



## Issue PDF archive:

# Can we insure our way to healthier oceans and ocean communities? <sup>[1]</sup>

By Sarah Carr, Editor, MEAM

*Editor's note: Insurance may seem like a bit of an odd topic for MEAM. It was not one that I had previously thought of in relation to marine ecosystems or ecosystem-based management. But I kept seeing references to various relationships between insurance and the oceans in my reading and decided to explore. And I am so glad I did. This is an incredibly exciting area with a lot of remarkable things going on – and the potential for many, many more.*

## **Imagine a world where:**

- Municipalities proactively restore wetlands and offshore reefs wherever possible to protect their citizens and infrastructure and lower their insurance premiums.
- Small-scale fishers receive insurance payouts immediately after devastating hurricanes so fisheries-dependent communities can start to recover.
- The risks of running an illegal fishing operation rise dramatically because it is impossible to get insurance for the ships involved.

Things like this are happening or being worked on right now, and there is tremendous potential for additional innovation in insurance products and services – particularly with regard to mitigating climate change impacts – that can benefit ocean ecosystems and coastal communities. In this issue of MEAM, we learn from experts about a wide variety of critical connections between insurance and the oceans and ocean users.

## **What does insurance have to do with the oceans?**

**First, let's talk very briefly about insurance.** Generally speaking, insurance is an arrangement in which one person or group (the “insurer”) agrees to compensate another person or group (the “insured” or “policy holder”) if some sort of loss or damage occurs, in return for payment (the “premium”). Insurers can be for-profit companies, non-profit organizations, or government agencies. In a nutshell, they are in the business of understanding, managing, and “carrying” the risk for the adverse events that they cover. In general, insurance is most suitable for events that happen infrequently and have fairly severe impacts.

**But insurance for the oceans?** Insurers have long been involved in maritime trade. In fact, insurance really developed into its modern form to manage the risks of shipping <sup>[2]</sup>. Insurers already cover marine vessels of all kinds, as well as commercial fishing, aquaculture, and seafood processing operations. Insurance is also commonly used to manage pollution, including oil spills <sup>[3]</sup>, in the marine environment. What we are seeing now, however, are insurers grappling with and alerting society to the enormous risks associated with climate change as well as pursuing innovative schemes to expand insurance to non-traditional markets such as small-scale fishers and in developing nations.

Working with the insurance industry can be beneficial to ocean ecosystems and coastal communities for a number of reasons:

1. Insurers want the same thing as the people or groups they are insuring: they want to avoid costly problems and disasters. Insurers want to minimize payouts to the people or groups they insure so they can stay in business (and make money in the case of for-profit insurers). Likewise, the people or groups insured do not wish to incur losses or damages.
2. When insurers talk, people listen. Insurers are uniquely positioned to work with policy holders to prevent and reduce risk because policy holders are incentivized to take risk-reducing actions they might not otherwise take, to avoid higher premiums. And many insurance companies actively lend their expertise to those they insure to help them take risk-

reducing actions <sup>[4]</sup> (i.e., actions that decrease the frequency with which adverse events happen and the amount of damage they cause.)

3. Insurers have some serious analytical chops. They need to be able to calculate risk appropriately (again, how likely adverse events are to happen and what they will cost). Based on these assessments, they then need to determine what risks they will insure, at what price, and with what terms and conditions. The data and analyses they generate can be very helpful for public policy making
4. Insurers think long term. Unlike many politicians who focus on relatively short political/election time scales (often 2-6 years) <sup>[5]</sup> which lead them to ignore serious risks and avoid taking measures to reduce exposure to risk, insurers are thinking pretty far into the future to stay in business.

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## Insuring nature for the first time: An insurance policy for the Mesoamerican Reef



When the next big hurricane hits the Mexican resort towns of Cancún and Puerto Morelos, caring for the Mesoamerican Reef just offshore will likely be higher on the to-do list of coastal property owners than it has been in the past. An extraordinarily innovative new insurance policy <sup>[6]</sup> on the Mesoamerican Reef, *the first ever insurance policy on natural infrastructure*, is underway. Under this policy, hotel owners along a 60-km stretch of coastline are paying into a trust fund set up by the Mexican state of Quintana Roo with the support of The Nature Conservancy (TNC) and other partners. This trust fund in turn pays premiums for a parametric insurance policy triggered by large storms. (Parametric insurance policies are policies tied to specific triggering events rather than actual damages, allowing payouts from the policy to flow almost immediately.) These payouts mean that divers can be in the water recovering broken coral within days of large storms. Once recovered and “rested”, coral can be reattached to the reef to maintain reef ecosystems and reef structure. This speedy action means a greater chance of coral survival and recovery.

This arrangement provides explicit recognition of the value of one of the reef’s many ecosystem services – coastal protection. TNC estimates that a 1-m loss of vertical height in the reef, a likely result from a Category 3 hurricane, would triple onshore damages <sup>[7]</sup>. In addition to paying premiums for the insurance on the reef, the trust fund will also provide a source of funding for ongoing reef protection and repair for storm damages after smaller storms when the parametric insurance policy is not triggered. *[Editor’s note: The trust fund and insurance policy also provide coverage for beach protection and repair.]*

According to Kathy Baughman McLeod, formerly TNC’s managing director of coastal risk and investment, TNC and its insurance industry partners are now exploring taking the reef and beach trust fund and insurance program being pioneered in greater Cancún to other reef-dependent (both in terms of physical protection and tourist economy) communities around the world. Mangroves, marshes, and oysters could be next, but the “science, structure, and models will be different as those systems perform differently,” says McLeod. In addition, she noted that programs will also need to be tailored to the types of communities and built environments near and dependent on these natural systems.

And will the new trust fund and insurance program for the Mesoamerican Reef help with other aspects of reef health? Will it incentivize hotels, property holders, and other stakeholders to do other things to protect the reef, such as improve wastewater management, control invasive species, improve diver/snorkeler practices, or prevent and remove marine debris? According to McLeod, TNC is working in close collaboration with the state of Quintana Roo and the reef park manager to bring these sorts of issues and stressors into the reef trust fund and insurance program. “The current reef managers are very sophisticated but resource-constrained. This is a chance to get them the funds that they need,” says McLeod.

# An insurer's perspective: Interview with Alex Kaplan of Swiss Re

*Editor's note: Alex Kaplan is Swiss Re's head of North America and senior vice president of global partnerships.*

"We're at the very beginning stages of really figuring out how to insure nature. The innovation here is not the insurance policy itself, that is, it's not the mechanism by which we calculate the insurance premiums or proceeds. The innovation here is that we're insuring something that no one owns. The whole premise of insurance is that you have to have 'insurable interest' to take out insurance on something. You can't buy homeowners insurance on somebody else's home. But of course nobody owns the reef. So who has an insurable interest in the longevity of that asset? Who is going to benefit from the insurance payout because they really care if it continues to be there or not?"

Using the Mesoamerican Reef as a pilot makes a lot of sense. You've got tens of billions of dollars worth of economic assets [in the hotels] that sit right on the coastline, and their success is highly contingent upon the vibrancy of the local environment. They have tremendous exposure to tropical cyclones. So if that coral reef provides risk reduction value and reduces future losses to the economic values that sit behind it, then we want to make sure that it's protected.

Again we're in the beginning stages of learning to insure nature, but the big question is how you reward – and theoretically punish – actors when it comes to the vibrancy of that natural asset? We're thinking through those issues, but generally speaking, let's say you know you have a healthy reef and that healthy reef has the ability to absorb a tremendous amount of energy from these waves including from very powerful hurricanes. If that reef degrades and its ability to protect against risk actually goes down, the probability of damage happening to the economic assets on the other side goes up. Therefore your premium does too. If you do good work on the ground to increase the rugosity of that reef, then you should be rewarded for that good behavior as well. Having a partner like TNC is absolutely critical because this is an entirely new market. We're starting with hurricanes because the insurance industry knows hurricanes probably better than any other risk. So that is relatively easy. And, really, this is the first foray into a much broader market."

*Want to learn more about this project? Join MEAM for a webinar on this project on February 28. Register at <https://oct.to/WebinarReef> [8].*

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## Understanding and capitalizing on the coastal protection value of natural infrastructure

Could an insurance discount for restoring wetlands or reefs be in your city's future? Scientists have begun working with the insurance industry to use proprietary industry models to put monetary values on the protection offered by coastal habitats such as salt marshes, seagrass beds, oyster reefs, mangroves, sand dunes, beaches, and [coral reefs](#) [9]. These habitats reduce [wave energy](#) [10] and flooding which in turn protects coastal residents and property. And unlike more traditional coastal protection mechanisms such as levees and seawalls, these types of natural infrastructure offer other benefits such as nursery habitat for commercially- and recreationally-valuable fish species, ecotourism, and improved water quality.



Some of the findings so far?

- Coastal wetlands prevented US\$625M in damages across 12 US states during Hurricane Sandy in 2012 <sup>[11]</sup> and reduce annual flood losses in Ocean City, New Jersey, by 16 percent <sup>[11]</sup> compared to areas where marshes have been destroyed. [This work was conducted by the University of California Santa Cruz and TNC in collaboration with Risk Management Solutions and Guy Carpenter and Company from the insurance sector. It was supported by insurance market Lloyd's of London and used high-resolution flood models and property-loss data from the insurance industry.]
- Preliminary analysis of a wide variety of risk mitigation measures for eight Caribbean countries found that natural infrastructure-based adaptation measures – namely mangrove and reef revival – are frequently some of the most cost-effective measures <sup>[12]</sup> that can be taken to avert damages from hurricane-force winds, coastal flooding from storm surge, and inland flooding from hurricanes and other storms. [This work was conducted by the Caribbean Catastrophic Risk Insurance Facility and collaborators with technical support from Swiss Re and others.]

Billions of dollars <sup>[13]</sup> are spent worldwide to reduce coastal hazard risks, but only about three percent of worldwide investments along coasts <sup>[13]</sup> goes to natural infrastructure such as wetlands. The types of studies summarized above – quantifications of ecosystem services using the insurance industry's own tools – have a number of functions:

- They show that investing in natural infrastructure can provide critical coastal protection in a cost-effective manner and is a viable alternative or complement to traditional coastal protection mechanisms such as seawalls and levees.
- They provide decision makers at all levels of government with the information they need to compare the full range of adaptation measures and develop effective climate adaptation plans.
- They provide insurers and investors with the information they need to develop innovative financial and insurance markets based on the protective value of nature. The Mesoamerican Reef project described earlier is one example where the natural infrastructure itself is the subject of the insurance policy. "Resilience bonds <sup>[14]</sup>" are another possibility. Resilience bonds take advantage of insurance premium savings from risk reduction projects <sup>[15]</sup> to generate a steady stream of revenue for continued resilience efforts (such as coastal habitat conservation and restoration projects) while also providing insurance that helps manage the financial risk from catastrophes.

It is critical to note, however, that financial/insurance products such as resilience bonds are not tied to the use (or even consideration) of natural infrastructure for coastal protection. To ensure that protecting and restoring coastal habitats are given full consideration as viable coastal protection measures, it is necessary to continue working with the insurance and engineering industries to mainstream these measures into their models.

## **An insurer's perspective: Interview with Alex Kaplan of Swiss Re**

*Editor's note: Alex Kaplan is Swiss Re's head of North America and senior vice president of global partnerships.*

"Everybody knows what adaptation is, and everybody knows that there's a thousand different ways we can adapt to these risks. The question is 'Is the investment we're making worth the return in saved money from averted disasters?' So if I spend a billion dollars on a seawall, will I save at least a billion dollars in reduced hurricane losses? If the answer is no, you're not going to do it. But generally speaking, decision makers don't have the tools to do that analysis. So what we're trying to do is simplify it and present a whole menu of options for adaptation measures, how much they cost, and how much they actually impact losses.

TNC was critical to that, and from there we started looking much more at green infrastructure. What we noticed in many instances is that green infrastructure, from a net economic benefit perspective, actually provides greater value than most of the infrastructure investments that we would typically consider. One example is in Barbados. We did this analysis in Barbados and we figured out that for every dollar of investment in the Folkestone Marine Park, Barbados could save \$20 in averted hurricane losses in the future <sup>[16]</sup>. That is incredibly compelling. One to 20 is an incredible return on investment, so you should do that.

And then TNC brought us into the mix asking, 'Okay, how do we really value nature, and how do we value it not only from a sort of a pure economic perspective but also as risk reduction in value?' I'll be honest, it's not something that had even crossed my mind. But if you can show me the modeling that a vibrant coral reef can actually reduce the intensity of wave action and those waves are otherwise hitting valuable economic assets, then that reef is providing a service aside from being beautiful to look at and we should figure out a way to put a price tag on it and protect it."

*Want to explore natural infrastructure for coastal protection for your area? Some great resources for learning more include:*

- [CoastalResilience.org](#) <sup>[17]</sup>
- [Financing Natural Infrastructure for Coastal Flood Damage Reduction](#) <sup>[18]</sup>
- [Economics of Climate Adaptation](#) <sup>[19]</sup>
- [Atlas of Ocean Wealth](#) <sup>[20]</sup>

# Livelihood protection insurance for small-scale fishers in the Caribbean

Fishers face numerous types of risks: damage to or loss of fishing vessels and gear, loss of catch or production, declines in market prices for their catch, increases in costs for their supplies, and accidents and illnesses. A 2009 study found that by decreasing uncertainty, insurance against some of these risks could increase fisheries sustainability and improve compliance with fisheries regulation [21].

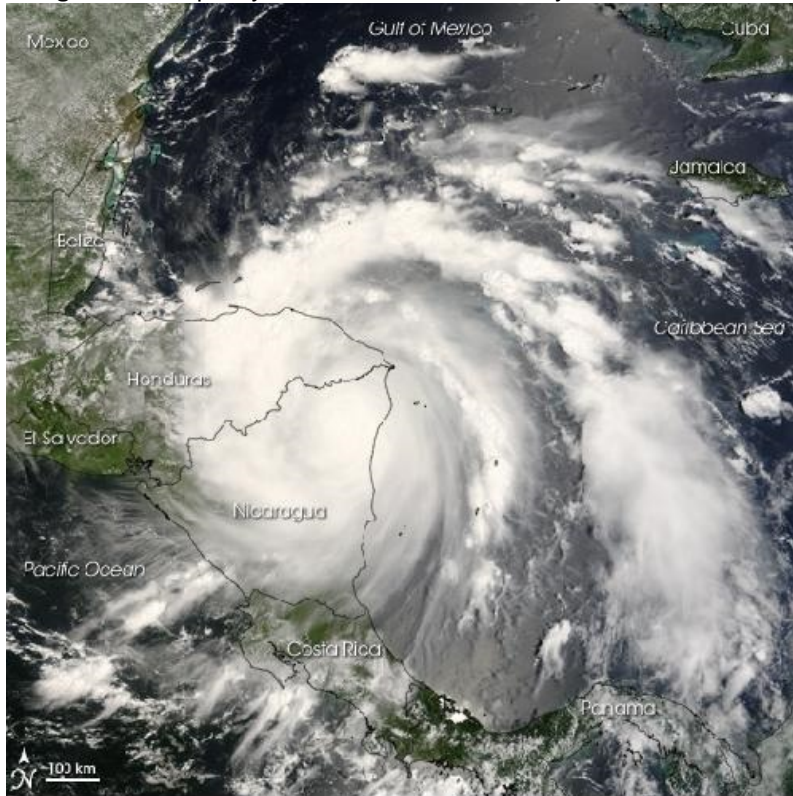
Private insurers have historically been reluctant to get involved with fisheries and aquaculture [22], particularly traditional small-scale activities in developing countries, due to the high risk. But this situation is slowly changing as governments and NGOs get involved. Milton Haughton of the Caribbean Regional Fisheries Mechanism (CFRM) spoke with MEAM about livelihood protection insurance that is being developed for small-scale fishers in the Caribbean [23].

## Insurance should positively impact fishers and the sustainability of the resources: Interview with Milton Haughton of the Caribbean Regional Fisheries Mechanism

*Editor's note: Milton Haughton is executive director of the Caribbean Regional Fisheries Mechanism (CRFM).*

**MEAM: Can you tell us a little about how insurance for the Caribbean fisheries sector would work?**

**Haughton:** This past year 2017 was an extremely difficult one for many fishing



communities across the Caribbean due to damage, destruction, and devastation caused by storms and hurricanes. Fishing communities are very vulnerable and, as a result of the hurricanes, they have sustained extensive physical damage to their homes, fishing boats and equipment, ports, and other infrastructure as well as economic losses throughout the production and distribution chain. We have not yet been able to evaluate the impacts and damage to the natural capital in the sea, that is, marine ecosystems and biodiversity, as a result of the hurricanes. Many fishing communities already subsist in precarious and vulnerable conditions because of poverty and rural underdevelopment. In some communities the fishing sector functions as a social security net that provides livelihoods for marginalized and vulnerable groups and individuals. Very few fishing vessels and fishing assets are currently insured in the region.

One of the paths forward in improving resilience of fishing communities, improving food security, and managing the increasing risks connected with a changing climate is making insurance available. There are two types of insurance policies being considered.

The first is a micro-insurance policy to protect low-income, small-scale fishers in the region against extreme weather risks. This is called the Livelihood Protection Policy and will be available through existing insurers. The original [Livelihood Protection Policy](#) <sup>[24]</sup> was launched in Grenada, St. Lucia, and Jamaica in 2014, for small farmers and day-laborers in other sectors. The policy is being customized for small-scale fishers and aquaculture operators with the intention to cover losses to livelihoods caused by storms, heavy rainfall, high winds, and other climate-related variables. The fishers would pay the premiums themselves, and the policy will provide quick payouts. The provision of assistance and resources in a timely manner is extremely important to helping fishers and fishing communities get back on their feet quickly after a natural disaster. Aid from external donors beyond immediate emergency relief supplies often takes months or years to arrive.

The second policy being considered is a parametric policy aimed at governments. They would pay the premiums and receive payouts to help with recovery and rehabilitation of the fisheries after an agreed trigger events such as a Category 3 hurricane or other climate related hazard. The policy is being developed by the Catastrophe Risk Insurance Facility Segregated Portfolio Company (CCRIF SPC) and the World Bank in collaboration with the CRFM and other regional partners and with support from the US government.

### **MEAM: Is risk insurance better than other types of disaster recovery aid?**

**Haughton:** Fishing communities will no doubt continue to require aid after natural disasters to assist with recovery, rehabilitation, and reconstruction. But since we know that the threats are increasing, the responsible and sensible thing to do is to utilize all available tools to protect ourselves, reduce risks and uncertainties, and improve the resilience of our communities and assets. Countries and communities never get enough aid to take care of all their needs and rebuild. Governments usually have to draw on their own resources as well. The establishment of an insurance product that will allow the pooling and transfer of risks for the fisheries sector and create a level of certainty is the way to go. Individuals and communities that are frequently impacted by destructive storms and hurricanes can fall into depression, despair and hopelessness. Risk insurance will help them to face the threats with peace of mind, confidence and assurance of a brighter tomorrow.

### **MEAM: Is this type of insurance expected to have any effect on participation in and/or sustainability of Caribbean fisheries?**

**Haughton:** The insurance should have a positive impact on the welfare of fishers and the sustainability of the resources. Many more fishers are expected to have indirect or direct access to climate-risk insurance coverage. And the intention is to develop a scheme where lower premiums, higher payouts, and technical assistance would be used to incentivize countries to implement policy reforms. These reforms would not only protect livelihoods, but also strengthen conservation, management and resilience of the fishery resources and marine ecosystems and support good governance fisheries. Improved management and conservation may mean: development and implementation of fisheries management plans, improved co-management arrangements between government and fishers, diversification of fisheries, reallocation of efforts from overfished stocks to under-utilized species, and restoring and maintaining the resilience of natural ecological systems such as coastal mangrove and wetlands – which will function as natural barriers to dissipate the storm energy and protect the coastal assets and infrastructure.

*Intrigued by the possibilities? Read about another example of an [insurance program for small-scale and subsistence food producers](#) <sup>[25]</sup> that could be adapted for fisheries communities.*

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## **Leveraging vessel insurance to fight illegal fishing**

Vessel insurance is a critical leverage point in the fight against illegal fishing. Shockingly, many [vessels widely known to be engaging in illegal fishing are insured](#) <sup>[26]</sup> by reputable marine insurers. If those conducting or enabling the illegal fishing are unable to insure their vessels, it would increase their financial risk and make it impossible for them to [launder money through fraudulent insurance claims](#) <sup>[27]</sup>. Researchers estimate that as many as [40 percent of vessels engaged in illegal fishing would stop if they lost their insurance](#) <sup>[28]</sup>.

Insurers also have many reasons to end this practice – it is illegal in many areas including the EU, it exposes them to financial risk, and it is harmful to their reputation. Oceana has led the charge at making insurers aware of their relationship to illegal fishing and promoting [due-diligence processes that make it harder for blacklisted fishing vessels to find insurance coverage](#) <sup>[29]</sup>. Lasse Gustavsson and Dana Miller of Oceana Europe spoke with MEAM about their work in this area.

## **The link between IUU fishing and insurance has only recently been exposed: Interview with Lasse Gustavsson and Dana Miller of Oceana Europe**

*Editor's note: Lasse Gustavsson is executive director of Ocean Europe, and Dana Miller is a marine scientist with Oceana Europe.*

**MEAM: Can you tell us a little bit about how you have been working with the insurance industry to reduce IUU fishing?**

**Gustavsson and Miller:** Those that participate in illegal, unreported, and unregulated (IUU) fishing break or avoid fisheries management rules and succeed in operating outside the effective reach of government control. IUU fishing can deplete already overfished populations and can destroy vital marine habitats and ecosystems. IUU fishing is an unresolved and internationally pervasive problem, and it is for this reason that Oceana has been working hard for many years in efforts to help prevent, deter, and eliminate this activity.



Most recently, Oceana has been working to mobilize the global marine insurance industry in taking action against IUU fishing. In 2016 Oceana joined an initiative led by UN Environment aimed at promoting responsible practices within the insurance industry – the Principles for Sustainable Insurance, or PSI. *[Editor's note: More about the PSI later in this article.]* Working within this framework, we have been promoting the adoption and implementation of the principles in the context of addressing IUU fishing.

With the assistance of the PSI Secretariat and with input from industry stakeholders, we facilitated the development of an [insurance industry statement on the topic of IUU fishing](#) <sup>[30]</sup> – the world's first insurance industry statement on sustainable marine insurance. Allianz Global Corporate & Specialty, AXA, Generali, Hanseatic Underwriters and The Shipowners' Club co-sponsored the statement before it was launched in October 2017 at the Our Ocean conference in Malta, an international gathering of world leaders hosted by the EU. The statement confirms the commitment of insurers, brokers, and agents to not knowingly insure or facilitate the insuring of vessels that have been blacklisted for their involvement in IUU fishing. Signatories have also agreed to encourage the adoption of other measures that may help to reduce, and ultimately eliminate, IUU fishing. Support shown toward this initiative within the insurance industry has been very encouraging and far-reaching. As of January 2018, 27 insurers, insurance market bodies, and key stakeholders spread across five continents have signed and supported the Statement.

Working again with the PSI Secretariat and with contributions from insurance associations, the Statement co-sponsors, and other industry stakeholders, we are currently developing risk management guidelines to assist insurers, brokers, and agents avoid contracts with association to IUU fishing. We will be publicly launching and disseminating these guidelines within our network and, when finalized, more broadly in the spring of 2018.

We feel that our efforts in engaging with the insurance industry on IUU fishing have been very successful so far but there is potential to do even more. Throughout 2018, we will be tracking the commitments made by statement signatories and encouraging international adoption of the industry guidelines. In the future we also hope to develop additional tools to assist insurers and other businesses identify companies and vessels that engage in or benefit from IUU fishing.

**MEAM: How willing has the insurance industry been to engage with you in this effort, and why hadn't they tackled this themselves earlier?**

**Gustavsson and Miller:** The insurance industry has been very receptive to engaging with us in this effort. A gradual process of building relationships based on trust and trying to understand the complexities of the industry has certainly helped. Sharing case study examples where links between insurers and IUU vessels have been exposed has also assisted in drawing attention and interest to the issue, while we have been careful not to publicly reveal sensitive information that could damage the

reputations of the companies implicated.

The industry did not tackle this issue themselves earlier because the link between IUU fishing and insurance has only recently been exposed. Before this, insurers may not have realized they could have an impact on or have a responsibility relating to IUU fishing at all – either by indirectly supporting it, or profiting from it.

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## Where else can insurance go?

In addition to these examples, there are numerous other intersections between insurance, ocean health, and coastal communities:

**Funding ocean research:** Partnerships with and sponsorships by commercial insurers can be an important source of funding for ocean research, particularly relating to climate change. Insurer XL Catlin has sponsored a [comprehensive review of ocean warming and its effects and consequences](#) [31], the [first freely-available digital baseline of coral reef health](#) [32], and the development of a [standardized framework for assessing deep ocean habitats](#) [33]. RSA Insurance Group is [working with WWF](#) [34] to map sensitive ocean areas in the Arctic and assess the impacts of increasing commercial activities such as oil and gas extraction, commercial shipping, and fishing due to sea ice loss.

Joe Tocco, chief executive of the Americas with XL Catlin, explained the [drivers for the industry this way in an op-ed in Risk & Insurance Magazine](#) [35]: “Why should the insurance industry care about ocean warming? For one thing, we are in the risk business, and ocean warming represents enormous risks. To manage any risk, we first have to understand it. If science and nations are to mitigate climate change, we must clearly grasp how the decline in coral reef health, loss of polar ice, ocean warming, sea level rise, and ocean acidification are affecting the people and property that the insurance industry helps to protect.”

**Convening global leaders to find solutions for ocean hazards:** In May of this year, leaders



from the insurance industry and political, economic, and environmental sectors will meet up in Bermuda for the first ever [Ocean Risk Summit](#) [36]. According to Chip Cunliffe, director of sustainable development with XL Catlin, the summit will “bring together leaders from across the political, economic, environmental, and risk management sectors to identify short- and long-term exposures to ocean-driven hazards and consider how to use new approaches, tools, and technologies to find potential solutions that will build resilience at local, regional and global levels.”

The conference will cover geopolitical, legal, economic, and regulatory risks as well as societal and environmental risks and will consider topics as broad-ranging as the [spread of waterborne viruses, Arctic sea ice loss, and threats to regional food security from overfishing and pollution](#) [37]. Cunliffe notes that there are other ocean related conferences focused on “overfishing, marine litter, aquaculture, finance, and governance, but there is an obvious gap related to risk and resilience. The Ocean Risk Summit looks to fill this space by understanding the importance of the oceans in the climate system and focusing on finding solutions to the existential risks from the changes we’re seeing.”

**Working with aquaculture clients to improve environmental, biosecurity, and health practices:** Chile is the second largest producer of salmon globally, but the industry has experienced repeated crises due to disease, algal blooms, and natural catastrophes. It has been accused of [poor environmental, security, and health practices](#) [38] (including overcrowded pens,



overuse of antibiotics, excessive use of food, and escapes of large numbers of fish). RSA Insurance Group, the largest insurer of Chilean aquaculture, is working with the aquaculture industry [34] there to improve spatial planning, area management, algal bloom mitigation, and biosecurity.

***Developing new bycatch markets to improve fisheries?:*** Bycatch markets with insurance have been proposed as a means to improve upon traditional bycatch quotas [39] and incentivize the development and earlier adoption of more environmentally friendly fishing gear [39].

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## So what does all of this have to do with you?

To get a better understanding of how ocean and coastal conservation and management practitioners should be thinking about their role relative to the insurance industry, MEAM spoke with Butch Bacani, program leader for UN Environment's Principles for Sustainable Insurance Initiative [40]. The Principles for Sustainable Insurance [41] were launched at the 2012 UN Conference on Sustainable Development (Rio+20) and provide a framework for the global insurance industry to:

1. Better manage environmental, social, and governmental risks such as climate change, natural disasters, ecosystem degradation, human rights violations, health risks, ageing populations, financial exclusion, and corruption, and
2. Strengthen its contribution to building resilient, inclusive, and sustainable communities and economies.

The PSI have been adopted by more than 120 insurance and stakeholder organizations worldwide, including insurers representing more than 25% of world premiums. They have many notable successes [42], including the insurance industry statement on IUU fishing discussed earlier in this article.

According to Bacani, there is a role for practitioners at all levels of government – local, national or international – to be working with the insurance industry to promote resilient and sustainable coastal and ocean ecosystems and communities. At the local level, city officials can work with insurers on integrating marine ecosystems into risk models and analytics, taking ecosystem-based disaster risk reduction measures (e.g., protecting and restoring mangroves, wetlands, coral reefs), and exploring insurance solutions for and investments in ecosystem-based solutions. One excellent opportunity for embedding coastal and marine ecosystems into the global agenda of resilient and sustainable cities is "Insurance Development Goals for Cities" [43], a global initiative of the PSI and ICLEI – Local Governments for Sustainability. Then at the national level, Bacani says government officials can work with insurers and the wider business community to shape policy and regulatory frameworks that incentivize responsible and sustainable maritime industry practices.

When asked about advice for working effectively with insurers, Bacani noted that it is important to keep in mind the insurance industry's triple role – as risk managers, risk carriers (insurers), and investors. Bacani described it this way:

"As risk managers, insurers help communities understand, prevent, and reduce risk through research and analytics, catastrophe risk models, and loss prevention. Insurers also advocate proper land-use planning, zoning and building codes, ecosystem-based disaster risk reduction, healthy lifestyles, and disaster preparedness.

As risk carriers, insurers protect households, businesses and governments by absorbing financial shocks due to risks such as cyclones, floods, droughts, earthquakes, accidents, and illnesses. Insurance pricing also provides risk signals and rewards risk reduction efforts. Insurance solutions for renewable energy, energy efficiency, green buildings, and usage-based insurance for vehicles enable the transition to a green economy.

Finally, insurers are major institutional investors with more than US\$30 trillion in global assets under management. Investments in low-emission infrastructure, technologies and transportation, sustainable water management, sustainable agriculture, and climate- and disaster-resilient infrastructure promote sustainable development."

## Insurance as a policy tool

While there has been relatively little academic study of the role of the insurance industry in environmental policy (including ocean policy),

***Insurance vs. regulation and liability.*** A 2002 analysis by the Organization for Economic Cooperation and Development [3] considered insurance to be a "surrogate regulation mechanism" because it is *ex ante* ("before the event") like regulation, rather than *ex post* ("after the event") like liability for damages. *Ex ante* measures can help prevent irreversible environmental damage and can be less expensive than remediation. In a review of 4,000 mitigation programs in the US, the Federal Emergency Management Agency (FEMA) found an average benefit-cost ratio (BCR) of 4 to 1 [44] for mitigation measures. BCRs

can be much higher too. In Mozambique, a post-flood aid request was 203 times the unfulfilled pre-disaster aid request [44].

[Editor's note: And for those of us living in a country with an anti-regulatory political climate [45] such as the United States right now, this private sector, market-based approach could be a winner when public sector approaches such as regulation are infeasible.]

**Insurance vs. disaster relief.** A 2011 analysis by Nordic Innovation [46] came to the conclusion that insurance can also be more cost effective than other policy measures such as disaster relief. Because insurance is taken out by policy holders before an adverse event (again, *ex ante*), the availability, price, and conditions of insurance generally reflect the cost of risk (as calculated by insurers). Higher premiums, stricter conditions, or even non-availability of insurance can influence what actions take place (e.g., if and where development can occur in a floodplain) and what preventative measures to reduce risk are required. Damages covered after an event (*ex post*, often in the form of donations or emergency relief funds) are compensatory like insurance. Disaster aid is not as closely connected to an individual policy holder's risk or actions, however, so there is less incentive for the policy holder to invest in risk reduction measures. Insurance will generally not be able to entirely replace the need for disaster relief, but it can be used in tandem with disaster relief to reduce financial dependence on disaster relief.

**Okay, insurance sounds promising. What's the catch?** Of course, nothing is without its complications. With insurance, complications come in the form of moral hazard (when those who are insured behave in riskier ways because they are insured) and adverse selection (the tendencies of those who are most at risk to get insurance and those with less risk to get less insurance). These tendencies can be dealt with in well-designed programs, but not all insurance schemes are well-designed or well-implemented. A poster child for an insurance program with severe problems is the National Flood Insurance Program (NFIP) run by the US government. The NFIP insures approximately five million homes in the US and was begun to provide an insurance alternative to disaster assistance and constrain development in flood-prone regions. While multitudes of homeowners have undoubtedly benefitted substantially from NFIP, the program – due to political pressures and equity concerns – currently charges premiums that are not tied to an individual homeowners' actual risk [47]. In recent years, this has enabled tremendous amounts of development in flood-prone areas [48] and increased the need for disaster aid to these areas [49] after flooding occurs.

Contact information:

*Kathy Baughman McLeod has recently left TNC and is now senior vice president of global environmental and social risk at Bank of America. To learn more about the Mesoamerican Reef project, contact Bess Tassoulas at [bess.tassoulas@tnc.org](mailto:bess.tassoulas@tnc.org).*

*Alex Kaplan can be contacted at [alex\\_kaplan@swissre.com](mailto:alex_kaplan@swissre.com) and on Twitter [@alexskaplan](https://twitter.com/alexskaplan) [50].*

*Milton Haughton can be contacted at [milton.haughton@crfm.int](mailto:milton.haughton@crfm.int) and on Twitter [@CaribFisheries](https://twitter.com/CaribFisheries) [51].*

*Lasse Gustavsson and Dana Miller can be contacted at [dmiller@oceana.org](mailto:dmiller@oceana.org) and on Twitter [@OceanaEurope](https://twitter.com/OceanaEurope) [52].*

*Chip Cunliffe can be contacted at [chip.cunliffe@xlcattlin.com](mailto:chip.cunliffe@xlcattlin.com) and on Twitter [@chipc27](https://twitter.com/chipc27) [53].*

*Butch Bacani can be contacted at [butch.bacani@un.org](mailto:butch.bacani@un.org) and on Twitter [@PSI\\_Initiative](https://twitter.com/PSI_Initiative) [54].*

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*Coastal development in Cancun, Mexico. (c) Wolcott Henry 2005/Marine Photobank.*

*Mangrove replanting in the Philippines. Howard Peters 2008/Marine Photobank.*

*Hurricane Felix over the Caribbean. NASA image by Jeff Schmaltz, MODIS Rapid Response Team, Goddard Space Flight Center/Marine Photobank.*

*Illegal fishing vessel in Gabon. Mike Markovina/Marine Photobank.*

*Destruction in Waveland, Mississippi (US), after Hurricane Katrina. David Helvarg, Blue Frontier Campaign/Marine Photobank.*

## **A new way to frame ecosystem services: Ecosystems as 'Providers' and 'Protectors'** [55]

**By Tundi Agardy, Contributing Editor, MEAM. Email: [tundiagardy@earthlink.net](mailto:tundiagardy@earthlink.net)**

Knowing what the oceans do for us today or could do for us in the future is essential to being able to set in motion marine management that will maintain these values over time. But while the potential yield of fish stocks or the touristic value of beaches is fairly easy to quantify or model, other ecosystem services are difficult even to define, let alone assess. And even when we do manage to produce comprehensive assessments of how ecosystem function and what benefits they provide, we trip up on communicating these values to the public and decision-makers.

Recently a group of Erasmus Mundus Maritime Spatial Planning masters students (P.O. Bonsu, S. Mahadeo, E. Menini, and B. Minuzzi Schemes) presented a paper proposing an innovative way of looking at ecosystem services. In describing the benefits that nature offers humanity in the northern Adriatic, they delved into how to assess cultural services, and how to define and quantify cultural heritage and the ecosystem services that support it.

The students put forth a simple yet elegant way to frame how ecosystems offer benefits to humans in the form of ecosystem services – the idea of ecosystems as either ‘Providers’ or ‘Protectors’. Ecosystems *provide* goods (‘Provisioning Services’ in the Millennium Ecosystem Assessment lexicon), but they also *provide* ecosystem values that are not goods – aesthetically pleasing landscapes and seascapes, biodiversity that enriches our experiences in nature, awesome wildlife that serve as an inspiration for the arts, etc. At the same time, ecosystems function to *protect* these and other values through those ecosystem services that the Millennium Assessment awkwardly termed ‘Supporting’ and ‘Regulating’ Services.

It is therefore possible to evaluate how ecosystems stabilize shorelines to protect our seascapes, how they filter coastal water to improve the quality of water in which we bathe and frolic, and how they promote nutrient cycling to support myriad species that we admire and build livelihoods around. These are all tied to ecological functions that indeed either support or regulate communities of organisms, but in essence these complicated functions can also be seen as *protecting* the many ways that humans benefit from healthy oceans and coasts.

### **Seeing the oceans as Protectors, not just Providers**

This simple precept got me thinking, and I had two immediate reactions. First, I was embarrassed and annoyed that I hadn’t thought of this myself.

My second thought was that it might just be that many marine management failures have to do with framing marine problems in too narrow a way. When we focus primarily on ecosystems as *Providers*, we concentrate on their giving, and hence, our taking. With that focus we set ourselves up for competition, for policies influenced by lobbying and money and power, and ultimately on taking what is being provided before the next person or company or nation snatches it away. A recent paper by Smith *et al.* (2017) describes how maximizing one ecosystem service can and often does degrade other ecosystem services <sup>[56]</sup>.

It doesn’t have to be this way. Imagine a world in which the decision makers and the public get it – and government policy and industry regulations are therefore crafted to not only allow sustainable ocean use, but also to keep the ocean ecosystems functioning as *Protectors*. Inevitably, this would lead marine management towards ecosystem-based management, with effective management benefitting many instead of just a few.

### **Steps we can take**

A pipe dream? Well, maybe. These days it can’t hurt to dream.... But there are concrete steps that could be taken to actively manage oceans so that they can continue to *Provide* and *Protect*.

One concrete step is to better communicate how healthy oceans benefit all of us, boosting out national economies, providing livelihood opportunities, and enriching us in countless other ways. We need to reach broader audiences than those who read MEAM and already understand. Luckily young people are equipped to do this with their parsimonious communications. New technological tools and social media could allow strong messages to be broadcast widely, to strengthen the worldwide culture of sustainability and the conservation ethic that is at its core.

Yet another step might be to change the conversation that drives marine spatial planning – admittedly only one approach to marine management, but one which lays the groundwork for integrated management at potentially large geographic scales. A recent paper by McGowan *et al.* (2018) illustrates what is widely viewed as a dichotomy, discussing marine spatial planning and zoning as either optimizing space-sharing or space-sparing <sup>[57]</sup> – in other words, use versus conservation. But we could radically transform marine spatial planning if we were to assume that space-sparing is necessary for sustainable space-sharing – in other words, that taking what nature provides us needs to be balanced by refraining from taking, in order to allow Nature as Protector to nourish us all.

And finally, a critical step to ensuring that the oceans can continue to provide and protect has to do with our coming to terms with **all** the ways the oceans sustain us. We should invest in improving our assessments of the spaces and sectors we attempt to manage – aiming for a full understanding of all the benefits oceans provide. Armed with that knowledge, we can counter misguided policy, and possibly even human greed.

## Latest News and Resources for Ocean Planners and Managers <sup>[58]</sup>

- [UN agrees to negotiate legally binding treaty to protect biodiversity of high seas](#) <sup>[59]</sup>
- [New international agreement prohibits commercial fishing in high seas of central Arctic Ocean for 16 years](#) <sup>[60]</sup>
- UN passes [non-binding resolution to end plastic waste entering oceans](#) <sup>[61]</sup>; moving towards [binding treaty to ban plastic waste entering oceans](#) <sup>[62]</sup>
- [2017 warmest year on record for global ocean](#) <sup>[63]</sup>
- [Arctic sea ice at lowest levels on record](#) <sup>[64]</sup>
- [Coral bleaching events now occurring too often for ecosystems to recover](#) <sup>[65]</sup>
- [Program launched to study ocean soundscapes and effects of sound on marine organisms](#) <sup>[66]</sup>
- US proposes [plan to open most of outer continental shelf to oil and gas development](#) <sup>[67]</sup>; proposal [open for comment until March 9](#) <sup>[68]</sup>
- [Seychelles adding two MPAs as part of MSP initiative](#) <sup>[69]</sup>
- [Marine planning visioning workshops being held across England in February and March](#) <sup>[70]</sup>
- Welsh draft national marine plan [open for comment until March 29](#) <sup>[71]</sup>; plan [worries some environmentalists](#) <sup>[72]</sup>
- [Ireland publishes roadmap for development of national marine spatial plan](#) <sup>[73]</sup>
- [Formal consultation process for Belgian maritime spatial plan to begin in early 2018](#) <sup>[74]</sup>
- [Spanish-language massive open online course \(MOOC\) on marine litter running now](#) <sup>[75]</sup>
- [Summer school on interdisciplinary approaches for sustainable oceans announced; applications due March 26](#) <sup>[76]</sup>
- [“Marine Spatial Planning \(MSP\) in a nutshell” video now available in French, Spanish, and Portuguese](#) <sup>[77]</sup>
- [Open-access overview of seabed mining – including state of development and environmental impacts – available](#) <sup>[78]</sup>
- [Join a Fishackathon event and code for marine conservation on Feb 10-11](#) <sup>[79]</sup>

And if you need a pick-me-up, we recommend checking out Ayana Elizabeth Johnson’s [Top 20 Ocean Conservation Wins of 2017](#) <sup>[80]</sup>. In particular, she notes that during 2017 South Africa, Mozambique, Madagascar, Argentina, Montserrat, Mexico, and Brazil all committed to developing national marine spatial plans.

And if you still need something to cheer you up, try swimming around in these virtual reality 360° videos from the #OurBluePlanet project: [Turtley-Awesome](#) <sup>[81]</sup>, [Hammerhead Sharks](#) <sup>[82]</sup>, and [Barracuda Tornado](#) <sup>[83]</sup>, and [Diving Under Icebergs With A Seal In Antarctica](#) <sup>[84]</sup>.

## Perspective: Radical MSP can solve social and environmental problems, not just facilitate industrialization <sup>[85]</sup>

*Editor’s note: Wesley Flannery is a lecturer in The School of Natural and Built Environment at Queen’s University, Belfast, UK. His recent paper “[Exclusion and non-participation in Marine Spatial Planning](#)” <sup>[86]</sup> was summarized in [MarXiv](#) <sup>[87]</sup>, the free research repository for marine conservation science and marine climate change science.*

**MEAM: You’ve said that you are interested in “more radical forms of marine spatial planning.” Please tell us more!**

**Flannery:** Marine Spatial Planning (MSP) has become a tool for facilitating ‘blue growth’ and is in danger of becoming little more than a process that facilitates the rapid industrialization of our coasts and seas. There is very little serious discussion about alternative uses for MSP; rather, the discourse around MSP is that its adoption will facilitate the rational use of marine space and that doing this will solve marine issues. For me, this reduces MSP to a simple zoning process that will maximize opportunities for further marine exploitation but will not address the wide range of marine problems that we face.

A more radical form of MSP would be more about sustainable place building and would be more focused on social and

environmental goals. The goals of more radical forms of MSP would focus on solving social and environmental problems – such as how we address issues like coastal poverty through better marine governance. MSP in the UK is meant to address issues like this, but judging by the actual plans, it seems to rely on the trickle-down effect from increased marine development – a model of poverty alleviation that has failed spectacularly in our cities.

**MEAM: Do you have any Do's and Don't's for marine planners trying to make their planning processes more equitable/just?**

**Flannery:** To make MSP more just/equitable, we need to:

1. Challenge the idea that MSP is inherently 'rational' – rationality is subjective. Whose rationality gets advanced by MSP is a key question (usually it's the rationality of the most powerful actors). Planners need to be explicit about power differentials across stakeholders and communities and develop engagement processes that address this issue – not every group can hire a lobbyist or make donations to the campaigns of politicians.
2. Move away from MSP as a tool to allocate space and towards MSP processes that are focused on developing sustainable futures for marine places. Planners need to develop processes that prioritize social well-being and environmental sustainability rather than the maximization of marine GDP.
3. Enhance transparency of MSP processes and build the capacity of less powerful stakeholders to participate. Some stakeholders will not be ready to engage in MSP. Planners will need to emphasize how MSP will impact these communities and how they can engage with the process. I once heard a marine planner say, “If you're not at the table, you're on the table” – this is not good enough. We need to work with communities that might not have the resources to engage in what can be a very long, resource-intensive planning process.
4. Move MSP beyond strategic objectives and into action planning. Most MSP processes have developed strategic-level objectives that are very vague and haven't resulted in radical action 'on the water'. Vague, strategic objectives tend to maintain the status quo and serve powerful actors.
5. Finally, rather than tack MSP processes onto existing governance regimes, we need to radically overhaul marine governance institutions – piecemeal institutional change is insufficient and will not lead to radically different or equitable marine futures.

**MEAM: Are there any current or past marine planning processes (or parts of processes) that you would like to call out for doing a good job incorporating social and distributional outcome goals? What did they do?**

**Flannery:** No – I'm not aware of any MSP process that has done a really good job in this area. However, I was very impressed with the [Eastern Scotian Shelf Integrated Management \(ESSIM\) Initiative](#) <sup>[88]</sup>, which I researched a few years ago. The team at Fisheries and Oceans Canada (DFO) were very conscious that some communities would not be ready to leap into ocean planning. From talking to these communities, it was clear that they really appreciated the outreach approach that the DFO team adopted and how they got them ready to come to the planning table. The planners were not able to address all issues that arise when you have both weak and powerful actors sitting down to collaborate, but I think they did a really good job of building capacity and making sure no group was excluded from the process.

## **A few more wrap-up announcements from MEAM** <sup>[89]</sup>

### **OCTO's MarXiv profiled in “Tear Down That Paywall: The Movement to Make Ocean Research Free for All**

“Yet many marine scientists, managers, advocates and policymakers around the world – from the poorest countries and organizations but also even the richest – have struggled to access research journals for years. The traditional model of academic publishing, in which major journals, published by a small handful of companies, charge subscription fees that can cost thousands of dollars for a single publication, has long made marine research harder to use for the very on-the-ground experts and practitioners it may need to reach.”

--- Jessica Leber. Oceans Deeply. 18 January, 2018

Read more about ways that OCTO and others are working [towards making marine research available to practitioners and those who need it in this news article from Oceans Deeply](#) <sup>[90]</sup>. OCTO's MarXiv (rhymes with “archive”) makes it possible to share your ocean and climate science papers, technical reports, and datasets legally and at no cost to you or users. It also provides unique DOI numbers, long-term storage, and indexing in Google Scholar. Read [more about MarXiv](#) <sup>[91]</sup> and [add papers to the repository](#)

<sup>[92]</sup>.

**Join MEAM at the Effects of Climate Change on the World's Oceans Symposium!**

MEAM is going to be reporting from the [Effects of Climate Change on the World's Oceans Symposium](#) <sup>[93]</sup> being held in Washington, DC, June 4-8, 2018. The forum will bring experts from around the world together to better understand climate impacts on ocean ecosystems and how to respond. We encourage MEAM readers to attend the conference and contribute to our coverage. Please let us know at [meam@openchannels.org](mailto:meam@openchannels.org) if you will be attending and would be interested in contributing!

[Printer-friendly version](#) <sup>[94]</sup> [PDF version](#) <sup>[95]</sup>

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#### Links

- [1] <https://meam.openchannels.org/news/meam/can-we-insure-our-way-healthier-oceans-and-ocean-communities>
- [2] <https://en.wikipedia.org/wiki/Insurance>
- [3] <http://www.oecd.org/finance/financial-markets/1939368.pdf>
- [4] <https://hbr.org/2017/08/how-the-insurance-industry-can-push-us-to-prepare-for-climate-change>
- [5] <https://meam.openchannels.org/news/meam/addressing-long-term-problems-short-term-budgets-and-mandates-what%E2%80%99s-practitioner-do>
- [6] <https://thought-leadership-production.s3.amazonaws.com/2017/07/14/20/58/36/9cc4164c-751e-4903-abb0-140652dc5316/RBRIF%20Infographic%20FINAL%2007142017.pdf>
- [7] <https://www.fastcompany.com/40452568/this-coral-reef-now-has-its-own-innovative-insurance-policy>
- [8] <https://oct.to/WebinarReef>
- [9] <https://www.nature.com/articles/ncomms4794>
- [10] <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154735>
- [11] <https://www.nature.com/articles/s41598-017-09269-z>
- [12] <http://www.ccrif.org/sites/default/files/publications/ECABrochureFinalAugust182010.pdf>
- [13] <https://cbe.mii.edu/joce/vol3/iss2/6/>
- [14] <https://www.brookings.edu/blog/the-avenue/2015/12/16/financing-infrastructure-through-resilience-bonds/>
- [15] <http://riskandinsurance.com/rewarding-resilience/>
- [16] <https://openminds.swissre.com/stories/750/>
- [17] <http://coastalresilience.org/>
- [18] <http://nature.org/FinancingNaturalInfrastructureReport10.7291/V9PN93H3>
- [19] [http://media.swissre.com/documents/rethinking\\_shaping\\_climate\\_resilient\\_development\\_en.pdf](http://media.swissre.com/documents/rethinking_shaping_climate_resilient_development_en.pdf)
- [20] [http://oceanwealth.org/wp-content/uploads/2016/07/Atlas\\_of\\_Ocean\\_Wealth.pdf](http://oceanwealth.org/wp-content/uploads/2016/07/Atlas_of_Ocean_Wealth.pdf)
- [21] <https://academic.oup.com/icesjms/article/66/5/950/664078>
- [22] <http://www.fao.org/fishery/topic/16617/en>
- [23] <https://www.seafoodsource.com/commentary/small-scale-fishers-get-lifeline-with-new-insurance-program>
- [24] <http://www.climate-insurance.org/projects/climate-risk-adaptation-and-insurance-in-the-caribbean/the-livelihood-protection-policy/>
- [25] <https://www.reinsurancene.ws/swiss-re-backed-livestock-insurance-scheme-payout-2-million/>
- [26] [http://www.slate.com/articles/health\\_and\\_science/science/2016/07/the\\_self\\_sunk\\_pirate\\_ship\\_the\\_thunder\\_and\\_recent\\_research\\_expose\\_how\\_insurance.html](http://www.slate.com/articles/health_and_science/science/2016/07/the_self_sunk_pirate_ship_the_thunder_and_recent_research_expose_how_insurance.html)
- [27] <http://ourocean2017.org/sites/default/files/lasse-gustavsson-our-ocean-2017-speech.pdf>
- [28] <http://onlinelibrary.wiley.com/doi/10.1002/fee.1293/abstract>
- [29] <https://www.maritime-executive.com/article/marine-insurers-join-the-fight-against-illegal-fishing>
- [30] <http://eu.oceana.org/en/assisting-ocean-stewardship-through-marine-insurance>
- [31] [https://portals.iucn.org/library/sites/library/files/documents/2016-046\\_0.pdf](https://portals.iucn.org/library/sites/library/files/documents/2016-046_0.pdf)
- [32] <http://catlinseaviewsurvey.com/>
- [33] <http://xlcatlin.com/insurance/news/xl-catlin-announces-sponsorship-of-deep-ocean-survey>
- [34] <http://www.argusdelassurance.com/mediatheque/7/5/5/000007557.pdf>
- [35] <http://riskandinsurance.com/ocean-warming-risk-matter-insurance/>
- [36] <http://www.oceanrisksummit.com/>
- [37] <https://www.prnewswire.com/news-releases/governments-and-industry-set-for-first-ever-ocean-risk-summit-in-bermuda-300487800.html>
- [38] <http://usa.oceana.org/aquaculture-our-work-chile>
- [39] <https://www.sciencedirect.com/science/article/pii/S0921800910003393>
- [40] <http://www.unepfi.org/psi/vision-purpose/>
- [41] <http://www.unepfi.org/psi/wp-content/uploads/2012/06/PSI-document1.pdf>
- [42] <http://www.unepfi.org/psi/>
- [43] <https://www.linkedin.com/pulse/united-nations-backed-insurance-industry-initiative-network-bacani/>
- [44] <https://www.sciencedirect.com/science/article/pii/S2212420914000661#bib63>
- [45] <https://www.theregview.org/2018/01/24/farber-trump-epa-anti-regulatory-state/>
- [46] <http://www.diva-portal.org/smash/get/diva2:707217/FULLTEXT01.pdf>
- [47] <https://www.nytimes.com/2017/11/04/business/a-broke-and-broken-flood-insurance-program.html>
- [48] [https://www.washingtonpost.com/opinions/after-harvey-flood-insurance-needs-reform/2017/08/30/0a04b88e-8d02-11e7-8df5-c2e5cf46c1e2\\_story.html?utm\\_term=.6f95d62af680](https://www.washingtonpost.com/opinions/after-harvey-flood-insurance-needs-reform/2017/08/30/0a04b88e-8d02-11e7-8df5-c2e5cf46c1e2_story.html?utm_term=.6f95d62af680)
- [49] [https://en.wikipedia.org/wiki/National\\_Flood\\_Insurance\\_Program](https://en.wikipedia.org/wiki/National_Flood_Insurance_Program)
- [50] <https://twitter.com/alexskaplan>
- [51] <https://twitter.com/CaribFisheries>
- [52] <https://twitter.com/OceanaEurope>
- [53] <https://twitter.com/chipc27>
- [54] [https://twitter.com/PSI\\_Initiative](https://twitter.com/PSI_Initiative)
- [55] <https://meam.openchannels.org/news/meam/new-way-frame-ecosystem-services-ecosystems-providers-and-protectors>
- [56] <https://www.sciencedirect.com/science/article/pii/S2212041617300086?via%3Dihub>
- [57] <https://link.springer.com/article/10.1007/s12080-017-0364-x>
- [58] <https://meam.openchannels.org/news/meam/latest-news-and-resources-ocean-planners-and-managers-2>

- [59] <https://news.nationalgeographic.com/2017/12/un-high-seas-conservation-treaty-ocean-protection-spdl/>
- [60] <https://www.newsdeeply.com/oceans/articles/2017/12/04/international-accord-bans-fishing-in-central-arctic-ocean-spurs-science>
- [61] <http://www.bbc.com/news/science-environment-42239895>
- [62] <http://www.bbc.com/news/science-environment-42190678>
- [63] [https://www.eurekalert.org/pub\\_releases/2018-01/ioap-2wt011718.php](https://www.eurekalert.org/pub_releases/2018-01/ioap-2wt011718.php)
- [64] <http://www.arctic.noaa.gov/Report-Card/Report-Card-2017>
- [65] <https://www.theatlantic.com/science/archive/2018/01/the-global-scourge-on-coral-reefs/549713/>
- [66] <http://www.iqoe.org/>
- [67] <https://www.nytimes.com/interactive/2018/01/23/climate/trump-offshore-oil-drilling.html>
- [68] <https://www.boem.gov/National-Program-Comment/>
- [69] <http://www.seychellesnewsagency.com/articles/8272/Marine+life+around+Seychelles%27+Aldabra%2C+Amirantes+groups+to+be+protected+areas>
- [70] <http://mssp-platform.eu/events/uk-mmo-stakeholder-events>
- [71] <http://mssp-platform.eu/events/consultation-draft-national-marine-plan-wales-still-open>
- [72] <http://www.bbc.com/news/uk-wales-42611115>
- [73] <http://www.publicnow.com/view/D9313B03429034327D3502459FD5DD37412E328D?2017-12-12-18%3A30%3A18%2000%3A00-xxx3439>
- [74] <http://mssp-platform.eu/events/formal-consultation-process-belgian-mssp-be-launched-2018>
- [75] [https://ou.edia.nl/courses/course-v1:OUNL+MLMOOCES18+2018\\_1/about](https://ou.edia.nl/courses/course-v1:OUNL+MLMOOCES18+2018_1/about)
- [76] <http://www.imber.info/en/events/climeco-imber-summer-schools/interdisciplinary-approaches-for-sustainable-oceans>
- [77] <https://bluesolutions.info/marine-spatial-planning-in-a-nutshell-video/>
- [78] <https://www.frontiersin.org/articles/10.3389/fmars.2017.00418/full>
- [79] <http://fishackathon.hackernest.com/>
- [80] <https://blog.nationalgeographic.org/2018/01/03/top-20-ocean-conservation-wins-of-2017/>
- [81] <https://www.youtube.com/watch?v=8EtfihvMLyQ&list=PLtra-MWzlvZG0zdfMizEjkAgVakHAj4cx&index=3>
- [82] <https://www.youtube.com/watch?v=q3UOyWo2rg8&list=PLtra-MWzlvZG0zdfMizEjkAgVakHAj4cx&index=7>
- [83] <https://www.youtube.com/watch?v=srGj8vJAnd0&list=PLtra-MWzlvZG0zdfMizEjkAgVakHAj4cx&index=10>
- [84] [https://www.youtube.com/watch?v=\\_ARBK1kfli0](https://www.youtube.com/watch?v=_ARBK1kfli0)
- [85] <https://meam.openchannels.org/news/meam/perspective-radical-mssp-can-solve-social-and-environmental-problems-not-just-facilitate>
- [86] <https://marxiv.org/nfbs3/>
- [87] <https://marxiv.org/ad8ys/>
- [88] <http://www.tandfonline.com/doi/abs/10.1080/1523908X.2012.662384?src=recsys&journalCode=cjoe20>
- [89] <https://meam.openchannels.org/news/meam/few-more-wrap-announcements-meam-0>
- [90] <https://www.newsdeeply.com/oceans/articles/2018/01/18/tear-down-that-paywall-the-movement-to-make-ocean-research-free-for-all>
- [91] <https://www.marxivinfo.org/>
- [92] <https://osf.io/preprints/marxiv>
- [93] <http://meetings.pices.int/meetings/international/2018/climate-change/Background>
- [94] <https://meam.openchannels.org/print/meam/issue/february-2018-114?destination=taxonomy/term/638>
- [95] <https://meam.openchannels.org/printpdf/meam/issue/february-2018-114?destination=taxonomy/term/638>