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The New Blue Economy: the Future of Sustainability

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1. PARAMETERS FOR DEMARCATING BUSINESSES THAT SUPPORT OCEAN SUSTAINABILITY

We have long defined “green business” as a subset of business in general. Likewise, “ecotourism” is a subset of travel and tourism. We are now contemplating the opportunity to track the *new* Blue Economy as a subset of the entire global ocean-generated economy. We know the many misuses of “green” and “eco,” and that other labels have been applied in ways that are misrepresentations. However, to best understand statistics regarding demand, growth, and contribution of a particular subset of sectors, we have worked hard to identify what is in each of those subsets, and what is not. Thus, likewise, we must set forth criteria for us to distinguish the sustainable, *new* Blue Economy sectors for separate tracking, even as we develop national income accounts related to the ocean in general. *In order to reach a general consensus on sustainability, we need a locally accurate, spatially explicit quantification of all things relating to ocean wealth in metrics that are understandable and usable by decision-makers at varying scales.* These metrics will help guide us in determining which industries fall into the “new (i.e. sustainable) blue economy” and which are outside that scope.

As such we must understand what is good for the ocean, for the life within the ocean, for the human communities who depend on the ocean, and for strengthening the diverse services the ocean provides to support all life on earth. In turn, we can aggregate those activities, at least conceptually, to understand what the new Blue Economy really can be.

2. WHY THE OCEAN ECONOMY?

“Protecting our oceans is not a luxury. It is a necessity that contributes to our economy, our climate and our way of life. Working together, we can change the current course and chart a sustainable future,” US Secretary of State, John Kerry (2014).

It is essential to standardize our methods and definitions for valuing the coasts and ocean. The world’s population depends upon the ocean for its very existence. The ocean regulates our climate and our weather. It generates half of the oxygen

we breathe (NOAA 2014). It provides food and income for billions of people. Covering almost three quarters of the planet, the ocean is the life support system for planet earth (see table 1). As a proxy, we express this life support as “eco-system services:” provisioning (e.g. food, oxygen and water); regulating (e.g. climate/temperature regulation, coastal stabilization); supporting (e.g. pollution filtration, waste processing, transportation of goods); and cultural services (e.g. aesthetics, recreation, fun and inspiration).

Table 1. General Characteristics of the Ocean

Contains 80% of Earth's life
Carries more than 90% of internationally traded goods
Produces more than half of the oxygen we breathe and provides a livelihood for an estimated three billion people who depend on marine and coastal areas, including for fishing, tourism, trade, transport and energy (UN Conference on Sustainable Development 2012 Fact Sheet).
Moderates the planet's climate by absorbing about 90% of the heat trapped in the ever-thickening atmosphere.
Provides the primary source of protein for more than 3.5 billion people.
Fisheries alone contribute \$100 billion per year to the global economy (Food and Agriculture Organization of the United Nations 2014)
13 of the world's 20 megacities are coastal

In reality, these statistics act only as a backdrop to the need for an economy classification specifically related to the ocean and its myriad of goods and services. Half of the world's people live within 100 kilometers of the coast (Small and Nicholls 2003). According to a National Ocean Economics Program study, “In 2010 the ocean economy comprised over 2.7 million jobs and contributed over \$258 billion to the GDP of the United States” (Kildow et al. 2014, 8). Some argue that global ocean economic activity is estimated between \$3 trillion and \$6 trillion (Cicin-Sain 2015). But we don't know for sure.

In addition to this ocean-sized economy, we also want to know what could and should be encompassed in the *new* Blue Economy. The potential of our coasts and ocean to meet sustainable development needs is immense. And, if they can be maintained in and/or restored to a healthy and productive state, the ocean will play an even more important role in humanity's future. In many ways, the coasts and ocean are the final on-ramp to merge onto our road to sustainable development.

3. CHANGES DRIVING THE NEW BLUE ECONOMY

Why don't we know how big the ocean and maritime tech industries are today? Traditional maritime industries such as fishing and shipbuilding no longer dominate the maritime sector in many countries. In addition to these, and the diverse component industries (e.g. fittings makers, engine builders, and other suppliers) that are part of the visible maritime sector, there are sectors that are less visible. Fast growing blue technology companies have remained largely invisible, because 1) they typically sell outside of wherever they are located (and thus they do not belong to the local Chamber of Commerce or Economic Development Agency nor do politicians necessarily know they exist), and 2) because they are so diverse, it is not immediately obvious why they should participate in a larger regional cluster association representing companies that are linked only by being ocean-related.

Additionally, the human relationship with the ocean is changing, and the old ocean economy is adapting to respond to new demands, ecological needs, and the dynamics of global climate change. Goal 14, “*Conserve and Sustainability Use the Oceans, Seas and Marine Resources for Sustainable Development*,” of the recently adopted UN Sustainable Development Goals (SDG) for the global ocean outlines seven targets and three means of implementation relating to the sustainable use of the ocean (see table 2). Particularly noteworthy in this context is target 14.7, which declares, “By 2030 increase the economic benefits to small island developing states (SIDS) and least developed countries (LDCs) from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.” This focus on economic development of SIDs and LDCs is starting to create a shift in management and protection of marine resources and their social and economic impact.

Table 2. UN Sustainable Development Goals and ocean

SDG 14 supports 9 of the other 17 SDGs, thus, SDG 14 is absolutely crucial to building a sustainable future.
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- SDG1 – end poverty
- SDG2 – end hunger
- SDG3 – ensure healthy lives and well-being
- SDG5 -- achieve gender equality
- SDG8 -- promote sustained, inclusive and sustainable economic growth
- SDG9 -- build resilient infrastructure
- SDG10 -- reduce inequality within, and among countries
- SDG11 -- make cities and human settlements safe, resilient and sustainable
- SDG13 -- combat climate change

Source: Neumann and Bryan 2015

How can we carry out SDG 14 unless we know what is included? For that matter, how can we seek sustainable development as outlined by all 17 SDGs? To accomplish this we need to look at: direct, indirect, market goods/services, nonmarket goods/services, public, and private sectors activities from the ocean, in the ocean, and to the ocean.

Part of our problem may be that we need to capture and subtract the externalities that come along with the spectacular employment and economic numbers of some of our unsustainable ocean industries.

We do not really understand and cannot yet isolate data on the status and distribution of the natural capital provided by marine and coastal ecosystems (extractive and non-extractive). Our goal in focusing on national accounts is to measure our ocean and blue economy and be able to present data about those economies. Such data will allow us to monitor change over time and influence policy setting that is important to marine and coastal ecosystem services for the benefit of people and sustainability.

We need baseline data on SDG 14 to measure ecological function as well as trade in goods and services, and how they each change over time. If we have the baseline data, we then need to use it to motivate people to take action when action is needed to address negative movements from that baseline. We must provide policymakers with useful evidence and a framework, and our national accounts are already credible sources of information. We know that there are many intangibles related to how people value the ocean, so we won't be able to measure everything.

But we should measure as much as we can and distinguish between what is sustainable and what is unsustainable. Because, “if you don't measure it, you can't manage it.”

The *new* Blue Economy is an attempt to create a unified, global definition of economic industries and activities that relate to the ocean in order to generate comprehensive and progressive economic health without violating the other goals of sustainable development. It not only takes into consideration the economic benefit to an industry, but also the potential ecosystem service effects. Is the industry sector good for the ocean, benign and neutral for the ocean, or does it harm the ocean and its ecosystem services and thus create costs that can be quantified through various valuation methods?

4. EXAMPLES OF THE TRADITIONAL OCEAN ECONOMY

Much of the traditional ocean economy was short-sighted, unsustainable (it assumed we could dump as much in, and take out as much as we wanted) and put at risk water, food and energy security. The blue economy is not about old versus new in time scale; it is about unsustainable versus sustainable. Are there traditional ocean activities that generate economic returns but that are benign or regenerative for our coasts and ocean? Or, is it all about extraction, pollution and other activities that diminish the ocean's health?

4.1 Offshore oil and gas

Risks associated with offshore oil and gas exploration and extraction include the opportunity for harm during construction of infrastructure and accidental oil spills and release of gas at sea during storage and shipping. For example, a major oil spill in the Arctic would create an insurmountable clean-up issue if oil were to seep under the ice cover and commingle with ice forms. Oil harbors and terminals present the threat of accidental releases from storage or during off-loading. And, major transportation routes of other hazardous substances similarly carry the risk of harm to human infrastructure, water supply, and wildlife resulting from discharges and releases when accidents occur.

4.2 Recreation and commercial fishing

After ocean acidification and climate change, there is no bigger threat to the ocean than overfishing for the global seafood trade. In addition, there are 12 million recreational anglers in the U.S. alone (Conathan 2011). For years, we have used an estimate of \$100 billion as our estimate of the scale of the fishing economy globally. However, there are other numbers used. According to NOAA's 2012 report to Congress, "Fish processing, restaurants, grocery stores, sales of tackle and gas, ice-houses, and a multitude of other businesses are involved with the seafood and fishing supply chain, generating \$183 billion per year in the U.S. economy and more than 1.5 million full- and part-time jobs." And, yet the NOAA Office of Science and Technology says that in 2012 there were \$199 billion in sales impacts generated by U.S. commercial and recreational fishing industries, supporting 1.7 million jobs. What is a sales impact, why is that number 16 billion more, and 200 thousand more jobs? And thus again, perhaps we don't really have a handle on the real scale of the sector.

4.3 Open pen aquaculture

Aquaculture production meets more than half the global seafood need now—and much of the production is land-based. Aquaculture will have to be scaled up to meet the basic protein needs of the expected 2 billion extra mouths by 2050. There are significant reasons to move away from the negative effects of in-ocean finfish and coastal production — both local (pollution, habitat destruction) and broader ecosystem impacts (escaping fish, diseases, parasites, chemical use, discharge of nutrients, microbial pathogens, drugs, herbicides and fungicides). Half of the fish imported into the U.S. in 2014 was a farmed product (given the escalating dietary needs of a booming global population, aquaculture will have to be part of the solution) (Pramod et al. 2014, 103). In this discussion of need, we should remember that the US had roughly 1.25 million metric tons of imported farmed seafood product in 2014 according to NOAA, of which about 870 thousand metric tons was salmon and shrimp, the vast majority of it farmed. So we have to be careful about how we're quantifying "need" to meet future food security. What we are really concerned about are the 1 in 7 people globally who obtain their protein from fish (World Health Organization 2016). In other words, fish are essential to over 1 billion people, and account for more than 50% of animal protein for 400 million individuals in the poorest countries. And, aquaculture attributes to 11 million jobs,

mostly in developing countries (Allison 2011, 18); 50% for women (Mills et al. 2011).

4.4 Shipping

Shipping is already the most carbon efficient means of transporting most goods across the world, but it is still a meaningful emitter of greenhouse gases, acoustic pollution, oil spills and other pollution. The International Maritime Organization estimates that CO₂ emissions from shipping are about 3% of the global human-caused emissions and expects them to continue to rise to meet demand for international trade. As with cruise ships, we are seeing improvements in fuels, propulsion systems, wastewater management, solid waste handling and emissions. This has included some return to high-tech hybrid sailing ships. So, we have an opportunity to make shipping ever cleaner. End of life of ships is another area for potential improvement.

Shipbreaking is the practice of recovering and recycling iron, copper and all sorts of other components from retired or derelict ships. From life jackets to electric cables, a surprising percentage of every ship can be repurposed or recycled, which is a good thing. Unfortunately, as practiced in certain countries, it is a very dangerous and poorly regulated industry with chronic labor abuses and minimal environmental mitigation. In these countries, shipbreaking pollutes the beaches and coastal waters, often at the expense of the seafood supply of local communities.

4.5 Coastal tourism

Simply stated, there is sustainable and responsible tourism; and there is unsustainable and disruptive tourism. Tourism infrastructure can seriously damage coastal areas if not planned with socially and environmentally recognized best practices. Coastlines around the world are under siege from the impacts of inappropriate tourism development. Conventional tourism often marginalizes and displaces local communities. This type of tourism can disturb and threaten local wildlife and their habitats, which attracted the tourist to the area in the first place. We know what the alternatives are, and we know how to pursue them.

4.6 Telecommunications

Submarine cables carry 95% of all global telecommunications, connecting 2.7 billion users and supporting global business, finance, entertainment, etc. (Cicin-Sain 2015). On one hand this facilitates commerce and communications without the need for postal air carrier emissions, but these cables do interact with the benthic zone and thus do cause some minimal harm to the seafloor. For an additional five to 10 percent of the total cost of any new cable system deployed, researchers are making a scientific and social case for “greening” new cables to be built to also collect information on tsunamis and to monitor global change in the deepocean.

5. NEW INDUSTRY SECTORS REFLECTING CHANGES TO THE OCEAN ECONOMY

5.1 Renewable Energy

“Many new emerging technologies designed to address climate change through the development of alternative sources of energy are increasingly being deployed in marine ecosystems. The most promising of these technologies are also the most threatening to marine ecosystems: offshore wind farms; carbon sequestration; tidal and wave energy; and ocean thermal energy conversion (OTEC),” (Spalding and de Fontaubert 2007).

The ocean offers numerous types of renewable energy, including offshore wind, tidal, current, ocean thermal energy conversion, and wave energy. According to a 2008 report from the US Department of Energy, the 28 states bordering the ocean and Great Lakes use 78 percent of the nation’s electricity, thus we can locate production near markets and reduce long distance transmission losses (Conathan and Kroh 2012). For example, we expect offshore wind operations will produce 175 gigawatts of power by 2035. Harnessing the ocean’s renewable energy capacity should be balanced against the potential harm it causes to natural habitats (changes in geomorphology and processes, sedimentation, erosion).

At the same time, we can also balance renewable energy against old school fossil fuel sourced energy. A January 2015 report from Oceana titled “Offshore Energy by the Numbers, An Economic Analysis of Offshore Drilling and Wind Energy in the Atlantic” notes that offshore wind would produce twice the number of jobs and twice the amount of energy as offshore drilling in the Atlantic Ocean. This report also found that “offshore oil and gas development along the Atlantic

could put at risk some of the nearly 1.4 million jobs and over \$95 billion in gross domestic product that rely on healthy ocean ecosystems, mainly through fishing, tourism and recreation.”

5.2 Seabed mining (still potential)

Mining the seabed in any nation’s exclusive economic zones (EEZs) or the deep sea within the high seas (Areas Beyond National Jurisdiction) presents us with numerous threats, including damaging seabed biomass and polluting the water column, which could harm communities dependent on that ecosystem for food. We should adhere to the precautionary principle, particularly in order to avoid the buildup of activities that deplete finite resources and irreversibly damage the ecosystem. As part of this, we need to consider whether or not seabed mining is less harmful than terrestrial mining (as some have asserted). In other words whether one is better than the other for the planet as a whole. And, if seabed mining is better, can we make it as benign as possible?

5.3 Remediation/restoration

Some businesses make money from ecosystem services, and some make money from restoring these ecosystem services. Remediation is a form of the latter. Design, construction, operation, and monitoring of large-scale coastal and marine restoration projects bear the potential for sustaining job creation and increasing ecosystem services vital to supporting existing coastal livelihoods. CAP-Oxfam’s 2011 report “Beyond Recovery” found that every \$1 million invested in wetland restoration can create 29 new jobs, which is nearly six times as many as the oil and gas industries for the same investment. Many of these jobs directly benefit the local community and cannot be outsourced.

According to *Estimating the Size and Impact of the Ecological Restoration Economy*, the domestic ecological restoration sector directly employs approximately 126,000 workers and generates about \$9.5 billion in economic output (sales) annually (BenDor et al. 2015). This activity supports an additional 95,000 jobs and \$15 billion in economic output through indirect (business-to-business) linkages and increased household spending.

5.4 Blue biotechnology

There is the risk of unintended extraction of marine species associated with blue biotechnologies. This field is yet ill defined and poorly regulated. The precautionary principle should be applied to bio-nanotechnology, biomaterials and the introduction of genetically modified fish, shellfish and microorganisms.

5.5 Blue carbon

An entire new category of business is being formed to sell credits for carbon storage and sequestration in coastal and ocean living biomass and sediments. Concern has been raised about commodification of the ocean, but it may be offset by the value of restoring and protecting habitats that provide other benefits such as increased productivity in coastal areas and the attenuation of wave energy in the face of climate change driven sea level rise and storm surges.

5.6 Blue technology

The blue technology sector includes providers of infrastructure, including manufacturers of sensors, instruments, and platforms; those building, deploying, and operating observing systems; providers of the data infrastructure that manages and communicates ocean data; organizations that develop and maintain data management systems, software tools and models; environmental safety and compliance technology companies; marine robotics; and desalination.

5.7 Other examples

Other examples include nutrition, nutraceuticals, cosmetics, fisheries byproduct transformation, and the innovative marine molecules sector.

6. THE NEW BLUE ECONOMY SUBSECTOR

In comparing the traditional ocean economy and the newer entrants to it, how can we define a *new* Blue Economy that moves us away from destructive extraction-focused business sectors that deplete our ocean resources, damage our economy, and cost people jobs? Just because something is new does not make it blue (e.g. seabed mining plans). And, just because something is part of the traditional ocean economic sector doesn't mean it can't make changes. In fact, "dirty" ocean

industries are changing and evolving with the new understanding that the ocean's ability to handle our extraction and dumping is not infinite.

We generally hope to see more sustainable use of biodiversity, such as sustainable fisheries and proper fisheries management. In 2011, then-NOAA Administrator Jane Lubchenco estimated that rebuilding all U.S. fish populations to sustainable levels could generate “an additional \$31 billion in sales impacts, support an additional 500,000 jobs and increase the revenue fishermen receive at the dock by \$2.2 billion... more than a 50 percent increase from the current annual dockside revenues.”

Similarly, we are observing a change from overly intensive (bad) open pen aquaculture that threatens coastal ecosystems and wild populations to more sustainable aquaculture. The new and more sustainable focus includes recirculating, closed systems; farming other marine biomass such as seaweed and micro algae; and, looking at seaweed processing for extraction of high value compounds. As the same time, we are seeing an older form of farming increasing its focus on how mariculture of shellfish can help clean near shore waters.

Cruise tourism is by far the most rapidly growing segment of the entire tourism industry, representing an \$18.4 billion a year industry in the Caribbean alone (Zappino 2005), and is projected to grow globally at 7% annually (World Travel and Tourism Council 2004). However, the average cruise holiday emits around 4 times more CO₂ per person per day than the average hotel stay (Farr and Hall 2015). According to Professor Ross Klein, a cruise industry watchdog, the carbon footprint of a cruise ship is three times worse, per passenger, than that of a Boeing 747 (Klein 2009). However, the newest additions to the cruise ship fleet represent real innovation and positive evolution in propulsion systems, wastewater management, solid waste handling and emissions reduction. Some service providers have added entire cruises dedicated to community assistance through “voluntourism” to meet a growing demand for impact—a sector that will have to be watched carefully in the future.

According to the Joint Ocean Commission Initiative report “America’s Ocean Future,” in 2007 the leisure and hospitality industry in U.S. coastal states supported almost 11 million jobs and more than \$214 billion in wages” (see table 3). According to the UN Chronicle, “coastal tourism is the largest market segment in the world economy, comprising five percent of the global GDP and six to seven

percent of global employment” (Cicin-Sain 2015). The Center for Responsible Travel (CREST) has been spotlighting the innovators in coastal tourism who are pursuing green resorts, and who integrate sustainable development and plans to adapt to climate change induced sea level rise and storm surge events.

Table 3. Aggregate U.S. Coastal State Sources for 2013 (National Ocean Economics Program 2015)

	Establishments	Employment	Wages	GDP
Leisure & hospitality	642,871	11,761,086	\$247,939,397,020	\$507,001,000,000

The global maritime transportation and shipping industry carries 90% of world trade and underpins the global economy. The World Shipping Council members operate about 90 percent of the global liner ship capacity and transport 60 percent of the value of global seaborne trade, or more than \$4 trillion annually. According to *Technological Advances in Maritime Transportation*, “Worldwide seaborne trade has more than quadrupled in the last 40 years and now exceeds 6 billion tons per annum, with an annual growth rate of about 4 percent. Currently some 10,000 shipping companies flying the flags of 150 different countries operate a commercial shipping fleet of roughly 50,000 vessels” (Michel and Noble 2008). And, by weight of goods per mile, even with traditional propulsion technology, maritime shipping has one of the lowest carbon footprints (per pound). This industry is not exactly changing with the *new* Blue Economy (although there are many new tech developments, from more efficient energy sources and lower air pollution to high tech computer directed sails that use the wind to cut on energy use), and maritime shipping does not necessarily care if the ocean underneath it is clean or dirty. Likewise, dredging ports for the ever bigger ships (or even the nearly completed expansion of the Panama Canal) cause localized environmental harm and even economic harm from loss of recreational activities and commercial fishing that has to be taken into consideration.

How does the incorporation of the ocean into national income accounts relate to efforts at assuring the sustainability of our ocean and ocean resources? How do we promote “good for the ocean” business sectors? And how do we share the value of habitat and ecosystem services to coastal nations and communities with decision-makers to inform policy, engineering, and conservation decisions?

Ideally we want to restore the health and productivity of the ocean and return to its maximum capacity to provide ecosystem services. Thus, we need to design and implement sustainable fisheries for worldwide food security with catch limits and enforcement mechanisms that prevent overfishing. We need to move to sustainable forms of aquaculture that maximize the output of needed protein without sacrificing many pounds of feed from the ocean to produce a fewer number of pounds for humans. Entire businesses are being built around restoration of mangroves, seagrass, salt marshes, and reefs to address risk reduction from sea level rise and storm surges (the traditional concrete armoring of the coast and rebuilding of beaches does not represent the new blue economy).

Changes to management and use of ocean resources will be most sustainable when driven by internal demand from their users and beneficiaries rather than by external pressures. We can see some of this already happening as we increase per capita coastal and ocean recreational revenue by looking for sustainable travel and tourism, and reducing the scale and focus on mass tourism (at the risk of being accused of suggesting it should be only for the 1 or 5% and everyone else can do without).

By creating various metrics for the value of ecosystem functions, be it monetary, jobs, fish catches, tons of carbon, harvest biomass, or food security, we can recognize what is at risk, including revenue. Thus, at-risk-based decision-making is facilitated and will hopefully lead to precaution. Precaution that results in action taken to protect these functions or services before the ecosystems that deliver them degrade or begin to fail to deliver expected benefits.

It is also important to note that the same ecosystem services may have very different values for specific users: a cost to commercial fisheries may be a benefit to tourism/recreation, for example. A range of user-centric social, cultural, and economic factors drive ecosystem service values. Thus, promoting one industry sometimes means discouraging or preventing another (areas designated for shipping lanes would be off-limits to wind energy or aquaculture). Some ocean industries may be major economic contributors (oil extraction) but put other sections of the *new* Blue Economy seriously at risk (fisheries, system restoration and remediation, biodiversity and tourism).

The question, then, becomes how we segregate/demarcate Standard Industrial Classification (SIC) codes to track total ocean economy and separately track the

new Blue Economy that is a subset within the global ocean economy. Some experts (Linwood Pendleton, for example) advocate for a regional/coastal approach in which everything within a certain distance of the coast is included in the valuation of the ocean economy. While having ecosystem benefit and marine resource valuation at a regional/coastal level will facilitate local solutions to ocean issues via regional management, assessment, and policy reform, it is not enough. Determining a comprehensive definition for the *new* Blue Economy that excludes unsustainable uses will allow all nations to focus and work collaboratively towards improving ocean management.

Overall, the world needs a common definition of the *new* “Blue Economy” to promote economic benefits of “good for the ocean” industries and activities, while ensuring truly sustainable development. It’s also important to note that civil society can play an important role here, and should expect and demand a level of stewardship, good environmental and social practices, and the use of the precautionary approach when it comes to evolutions in global industry and the ocean in order to promote sustainable use and development. Civil society can and should contribute to defining best practices based on comprehensive research and in consultation with maritime industries, thus defining and implementing the *new* Blue Economy.

7. OTHER EXAMPLES OF ISSUES OR CO-BENEFITS IN DEFINING THE BLUE ECONOMY

New international collaboration is arising from new industries/strategies/projects. For example, the BioMarine International Clusters Association has as its goal to foster international relationships and create business opportunities by connecting SMEs (small and medium-sized enterprises) with market leaders and opening the doors for early stage investment and forging strategic partnerships. We are starting to see blue tech clusters form, such as those in San Diego in the U.S. and Qingdao, Shandong Province in China. These clusters should collaborate in order to facilitate sustainable blue technology development in these communities. This collaboration should be more formal so that this new blue technology is more visible.

We learned from coastal and marine spatial planning exercises that there is an increased competition for space in the sea as new uses collide with the traditional ocean economy activities, and many coastal areas were already supporting diverse,

sometimes overlapping economic activities of all kinds. We know we need better management frameworks so that we can mitigate the likelihood that this increasing congestion will lead to higher accident rates, more oil and chemical spills, and mounting tensions among maritime-based industries, all resulting in more harm to the ocean. To achieve our hoped-for improvement in ocean health, we need efficiency coupled with policy that effectively contains scale and growth to ensure that development stays within the boundaries of the ocean's environment limits. Such strategy requires internalizing environmental costs and setting the right price for goods and services.

8. ISSUES TO CONSIDER AS THE BLUE ECONOMY MOVES FORWARD

How do we engage both the citizen and the consumer to become real actors and influencers in the *new* Blue Economy? We need to think about the best way to teach and train the next generation to prepare them for the challenges around synthesizing research, specialized centers/universities, and policy/management.

How can we shift subsidies away from environmentally harmful activities and towards activities that enhance public goods and ocean resources? And, at the same time, we should strive to ensure that technology and efficiency gains are not outstripped by growth. We should focus on *sustainable* marine economic activities that meet the needs of current and future generations, and not focus on growth for the sake of growth.

How do we account for the “rebound” effect of sustainability in the marine economy? More efficient use of resources can rebound in financial savings from increased efficiency that are then used for additional consumption of goods and services and as a result the environmental benefits of efficiency improvements are negated.

9. THE OCEAN FOUNDATION'S EFFORTS TO FOSTER AND FORMALIZE THE NEW BLUE ECONOMY

We continue to develop our Rockefeller Ocean Strategy as an ocean-centric investment fund with holdings in companies that have products or services that are

“good for the ocean.” Almost by definition, we offer an alternative for those seeking a new investment as they leave behind fossil fuel (oil and gas) holdings as part of the divestiture movement. To date we have raised about \$25M, and we have over 36 months’ track record of performance – and we are now able to seek institutional investors. We are working with Rockefeller & Co to update our marketing packet with this in mind. We still maintain an initial goal of raising \$100M.

To make this portfolio successful, we continue to advise the Rockefeller & Co investment team on ocean threats and trends, emerging coastal and ocean policies as a way to spot investment opportunities. We also review all companies in the portfolio, as well as new companies proposed for the portfolio. Rockefeller & Co looks at whether each company is “investment grade” and runs it through standard corporate social responsibility screens, and we at The Ocean Foundation make certain of the *bona fides* of the “good for the ocean” screen.

And, we can do more to define the *new* Blue Economy. The Ocean Foundation and the Center for Blue Economy are working on a joint proposal for a series of workshops designed to facilitate multinational (Asia, EU and USA) agreement on the identification of the *new* Blue Economy via mutually agreed criteria, industry classification codes etc. “The Oceans in National Income Accounts: Seeking Consensus on Definitions and Standards,” the first workshop, stemming from this collaborative effort was held in Monterey in October 2015. It included 30 representatives from 10 nations brought together to discuss measuring both the ocean economy, and the (new) blue (sustainable) economy in the most fundamental terms: the national accounting classifications for economic activities. These 10 nations had a lot in common in what they list in their ocean economy. In addition, the representatives seemed to be able to easily agree on some additional industry sectors that are part of the ocean economy that not everyone hosts (and thus not everyone lists), which was a positive outcome of this convening. The following working definition came out of this meeting: “The blue economy refers to a sustainable ocean-based economic model and employs environmentally-sound infrastructure, technologies and practices that support sustainable development.” At the end of the symposium, all participants agreed on the need for a long term effort to 1) build a common set of categories, use a common methodology and well defined geographies to measure the market economy of the oceans; and 2) to seek ways to measure natural capital to indicate whether the economic growth is sustainable over the long term, and thus to agree on appropriate methodologies for

each context. And, we need to start now on a balance sheet for ocean resources. Another meeting with additional coastal nations will be held in China in the fall of 2016.

Last fall The Ocean Foundation co-sponsored and co-chaired a Blue Economy roundtable discussion with the House of Sweden (see “Summary from the roundtable discussion on Blue Growth” on The Ocean Foundation’s blog). The purpose of the roundtable was to identify ways to achieve closer trans-Atlantic collaboration and cooperation, including: how can the blue growth agenda contribute to reversing the current decline of ocean health and at the same time create jobs and wealth? How can we ensure the integrity of ocean ecosystem services and make their value visible? What are our roles and responsibilities?

And, we can help with the valuation of natural capital. We partnered with JetBlue to look at the real value of natural systems (clean beaches, healthy mangroves, and vibrant reefs) in the Caribbean and how they relate to the bottom line of travel and tourism providers. The resulting “Eco-Earnings: A Shore Thing” report highlighted the connection between such healthy ecosystems and increased revenue confirming that clean, unspoiled beaches should be recognized as the main driver for Caribbean leisure travel. These valuable assets undoubtedly drive airline ticket and destination demand. And, we have started down the road of developing analytical evidence specific enough to matter to industry’s decision-making and bottom line.

10. CONCLUSION

The ocean generates economic values that are not usually quantified (non-market data, including ecosystem services values). And, often there is no consensus on how to quantify these non-market values. In addition, the losses resulting from unsustainable use of coastal and marine resources and environmental degradation are not usually captured. We need a long-term effort to seek ways to measure natural capital to indicate whether the economic growth is sustainable over the long term (and value ecosystem goods and services), and agree to appropriate methodologies for each context. Thus, we need to start now on a balance sheet for ocean resources.

Our understanding of the ocean economy is changing as it is further studied and defined. In turn, industry sectors are being created or evolving to reflect demands for efficiency, sustainability and stewardship. Thus, this examination and categorization of the Blue Economy is timely. Let's make sure we rethink and define the *new* Blue Economy in such a way that ensures the sustainable economic growth and development of the resources and services of the ocean on which we all rely. At the core of the *new* Blue Economy concept is the de-coupling of socioeconomic development from environmental degradation. We are measuring as a subset of the entire ocean economy that has regenerative and restorative activities that lead to enhanced human health and well-being, including food security and creation of sustainable livelihoods.

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