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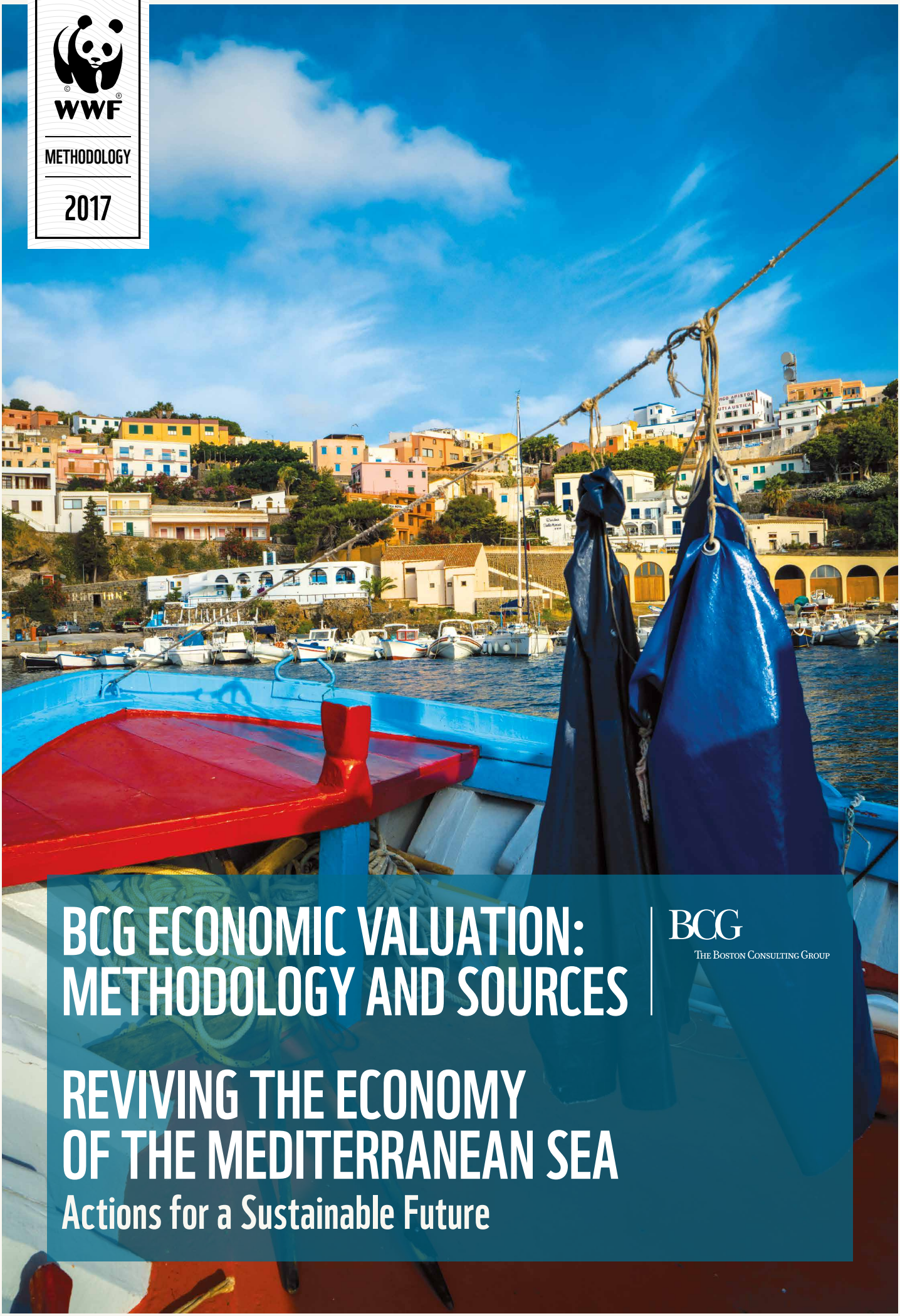

BCG ECONOMIC VALUATION: METHODOLOGY AND SOURCES

BCG
The Boston Consulting Group

REVIVING THE ECONOMY OF THE MEDITERRANEAN SEA

Actions for a Sustainable Future

Front cover
View of Ustica from a fishing boat returning to the harbour
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WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

The designation of geographical entities in this report, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of WWF concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Published in September 2017 by WWF – World Wide Fund For Nature (Formerly World Wildlife Fund).

Citation of this report: WWF, 2017. BCG Economic Valuation: *Methodology and Sources. Reviving the Economy of the Mediterranean Sea: Actions for a Sustainable Future*. WWF Mediterranean Marine Initiative, Rome, Italy. 19 pp.

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This report is available at: ocean.panda.org

Contents

Ocean annual and asset-valuation methodology & sources

This methodology document produced by the Boston Consulting Group (BCG) provides supplemental information to the discussions on economic value in the report *Reviving the Economy of the Mediterranean Sea: Actions for a Sustainable Future* and illustrated by Figure 1 of the same report (pp 18-19).

The assumptions, analysis and data sources that inform the Mediterranean Sea's annual contribution ("gross marine product") and asset-valuation ("shared wealth fund") are outlined in this methodology document. BCG's intent was to triangulate and refine existing primary research at the regional scale adapted from the global report, *Reviving the Ocean Economy: The case for action – 2015*, published by WWF International. The full report can be found at ocean.panda.org.

The analyses are partly based on information that has not been generated by BCG and has not, therefore, been fully verified. The information, opinions and analyses contained here are based on sources believed to be reliable and comprehensive but no representation, expressed or implied, is made as to the accuracy, completeness or correctness of the original methods used to gather the primary data.

Furthermore, the analyses and conclusions contained in this document are based on various assumptions that BCG has developed regarding economic growth, and the current and future state of the Mediterranean Sea (based upon factors and events subject to uncertainty). Of course, future results or net present values (NPV) derived from forecasted results could thus be materially different.

We welcome constructive comments and contributions (published regional economic valuation papers regional valuation references) to help improve the economic analysis further. We can also share the spreadsheet which contains our calculations, upon request.

Terminology

What is the "gross marine product" (GMP) and how does it relate to gross domestic product (GDP)?

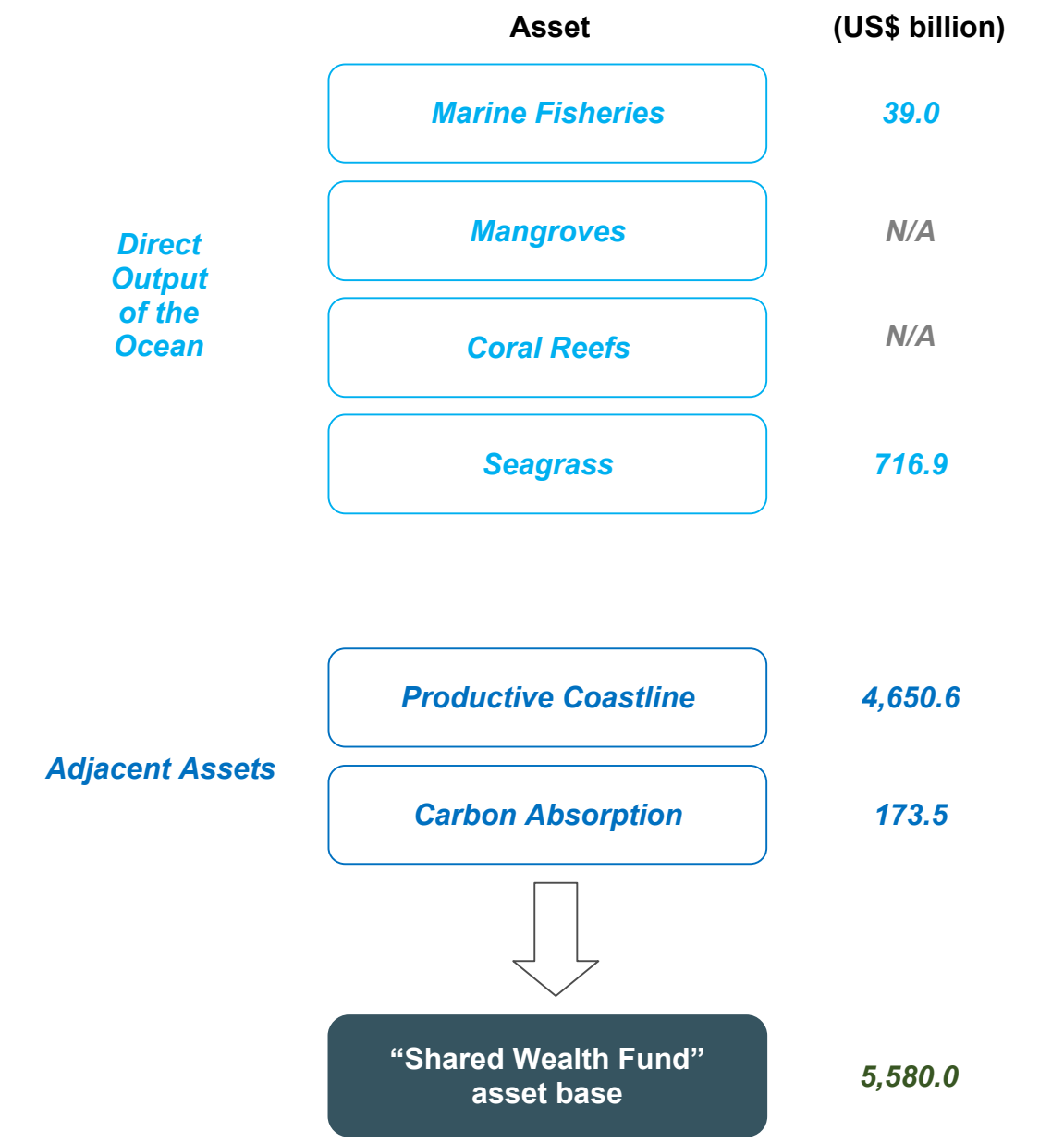
This report introduces the measurement "gross marine product", or GMP, to allow comparison to the national economies of the Mediterranean region. GMP is the value of the annual economic output of the ocean. GMP directly calculates the *output* of marine-related industries, as well as the benefit received from some natural processes, such as carbon sequestration by seagrass. However, shipping activities, trade and oil & gas have been excluded from the analysis, to avoid inflation of the value, to prevent overlap of allocation from global activities in these industries and because these sectors do not benefit from a healthy" sea.

What is an ocean "shared wealth fund"?

The ocean "shared wealth fund" leverages the analogy made in the *Reviving the Ocean Economy: The case for action – 2015 report*. The "shared wealth fund" is an attempt to calculate the total asset base of the ocean in the Mediterranean region, from which annual economic production (i.e. GMP) is drawn. For the marine assets of the Mediterranean Sea, this has been conservatively estimated at US$ 5.6 tn. The ocean "shared wealth fund" is the overall asset value of the Mediterranean Sea, based on market value of assets (for marine fisheries) or on net present value (NPV) of assets' cash flows (for all other elements of ocean "shared wealth fund")

Total Mediterranean "shared wealth fund" by asset categories valued at US$ 5.6 tn

Seven primary 'value-generating' asset categories



The total asset value of US$ 5.580 bn is an aggregate of the most readily measured ocean assets within the Mediterranean Sea. Assets included in this analysis are: productive coastlines, marine fisheries, carbon sequestration and seagrass. The latter is included as a marine ecosystem that generates a service that can be consumed directly from the ocean and is valued at US$ 716.9 bn (13% of total assets), while marine fisheries make up US$ 39.0 bn. The remaining two are adjacent assets, which provide functional benefits that are utilized indirectly they are valued at US$ 4824.1 bn and include productive coastlines (focussed on tourism) and carbon absorption. All of these assets are dependent on the sound ecological function and wellbeing of the ocean environment to generate value. The calculations for arriving at these sums are available upon request.

These categories are not a collectively exhaustive list but aim to tackle main buckets where primary analysis exists.

Methodology: In order to value each asset class two different methods were utilized:

1. **Market Based:** Derived asset value looking at quantity of a resource priced at its current market value

2. **Value Based:** Implied asset value ascertained by identifying annual value generation of the asset, and conducting a Net Present Value (NPV) of future years

For several of the asset categories, a hybrid or modified version of the two above methods was employed to better estimate and triangulate total asset value.

- **Net Present Value Calculations**

  For all calculations utilizing the NPV method, certain assumptions were established to ensure consistency and accuracy.

  In order to appropriately calculate the net present value of our asset classes, we needed to determine an appropriate global risk-free rate and global risk premium. We leveraged a report from 2013, which calculated "Market Risk Premium and Risk Free Rate Used for 51 countries in 2013" (survey n= 6,237). The researchers surveyed "finance and economics professors, analysts and managers of companies obtained from previous correspondence, papers and webs of companies and universities" and asked them to share the "Free Rate and the Market Risk Premium (MRP) used 'to calculate the required return to equity in different countries'". Based on these results, we calculated the arithmetic mean across these 51 countries, to determine **the global risk free rate (4.1%) and global risk premium (7.1%) for our NPV calculations**.

  Source: Market Risk Premium and Risk Free Rate used for 51 countries in 2013: a survey with 6,237 answers Pablo Fernandez, Javier Aguirreamalloa, and Pablo Linares (IESE Business School, 2013) http://www.scribd.com/doc/185124918/02-2-Market-Risk-Premiumand-Risk-Free-Rate-Survey#scribd

Definitions:

A **net present value** requires specification of the number of future years being considered

(e.g. 10 years, 50 years, infinity) and a discount rate, which is the sum of the risk free rate and risk premium to represent the fact that society places a greater value on current benefits than future benefits.

A **risk-free interest rate** is the theoretical rate of return of an investment with no risk of

financial loss. One interpretation is that the risk-free rate represents the interest that an investor would expect from an absolutely risk-free investment over a given period of time.

A **risk premium** is the return in excess of the risk-free rate of return an investment is expected to yield; an asset's risk premium is a form of compensation for investors who tolerate the extra risk, compared to that of a risk-free asset, in a given investment.

For each asset category, methodology and sources are provided:

- **Marine Fisheries**

  Type of Valuation: Market Based

  Calculation: Total productive fish bio-mass (in tons) multiplied by an implied market price for 1 ton of fish multiplied by the Mediterranean's EEZ share of total global sea area

  Considerations: It does not take into account supply and demand elasticity, recognizing that the larger the supply becomes, lower prices are expected. Additionally, this figure does not distinguish between readily catchable and common fish varieties, and those fish categories that may not be in high market demand, or that are too difficult to feasibly catch (e.g. deep-sea varieties). Due to lack of definitive references and quantitative data, we were unable to make adjustments to account for region specific information (e.g. impact of climate change on fish distribution). Should more granular data or region specific data become available, a more precise valuation could be performed.

  Though the value of fisheries may seem low relative to the overall asset base in the Mediterranean, other analyses suggest that fisheries typically only account for ~1% of national GDP.

  Primary Sources:

  - **Total Fish:**
    Wilson RW, Millero FJ, Taylor JR, Walsh PJ, Christensen V, Jennings S and Grosell M (2009)"Contribution of Fish to the Marine Inorganic Carbon Cycle" Science, 323 (5912) 359-362.
  - **Market Value of fish:**
    OECD-FAO Agricultural Outlook (Fisheries) 2014-2023:
    http://stats.oecd.org/
  - **EEZ area:**
    UBC Sea Around Us database (Industrial, Artisanal)
    http://www.seaaroundus.org/data/#/eez
  - **Total ocean coverage:**
    NOAA (National Centers for Environmental Information) database
    http://www.ngdc.noaa.gov/mgg/global/etopo1_ocean_volumes.html
  - **Inflation rate**
    World Bank (consumer price annual inflation rate)
  - **Fisheries contribution to GDP:**
    Sauzade D., Rousset N. (2013). Greening the Mediterranean fisheries: tentative assessment of the economic leeway. Plan Bleu, Valbonne.
    http://planbleu.org/sites/default/files/publications/greeningmediterraneanfisheries.pdf

- **Mangroves**

There are no mangrove forests in the Mediterranean Sea, therefore this category has been excluded from the Mediterranean analysis.

- **Coral Reefs**

  There are no significant coral reefs in the Mediterranean Sea, therefore this category h excluded from the Mediterranean analysis

- **Seagrass**

  Type of Valuation: Value based (using some market assumptions – i.e. quantity of resource)

  Calculation: Net present value of all future seagrass values based on the following assumptions:

  A. Total seagrass: 1.2 million hectares

  B. Degradation of Sea Grass: -1.5% yearly

  C. Value derived from Sea Grass = US$ 26,279 per hectare (applied for each year, not adjusted for forecasted inflation as we want NPV in current dollars)

  D. Discount rate: Average global risk free rate

  E. No risk premium – decision made not to apply risk premium to natural assets (only on assets directly connected to industrial / market output)

  Consideration: Benefits from provisioning services from seagrass have been excluded in order to avoid double counting (e.g. with marine fisheries/carbon fixation).

Primary Sources:

- **Total Sea Grass:**
  Telesca, Luca, et al. "Seagrass Meadows (*Posidonia Oceanica*) Distribution and Trajectories of Change." *Sci. Rep. Scientific Reports* 5 (2015): 12505. Web. <http://www.nature.com/articles/srep12505>.

- **Value generation:**
  De Groot, Rudolf et al. "Global estimates of the value of ecosystems and their services in monetary units" (2012) 55 <http://www.sciencedirect.com/science/article/pii/S2212041612000101>

  Costanza, Robert et al. "Changes in the global value of ecosystem services". Global Environmental Change 26 (2014) 152-158 <http://www.sciencedirect.com/science/article/pii/S0959378014000685>

- **Asset degradation:**
  Telesca, Luca, et al. "Seagrass Meadows (*Posidonia Oceanica*) Distribution and Trajectories of Change." *Sci. Rep. Scientific Reports* 5 (2015): 12505. Web. <http://www.nature.com/articles/srep12505>.

- **Productive / Destination Coastlines**

Note: productive coastline asset value is calculated as the net present value of coastal tourism activity. Coastal tourism includes consumptive and non-consumptive activities in coastal zones. Consumptive activities include fishing, shell fishing, etc., whereas non-consumptive activities include swimming, diving, boating, surfing, wind-surfing, jet skiing, bird watching, and snorkelling.

Type of Valuation: Value Based

Calculation: Net present value of all future coastal production (tourism-based) values based on the following assumptions:

A. Total value produced annually: US$ ~297 million (taken from yearly calculation)

B. Perpetual growth rate: 1% (based on global report methodology)
Note: BCG's analysis concludes that only 27 per cent of potential coastlines are utilized by human development. It is likely this will continue to rise in the coming decades, however this also may diminish value of this and other connected assets – thus a conservative perpetual growth of 1 per cent was used.

C. Discount rate: Average global risk free rate + average global risk premium

D. Risk premium – decision made to apply risk premium to all assets deriving value from industrial / market based sources.

Primary Sources:

- **Coastal tourism value**
  Coastal Value annual assessment – see below sections for methodology.

Secondary Sources:

- World Wildlife Fund. Marine Problems: Tourism and Coastal development
  http://wwf.panda.org/about_our_earth/blue_planet/problems/tourism/
- UNWTO. Tourism Highlights. 2014 Edition
- World Wildlife Fund – Blue Plan: Coasts
  http://wwf.panda.org/about_our_earth/blue_planet/coasts/
- Sustainable Development of Tourism – UN World Tourism Organization. Coast Project.
  http://sdt.unwto.org/en/content/coast-project
- World Ocean Review. Coasts
  http://worldoceanreview.com/en/wor-1/coasts/living-in-coastal-areas/2/
- Intergovernmental panel on Climate Change. "Increasing human utilization of the coastal zone"
  http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch6s6-2-2.html
- NOAA – State of the Coast
  http://stateofthecoast.noaa.gov/population/welcome.html
- UN Atlas of the Oceans
  http://www.oceansatlas.org/servlet/CDSServlet?status=ND0xODc3JjY9ZW4mMzM9KiYzNz1rb3M~
- Estimates of Coastal Populations
  http://www.rockefeller.edu/labheads/cohenje/PDFs/256Cohensmall.htm

- **Carbon absorption**

  Carbon sequestration rates were applied to area of natural assets that sequester carbon (seagrass) and the total weight of carbon multiplied by the cost of carbon

  Type of Valuation: Value and market based

  Primary Calculation: Net present value of future expected carbon sequestration from sea grass, multiplied by market price of carbon

  A. Estimated annual value of carbon sequestration from biological processes over the entire Mediterranean basin: ~15 bn US$ per year

  B. Discount rate: average global risk free rate + Average global risk premium

  C. Risk premium – decision made to apply risk premium to all assets deriving value from industrial / market based sources

Primary Sources:

- **Annual value of carbon sequestration**
  Canu, Donata Melaku, et al. "Estimating the Value of Carbon Sequestration Ecosystem Services in the Mediterranean Sea: An Ecological Economics Approach." *Global Environmental Change* 32 (2015): 87-95. Web. <http://www.sciencedirect.com/science/article/pii/S0959378015000278>

- **Asset degradation:**
  Telesca, Luca, et al. "Seagrass Meadows (*Posidonia Oceanica*) Distribution and Trajectories of Change." *Sci. Rep. Scientific Reports* 5 (2015): 12505. Web. <http://www.nature.com/articles/srep12505>.

Secondary Sources:

Van Bochove J., Sullivan E., Nakamura, T. (eds) UNEP WCMC Cambridge, 128 Pp

Annual Value Generated from the Mediterranean's 'Ocean Economy' is ~450 bn US$

The analysis in part 1 of the report demonstrates the annual economic value of sea-related activities[1,2] in the Mediterranean. The Mediterranean Sea's GMP makes up ~18% of the global GMP. In comparison to the total Ocean Area, the Mediterranean Sea makes up ~1% of the total global Ocean area.

We determined the annual economic value range using a bottom-up analysis. This was conducted by categorizing and evaluating the annual economic value for ocean-related goods and services in the Mediterranean.

Methodology

We conducted a "bottom-up" analysis to estimate the annual economic value generated by marine-related industries. Where data was unavailable top-down estimates have been made and were used to assign a specific value to the sub categories. Marine industries were broken down into 5 primary categories, each with respective services allocated within. The below list is not exhaustive and only takes into account the primary activities related to the sea. This analysis is decidedly conservative in its approach, and only values what we are capable of assessing and quantifying. Thus, the true yearly economic value of the sea in tangible and intangible terms may be much higher.

Please see below for the activities that comprise each category:

- Direct output of the sea: Fishing/seafood related activities, marine renewable energy
- Services enabled by the sea: Education & training, research & development, sea surveying, cruise industry, marine tourism, and security & control
- Adjacent benefits of the sea: Coastal tourism, carbon sequestration, coastal protection, and marine biotechnology
- Trade & transportation within the sea: Shipping & transport, ship building, naval shipbuilding, yacht & boat building, marine equipment, ports, marine services, submarine telecoms, marine IT, underwater vehicle industry, and underwater technology – *has been excluded from this analysis*
- Other intangible benefits of the sea: *has been excluded from this analysis*

Once all primary industries were identified, and placed into the categorization framework, we calculated the annual value generated for each sub-category. Publicly available data for the regional / country value for each of the industries is not fully available for some activities, with some data estimated from the past, or extrapolated from a global number used in the global report. Multiple publicly available sources were leveraged and triangulated to arrive at a fair and estimated amount for each respective industry. For certain industries where past information was available, but not most recent data, historical CAGR (compound annual growth rate) was calculated and used to estimate current economic value.

Additionally, all oil & gas production revenue and expenditures are not included in this overall analysis. The contribution of yearly off-shore production, in conjunction with potential off-shore reserves and annual oil & gas expenditures such as oil rigs, LNG containers, etc, would inflate the true value of an industry that would remain operational with or without the sea.

Please see below for the methodology leveraged to arrive at market estimate (for source information please see primary source citation):

[1] The numbers presented in the report do not represent a net value as they do not exclude costs

[2] Intangible benefits defy formal economic assessment, yet, carbon storage and ecosystem services by seagrass has been included to better reflect the contribution of a healthy sea.

Ocean related activities

Direct output of the ocean

Marine fisheries (Industrial)

This category comprises of offshore and coastal marine fisheries.

Methodology

- According to the latest General Fisheries Commission for the Mediterranean (GFCM) report "The State of Mediterranean and Black Sea Fisheries 2016" (2016), fisheries in the Mediterranean and the Black Sea account for a minimum of 3.09 bn US$ at constant 2005 prices. We have taken the total value of fisheries and subtracted the value of the Black Sea, resulting in a value of ~2.5 bn US$ at constant prices of 2005. This was converted using the below calculator to 2015 prices. The new value used in the model is 3.1bn US$ for industrial, semi-industrial and small-scale fishing.

Primary Sources:

- **GFCM Report 2016 on the state of fisheries**
  The State of Mediterranean and Black Sea Fisheries 2016
  http://www.fao.org/3/a-i5496e.pdf

- **Conversion**
  http://stats.areppim.com/calc/calc_usdlrxdeflxcpi.php

Marine fisheries (subsistence & recreational)

Comprises marine fisheries (subsistence) and marine fisheries (recreational)

Methodology

- Weight of fish multiplied by price of fish for total value of marine fisheries
- Weight of fish obtained by extrapolating total region fish catch in 2010 by applying historical 2006-2010 CAGR, 2009-2010 CAGR used for Malta due to one-off spike in fish capture
- 2015 price of fish obtained from OCED FAO Outlook database

Primary Sources:

- **Marine fisheries (subsistence) and marine fisheries (recreational) fish weight**
  UBC Sea Around Us database (Industrial, Artisanal) http://www.seaaroundus.org/data/#/eez

- **Price of fish:**
  OECD-FAO Agricultural Outlook (Fisheries) 2015-2024
  http://stats.oecd.org/

Aquaculture

Methodology

- Weight of fish multiplied by price of fish for total value of aquaculture
- Weight of fish obtained by extrapolating total region fish catch in 2013 by applying historical CAGR. Used different historical CAGRs – 2009-2013 for Albania, Algeria, Bosnia & Herzegovina, Lebanon, Libya, Morocco, Palestine, Slovenia, Spain, Syria, and Turkey; 2011-2013 for Croatia, Cyprus,

Egypt, France, Greece, Israel, Italy, Monaco, Montenegro, and Tunisia. Growth rates were selected to choose more conservative estimates due to high variability in catch data which could potentially skew growth rates.
- 2015 price of fish obtained from OCED FAO Outlook database

Primary Sources:

- **Aquaculture fish weight**
  FAO aquaculture data
  http://www.fao.org/fishery/statistics/global-aquaculture-production/en

- **Price of fish:**
  OECD-FAO Agricultural Outlook (Fisheries) 2015-2024
  http://stats.oecd.org/

Marine renewable energy

Methodology

- Scaled down global marine renewable energy number to the Mediterranean based on top-down Mediterranean GMP estimate as a percentage of global GMP (8.9%)
- Global marine renewable energy value based on 2014 expenditures on marine renewable energy (e.g. tidal and wave) excluding off-shore wind expenditures due to their dependence on wind, and their lack of dependence on the sea to remain operational.

Primary Sources:

- **Borderless. "Wave & tidal energy spend to hit US$1.2bn by 2015."**
  http://borderless.net/content/wave-and-tidal-energy-spend-hit-us12bn-2015

- **WTSH, KIEL & Douglas Westwood. "World Marine Markets."**
  http://www.schleswigholstein.de/MJKE/DE/EuropaOstseepolitik/Meerespolitik/Download/studieWorldMarine__blob=publicationFile.pdf

Direct services enabled by of the ocean

Marine tourism

Methodology

- Total marine and coastal tourism calculated by applying % of tourism attributable to marine ecosystems to total tourism receipts[3]
- Total tourism receipts comprise of international tourism receipts and domestic tourism spending
  - International tourism receipts unavailable for Bosnia & Herzegovina, Libya, Monaco, Palestine, and Syria. Took the average % that international tourism receipts accounts for of total GDP for the other Mediterranean countries to estimate international tourism receipts for these countries.
  - Domestic tourism receipts unavailable for Monaco and Palestine. Took the average % that international tourism receipts accounts for of total GDP for the other Mediterranean countries to estimate international tourism receipts for these countries.

[3] Due to lack of relevant literature and statistics, the totality of marine and coastal tourism is assumed dependent on a healthy sea.

- Where latest tourism receipt numbers were not available, historical CAGR for each country was applied to the latest available data point
    - Marine and coastal tourism split is based on marine & coastal tourism proportion from the global report "Reviewing the Ocean Economy - The case for Action 2015" (marine tourism – 27%, coastal tourism –73%) . https://c402277.ssl.cf1.rackcdn.com/publications/790/files/original/Reviving_Ocean_Economy_REPORT_low_res.pdf?1429717323

Primary Sources:

- **International tourism receipts**
  World Bank
  http://data.worldbank.org/indicator/ST.INT.RCPT.CD

- **Domestic tourism spending**
  WTTC
  http://www.wttc.org/datagateway/

- **% tourism attributable to marine ecosystems**
  Eurostat: Tourism Statistics at Regional Level
  <http://ec.europa.eu/eurostat/statistics-explained/index.php/Tourism_statistics_at_regional_level>

Cruise industry

Methodology

- Cruise industry value calculated by aggregating estimates for total cruise market size by country.
- Data was only available for a subset of countries: Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Malta, Morocco, Slovenia, Spain, and Turkey.
- Where only historical data were available, used the CAGR for the years with available data to bring the estimate to 2015.

Primary Sources:

- **Cruise industry market size in Croatia, Egypt, France, Greece, Israel, Morocco, Slovenia, Spain, and Turkey:**
  Euromonitor International Cruise Market Data

- **Cruise industry market size in Cyprus and Malta:**
  Cappato, Alberto. *Cruises and Recreational Boating in the Mediterranean*. Plan Bleu.

Education & training

Methodology

- Scaled down global education & training number to Mediterranean based on top-down Mediterranean GMP estimate as a percentage of global GMP (8.9%)
- Global education & training value based on annual expenditures derived from "Marine industries global market analysis" report and grown at historic 5 year CAGR rate of 3%. Data in euro converted to US$ at 2014 exchange rate.

Primary Sources:

- **Global education and training value**
  Marine Industries Global Market Analysis. Vol. 1. Douglas-Westwood Limited, Mar. 2005. <http://oar.marine.ie/bitstream/10793/559/1/Foresight%20Series%201%20Marine%20Industries%20Global%20Market%20Analysis.pdf>.

Research & development

Methodology

- Scaled down global research & development number to Mediterranean based on top-down Mediterranean GMP estimate as a percentage of global GMP (8.9%)
- Global research & development value based on annual expenditures derived from "Marine industries global market analysis" report and grown at historic 5 year CAGR rate of 2%. Data found in Euros and converted to US$ at 2014 exchange rate.

Primary Sources:

- **Global research and development value**
  Marine Industries Global Market Analysis. Vol. 1. Douglas-Westwood Limited, Mar. 2005. <http://oar.marine.ie/bitstream/10793/559/1/Foresight%20Series%201%20Marine%20Industries%20Global%20Market%20Analysis.pdf>.

Ocean survey

Methodology

- Scaled down global research & development number to Mediterranean based on top-down Mediterranean GMP estimate as a percentage of global GMP (8.9%)
- Global ocean survey value based on annual expenditures derived from "Marine industries global market analysis" report and grown at historic 5 year CAGR rate of 3%. Data found in Euros and converted to US$ at 2014 exchange rate.

Primary Sources:

- **Global ocean survey value**
  Marine Industries Global Market Analysis. Vol. 1. Douglas-Westwood Limited, Mar. 2005. <http://oar.marine.ie/bitstream/10793/559/1/Foresight%20Series%201%20Marine%20Industries%20Global%20Market%20Analysis.pdf>.

Security & control

Methodology

- Scaled down global security & control number to Mediterranean based on top-down Mediterranean GMP estimate as a percentage of global GMP (8.9%)
- Global security & control value based on annual expenditures derived from total expenditures on Maritime related security for 2014.

Primary Sources:

- **Global security & control value**
  Marine Industries Global Market Analysis. Vol. 1. Douglas-Westwood Limited, Mar. 2005. <http://oar.marine.ie/bitstream/10793/559/1/Foresight%20Series%201%20Marine%20Industries%20Global%20Market%20Analysis.pdf>.

Adjacent benefits of the ocean

Coastal tourism

Methodology

- Total tourism receipts comprise of international tourism receipts and domestic tourism spending
  - International tourism receipts unavailable for Bosnia & Herzegovina, Libya, Monaco, Palestine, and Syria. Took average % of total GDP that international tourism receipts account for, for the other Mediterranean countries to estimate international tourism receipts for these countries.
  - Domestic tourism receipts unavailable for Monaco and Palestine. Took the average % that international tourism receipts accounts for of total GDP for the other Mediterranean countries to estimate international tourism receipts for these countries.
- Where latest tourism receipt numbers were not available, historical CAGR for each country was applied to the latest available data point
- % of tourism attributable to a healthy marine environment based on different studies done for each country
  - Marine and coastal tourism split is based on marine & coastal tourism proportion from the global report "Reviewing the Ocean Economy – The case for Action 2015" (marine tourism – 27%, coastal tourism – 73%) https://c402277.ssl.cf1.rackcdn.com/publications/790/files/original/Reviving_Ocean_Economy_REPORT_low_res.pdf?1429717323

Primary Sources:

- **International tourism receipts**
  World Bank
  http://data.worldbank.org/indicator/ST.INT.RCPT.CD

- **Domestic tourism spending**
  WTTC
  http://www.wttc.org/datagateway/

- **% tourism attributable to marine ecosystems**
  Eurostat: Tourism Statistics at Regional Level
  <http://ec.europa.eu/eurostat/statistics explained/index.php/Tourism_statistics_at_regional_level>

Carbon sequestration

Comprises of carbon sequestration of seagrass

Methodology

- Carbon sequestration value taken from a report that determines the annual value of carbon sequestration from biological processes in seagrasses.

Primary Sources:

- **Annual value of carbon sequestration**
  Canu, Donata Melaku, et al. "Estimating the Value of Carbon Sequestration Ecosystem Services in the Mediterranean Sea: An Ecological Economics Approach." Global Environmental Change 32 (2015): 87-95. Web. <http://www.sciencedirect.com/science/article/pii/S0959378015000278>

Coastal protection

Methodology

- No data available for the Mediterranean, therefore this category has been excluded from the analysis.

Marine biotechnology

Methodology

- Marine biotechnology market estimated by scaling down global market for marine biotechnology to Mediterranean based on top-down Mediterranean GMP estimate as a percentage of global GMP (8.9%)
- Global market for marine biotechnology was provided for 2008, and adjusted to get to 2015 based on growth rate provided (4%)

Primary Sources:

- **Global marine biotechnology market**
  Global Industry Analysts Inc. (2013). *Marine Biotechnology: A Global Strategic Business Report*., http://www.strategyr.com/marine_biotechnology_market_report.asp *(Referenced in Regional State of the Coast Report: Western Indian Ocean, page 407)*

The Mediterranean Sea in numbers

100% RECYCLED

ONLY 7.14%

of the Mediterranean Sea is under some form of protection

US$5.6 tn

The overall value of ocean assets in the Mediterranean Sea is more than 5.6 trillion US$

5th

The economic output of the Mediterranean Sea makes it the fifth largest economy in the region

250 MILLION

About 250 million people (or 55% of the total population) resides in coastal hydrological basins

WWF

Why we are here

To stop the degration of the planet's natural environment and to build a future in which humans live in harmony with nature.

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