Tundi eloquently puts it) through training, preening and tending them so that the flowers (also known as MPAs in the context of EBM) do so in concert and harmony. This 'gardening in the shadow of hierarchy' approach could represent a way forward from the top-down/bottom-up/scale mismatches dilemmas that these perspectives are discussing.

Peter JS Jones

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To comment on this letter:
<http://openchannels.org/node/7416>

Notes and news

Study examines challenges and success factors for large-scale conservation partnerships

Large-scale conservation initiatives are collaborative projects that span broad geographic areas and various biological and administrative boundaries. Like the problems they are designed to address (such as achieving conservation and sustainable development across an entire marine ecoregion), these initiatives can be quite complex. A new study published in *Conservation Biology* gathers and examines the challenges of large-scale conservation, and reports on traits critical to successful partnerships.

Among the successful traits:

- Adopting an adaptive management approach that uses research to revise conservation objectives and select suitable management actions; and
- Linking economic and ecological benefits to ensure continued funding.

The study team, led by Erik Beever of the US Geological Survey, polled conservation practitioners from 11 different initiatives spread across 29 countries. Individual programs ranged in area from 10000 km² to an entire continent. The full article is available for

a charge at <http://onlinelibrary.wiley.com/doi/10.1111/cobi.12233/abstract>. A research brief is available for free from the European Commission at <http://ec.europa.eu/environment/integration/research/newsalert/pdf/373na5.pdf>

Summary of IPCC report released for seafood industry

The seafood industry faces severe disruption from climate change and ocean acidification. That is the conclusion of a new publication that distills the Intergovernmental Panel on Climate Change Fifth Assessment Report (www.ipcc.ch/report/ar5) relative to the threat of climate change and acidification to marine resources.

The briefing was produced by the Sustainable Fisheries Partnership and the University of Cambridge Institute for Sustainability Leadership. Among its forecasts:

- A loss of US \$17-41 billion in global fisheries landings by 2050 with global warming of 2°C;
- An increase in fishery yields of 30-70% in high latitudes and a decrease in fishery yields of 40-60% in the tropics and Antarctica with global warming of 2°C; and

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<http://openchannels.org/node/7417>

- Reduced access to marine protein for 400 million people.

The briefing encourages the seafood industry to undertake vulnerability assessments of fisheries and aquaculture operations; support the strengthening of coastal zone management to reduce land-sourced pollution, over-harvesting and physical damage to resources; and create new habitats such as artificial reefs to act as fish nurseries in areas where coral reef destruction occurs. The briefing “Climate Change Implications for Seafood and Aquaculture” is at <http://bit.ly/seafoodclimate>

Report provides framework for fishery transition projects

A new report offers a framework for transitioning fisheries to management systems based on secure tenure. *Towards Investment in Sustainable Fisheries: A Framework for Financing the Transition* outlines how fishing communities and project developers can design and promote fishery transition projects to attract investors who seek financial returns as well as social and environmental benefits. Produced by EDF and The Prince of Wales’s International Sustainability Unit, the report is available at www.edf.org/towards-investment-sustainable-fisheries

Editor’s note: The goal of our regular EBM Toolbox feature is to promote awareness of tools for facilitating EBM.

The EBM Toolbox: No single technology is a complete solution

By Charles Steinback, Point 97. www.pointnineseven.com

Wild fisheries products are the world’s most widely traded foods, delivering US \$230 billion to the global economy and providing the primary protein source for one billion people worldwide. In recent years, new technologies have emerged to address social and environmental challenges related to depleted fish stocks.

These technologies are rapidly shaping ocean management efforts. In fact, they can be a game changer in terms of creating measurable and beneficial impacts to communities that depend on our oceans. Such technological innovations range from remote-controlled unmanned aerial vehicles (UAV) equipped with imaging equipment currently being tested by Stanford University for coral research, to data collection via mobile phones used in applications such as Digital Deck (http://pointnineseven.com/resources/display/digital_deck), and much more — including the wide array of software tools profiled in The EBM Toolbox over the years.

It is key, however, that these new technologies actually advance ocean management practices and intelligence

needs, and not just be “solutions in search of a problem”. They should help deliver long-term and persistent solutions to the most challenging problems of our time.

Often this means that no single technology is a complete solution. Instead, each technology ideally contributes to a larger system. Imagine an integrated technology system that combines an automated information system for monitoring AND reporting of fishing effort. Such a system might integrate optical satellite sensors that record salinity, water temperature, and chlorophyll with fisher harvest data and make the information available on a secure centralized database.

Then combine these solutions with a dashboard that visualizes market demand and pricing data for optimized and sustainable harvesting opportunities. This integrated system would inform policy, regulation, and standards and expand economic opportunity as well as conservation — increasing social and environmental benefits for fisheries, coastal communities, and other populations dependent on ocean resilience.

That may be the future. 