OCEAN HEALTH INDEX 2013: RESULTS SUMMARY
October 8, 2013

Introduction to the Ocean Health Index

What is the Ocean Health Index?
The Ocean Health Index is the first assessment tool that scientifically compares and combines key elements from all dimensions of the ocean’s health – biological, physical, economic and social—to measure how sustainably people are using the ocean.

What is Ocean Health?
A healthy ocean sustainably delivers a range of benefits to people now and in the future.

How does the Index work?
It tracks a portfolio of ten goals that people have for a healthy ocean and scores how well coastal countries and their marine territories optimize their potential ocean benefits.

What’s the difference between a goal and a benefit?
Each goal expresses a broad, long-term purpose, optimizing a sustainable flow of benefits to people. Benefits are the specific and measurable goods (e.g. fish), services (e.g. coastal protection) or cultural values (e.g. sense of place) that the ocean provides.

How were the goals selected?
Participating scientists, economists and sociologists reviewed existing studies of what people want and expect from the ocean, then grouped them into the ten categories called ‘goals’.

Are some goals more important than others?
They may be for some countries, but at the global level the Index weights all goals evenly. Nations could re-value goals as part of a country-level Ocean Health Index study.

How is a goal scored?
Each goal scores from 0 to 100. The amount of each benefit is compared with a sustainable reference point. The most recent value, ‘present status,’ forms half of the score. The other half, ‘likely future status’ is based on three things: the average rate of change for status (status Trend) during the most recent five years, the cumulative Pressures that will harm future benefits and the cumulative Resilience actions (e.g. treaties, laws, enforcement, habitat protection) that can reduce pressures and maintain or raise future benefits. The Index uses more than one hundred global databases and strives to use the most current data available. It is updated and improved annually. Detailed methods and data are at: www.oceanhealthindex.org/about/methods
What drives goal scores?

Present Status makes up 50% of each goal score, status Trend makes up 33% and the balance between Pressures and Resilience makes up 16%. Thus 83% of a goal score reflects how sustainably a goal’s benefits have actually been achieved during the recent five years. Pressures and Resilience are ultimately important for scores, but are weighted lower because we can only approximate their effects. Individual pressures are ranked for their importance to different goals. Resilience actions are the only ways we can change a score, because they can reduce pressures, protect ocean habitats and species, improve status and optimize benefits to people. Without effective Resilience, negative trends will continue. New resilience measures improve scores gradually, because status Trend must shed five years of pre-resilience values, but each year should bring more rapid improvement.

<table>
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<tr>
<th>Present Status (50% of goal score)</th>
<th>Likely Future Status (50% of goal score)</th>
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<tbody>
<tr>
<td>Is the goal’s present value (represented by the most recent data available) compared to a goal-specific reference point.</td>
<td><strong>Trend</strong> (33%) is the average percentage change in Status shown by the most recent five years of data. <strong>Pressure</strong> is the sum of the ecological and social pressures likely to depress near-future scores for a goal. <strong>Resilience</strong> is the sum of ecological factors (if any) and social initiatives (policies, laws etc.) enacted that can reduce pressures and therefore increase near-future scores for a goal.</td>
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How is a country’s score calculated?

A country’s score is the average of its goal scores. Goals not applicable to a country are not scored or averaged. The score for a country with more than one Exclusive Economic Zone (EEZ) is the area-weighted average of its several EEZ scores. Scores are calculated for 221 EEZs, representing all of the world’s 151 coastal countries and their territorial holdings.

How is the global score calculated?

The global Ocean Health Index score is the area-weighted average of scores for all EEZs.

What about the High Seas?

The term ‘High Seas’ refers to waters beyond national jurisdiction. The Ocean Health Index will assess those international waters, as well as waters around Antarctica, and include them in results for 2014. Scores for 2013 only evaluate waters out to 200 nm offshore from coastlines.

What does the score mean?

All scores range from 0 to 100.

• ‘100’ means that the evaluated system has achieved its defined target (reference point), is sustainably delivering all of the specified benefits that it can and is likely to continue doing so in the near future.

• ‘0’ means that global data were available, but that the country either did not achieve any of the available benefits or that the benefits it did obtain were gained in a manner that was not sustainable.

• Intermediate scores mean that the optimal benefit is not being obtained and/or is not being obtained in a sustainable way. The higher the score, the closer a country is to obtaining optimal sustainable benefits.

Is it possible to score 100?

Scores of 100 are surely achievable for individual goals. Country scores of 100 may be possible, but no country is close yet, though several remote territories are. Some countries may underuse ocean benefits
such as food or tourism to protect resources against future uncertainty, thereby producing a score less than 100 in the current calculation. Negative interactions between goals (and perhaps between countries) could occur. For example, development that increased Tourism & Recreation could compromise coastal habitats, decreasing scores in Carbon Storage, Coastal Protection, Clean Water, Biodiversity or Food Provision. Maximizing benefits from extractive goals such as Food Provision or Natural Products could decrease benefits from other goals. On the other hand, high scores for Clean Water, Biodiversity, Coastal Protection, Sense of Place and Carbon Storage could improve the flow of benefits from other goals. Without detailed quantitative understanding of such tradeoffs and interactions, it isn’t possible to say whether a country or global score of 100 is theoretically possible, but we aren’t really close enough to worry about that yet.

**Does the Ocean Health Index explain why a score is high or low?**

Index scores are derived from approximately one hundred databases. Each database measures one or more specific factors, for example sea level rise, marine and terrestrial protected areas, coastal human population, the risk of extinction for marine species or iconic species, or the annual amount of revenue provided by industries in the marine sector.

Sometimes the database contains information that explains a score. For example, we can see that a large increase in protected areas caused South Georgia and the South Sandwich Islands’ score for the Sense of Place: Lasting Special Places sub-goal to increase 95 points from 2012 to 2013. The database does not specify which areas were added, but exploration elsewhere reveals that a new 1 million square kilometer marine protected area was designated in 2012.

On the other hand, some data layers do not contain information that explains their values or variation and those seeking such explanations must consult other sources. For example, to understand the underlying reasons why species were assigned the particular categorical extinction risks shown in the database, a reader would need to consult the narrative species accounts that form the basis of the International Union for Conservation of Nature “Red List.” Similarly, to explain underlying causes of a nation’s variations in the amount of marine sector revenue, one would need to explore other sources of information about that country as well as the global economic background. Was there a global economic slowdown? Did environmental conditions affect the mariculture or tourism industries? Was there political unrest or other disturbance? Such information is beyond the scope of the Index.

Though it may seem unsatisfying that the Index cannot provide all the answers we want, seeking them by digging deeper into its underlying databases (available online) and beyond will enrich anyone’s knowledge about the ocean and the world.

**Ocean Health Index Results for 2013**

**What’s new in 2013?**

Reporting regions that were combined in 2012 have been separated out, and scores are now evaluated for 221 EEZs compared to 171 in 2012. New methods for scoring Food Provision and Tourism & Recreation are described below. Newer data for existing data layers and some new data layers have been added.

**Are 2013 and 2012 scores comparable?**

Caution: Raw scores released in 2012 and 2013 are not directly comparable owing to changes in methods and reporting unit configuration for 2013. To permit comparison, 2012 results were recalculated using 2013 methods. All comparisons mentioned below or on the Index website are based on recalculated 2012 results. Comparison of 2013 results with original 2012 results that have not been recalculated will produce erroneous results.
What is the global score for 2013?
The global score is 65, unchanged from its recalculated value for 2012. Though not as bad as it could be, and somewhat improved from the original raw value published for 2012, it remains far from 100, sending a strong message that we could enjoy more benefits if we used the ocean in more sustainable ways.

![Global 2013 chart]

**Highlights of country scores for 2013**

Country scores ranged from 41 (Guinea Bissau) to 94 (Heard and Macdonald Islands). The ten highest scores were all obtained by island territories or nations. They are: Heard and McDonald Islands (94), Saba (90), Howland Island and Baker Island (88), Kerguelen Islands (86), Sint Eustatius (85), Phoenix Group (84), Bonaire (84), Prince Edward Islands (83), Northern Saint-Martin (82) and Curaçao (81). Five of these regions are in the southern hemisphere, five in the northern. The five southern hemisphere islands are either uninhabited or have small populations. The five northern islands are all in the Caribbean.

Heard and McDonald Islands’ score and rank (94, 1st) were the highest for any populated region, though the population is only 110. Saba’s (90, 2nd) were the highest for a nation with population greater than 1,000. Top scores for progressively larger populations were: Bonaire (84, 7th) for a nation with a population greater than 10,000, Curaçao (81, 10th) for more than 100,000, Croatia (75, 18th) for more than one million and France (73, 32nd) for more than 50 million people.

The score for 11th ranked South Georgia and South Sandwich Islands (population 30) showed the greatest year-to-year increase for any region, 9 points or 13%, caused by designating 1 million square kilometers of its highly productive waters as a marine protected area, which more than doubled its Sense of Place goal score.
Eritrea suffered the largest year-to-year score decrease, 7 points or 12%, largely because of severe decrease in all aspects of its Coastal Livelihoods & Economies goal.

The results for remote regions show that despite the Ocean Health Index’s emphasis on benefits to people, relatively pristine locations can still score very high. However, developed countries with successful governance and far-sighted social, economic and environmental planning can also score well.

The ten lowest scoring countries (in descending order) were: Nicaragua (46), Somalia (46), Angola (45), Pakistan (45), Guinea (44), Ivory Coast (44), Haiti (43), Liberia (42), Democratic Republic of the Congo (42) and Guinea Bissau (41). All are poor and have a recent history of war, civil strife, ethnic conflict and/or dictatorship. Countries with those conditions do not have the resources or opportunity to address social or environmental needs; and they cannot easily take the social resilience actions necessary to reduce social and environmental pressures. Substantial increase in global Ocean Health Index scores will be limited if such countries cannot escape from conditions that currently constrain their opportunities.

Goal and sub-goal scores can provide individual countries with guidance on the highest priority areas for investment to raise their ocean health scores, thereby increasing the provision of social, economic and environmental benefits.

**Scores for 2013 by goal and sub-goal**

**FOOD PROVISION** · global score: 33 · range: 0-93
Target: Capture and raise the maximum sustainable amount of seafood.
The goal score is the yield-weighted average of scores for Wild Caught Fisheries and Mariculture sub-goals, described below.

The top ten scoring regions were: Solomon Islands (93), Tuvalu, Palau and Marshall Islands (all 89), Vanuatu (88), Wallis and Futuna (87), Papua New Guinea (85), Nauru (84), Heard and McDonald Islands (82) and New Caledonia (71). China had the eleventh highest score (68).

Thirty-seven (37) countries or territories scored 10 or below; twenty-eight (28) of them are island nations or territories, many in the Caribbean region.

Note that the Food Provision goal and sub-goals are not based solely on the quantity of food produced, but instead on how close each region is to the optimal sustainable production of the seafood available for it to potentially catch or raise.

The low global score, 33, indicates that the ocean’s potential for food is not being realized to full human benefit now and that full benefit of its resources will not be available in the future without more effective management and planning.

**Fisheries sub-goal** · global score: 31 · range: 0-93
Target: Capture the maximal sustainable amount of seafood.
Reference point: The 2013 reference point is calculated in a new way. The population biomass (the weight of fish in the ocean) of each landed stock is compared to the biomass that can deliver the stock’s maximum sustainable yield. The geometric mean of the values for all stocks in an area, each weighted by its proportional contribution to the total catch, gives the overall fisheries stock status for that area. The reference point is for the biomass of wild stocks to be within 5% of the amount that can deliver the maximum sustainable yield. Countries are penalized for both under- or over-harvesting. Penalties for under-harvesting are half as large as for over-harvesting. This new method improves on the multiple
species maximum sustainable yield method used in 2012. The 2013 analysis used five additional years of FAO catch data, 2007-2011. 2006 was the most recent year used for the 2012 analysis.

A score of 100 would indicate that a country’s marine fisheries are sustainably catching a total amount of fish that is as large as it can be without jeopardizing future catches.

A low score indicates one of two things – that seafood is being caught in an unsustainable manner, or that countries are not maximizing the potential to catch as much as sustainably possible within their marine waters. Countries that reduce their catch below that level for conservation reasons lose points on this sub-goal, but may gain points on conservation-related goals such as Biodiversity or Sense of Place.

The top ten regions that scored highest for Food Provision also scored highest for the Wild Caught Fisheries sub-goal, though in slightly different order. They were: Solomon Islands (93), Palau and Tuvalu (both 90), Vanuatu and Marshall Islands (both 89), Wallis and Futuna (87), Papua New Guinea (85), Nauru (84), Heard and McDonald Islands (82) and New Caledonia (79). Eleventh ranked was Peru (67).

Forty-one (41) countries or territories scored 10 or below. An additional fifteen could not be scored; scores seemed unreliable for three areas with 0 scores.

Scores for this sub-goal for the ten countries with highest fishery catches were: China (16), Peru (67), Russia (16), United States (41), India (13), Indonesia (25), Chile (49), Japan (17), Norway (34) and Taiwan (8). Those scores averaged only 29, two points below the global average, indicating great need for improvements in the major fishing nations. Distant water catches by those or other nations are allocated to the regions where the fish were caught, so all scores reflect the condition of fisheries in the region listed.

**Mariculture sub-goal** · global score: 26 · range: 0-100

Target: Harvest the maximal sustainable amount of farm-raised seafood (tonnes) per coastal inhabitant (i.e. within the 50 KM coastal strip), making the assumption that production depends on the presence of coastal communities that can provide the labor force, coastal access, infrastructures, and economic demand to support the development of mariculture facilities. The score for each country indicates how close its current yield is to the score for the most productive country, which was Norway in 2013. Because regional status values were highly skewed, the reference point is set at the 95th percentile region (Thailand) with all regions above that value set to a status score of 100. Mariculture yield data were updated to 2011.

This new reference point replaces that used in 2012, which compared harvested tonnes per km of coast to that in the highest producing country, making the implicit assumption that all portions of a coastline are potentially equally productive. The 2013 reference point avoids that assumption.

A high score can mean that a country is sustainably harvesting as close to the maximum amount of farmed seafood as possible based on its own potential. A low score can indicate one of two things – that seafood is being farmed in an unsustainable manner or that a country is not maximizing its potential to farm fish and other marine animals in its coastal territory.

The current score, 26, indicates that most countries are not sustainably producing the amounts of farmed seafood that they potentially could.

The top-ranking countries were: Ecuador, Faeroe Islands, New Zealand, China, Norway and Chile (all received scores of 100), Canada (93), Thailand (92), France (73), Ireland (69), Spain (66), Iceland (63), South Korea (57) and Belize (51).
Seventy-seven (77) countries scored 10 or below, suggesting that large gains could be obtained by further development or improved management of mariculture.

**ARTISANAL FISHING OPPORTUNITIES**  
**global score:** 95  
**range:** 76-100

**Target:** Opportunities for small-scale local fishing meet the estimated need  
**Reference Point:** Opportunities for artisanal fishing meet the need, as expressed by per capita GDP corrected by purchasing power parity (PPPpcGDP), for which additional years of data were added.

The high global score, 95, suggests that most countries are meeting most of the apparent economic need for their citizen’s to be able to carry out small-scale fishing for subsistence, barter or commercial purposes (mainly local markets).

Region scores ranged from 76 (Liberia and Democratic Republic of Congo) to 100 (South Georgia and the South Sandwich Islands, Prince Edward Islands, Amsterdam Island and Saint Paul Island, Kerguelen Islands, Qatar). Numerous countries scored 99.

Four of the five top scoring regions are small, very remote islands in the Southern Ocean or South Indian Ocean with tiny populations of year-round research personnel. With no GDP and unlimited access to the shore, those locations obviously gain perfect scores. At the other extreme, Qatar gains a perfect score because its PPPpcGDP is the highest in the world ($102,943 in 2011) so there is no indicated need for artisanal fishing. High scores for other countries indicate either that high need is successfully met by policies that guarantee high access to fishing opportunities; or that there is low apparent need for such opportunities.

**NATURAL PRODUCTS**  
**global score:** 31  
**range:** 0-100

**Target:** Harvest maximum sustainable amount of non-food products  
**Reference point:** Global data were available for metric tonnes of exports of six products: ornamental fish for aquariums, fish oil, seaweeds, shells, sponges and coral products. The reference point for each product is 35% below the maximum value (2008 USD) ever exported from that country. The 35% buffer protects against the possibility that the maximum value resulted from overharvesting. The goal score is the weighted average of scores for any of the six values available in the country.

Additional years of data were added for Natural Products risk (for corals and ornamental fish), exposure, and harvest. The sustainability coefficient for fish oil was updated. Methods for data analysis were improved.

Scores ranged from 0 (seven countries) to 100 (Equatorial Guinea), followed by Cuba (99), Guadeloupe and Martinique (98), Tuvalu (98) and Saba (97).

The low global score, 31, indicates that most countries are not gaining all the benefits they could from sustainable harvest of any of the six scored resources present in their location, either because of unsustainable harvesting methods or under-harvesting of potential resources.

**CARBON STORAGE**  
**global score:** 74  
**range:** 5-100

**Target:** Reduce global warming by conserving coastal habitats that store carbon long-term  
**Reference point:** Maintain or restore the extent and condition of coastal carbon-storing habitats (mangrove forests, seagrass beds, salt marshes) to their ~1980 values.
High scoring countries have conserved their mangrove forests, seagrass beds and salt marshes to the extent and condition prevailing in about 1980. The global score, 74, indicates that the condition of those habitats has declined in most countries since that time.

Scores ranged from 5 (Nicaragua) to 100 (twenty-one countries: Cuba, Saba, Sint Eustatius, Antigua and Barbuda, Benin, Seychelles, Netherlands, Belgium, French Guiana, Denmark, Germany, Estonia, Bangladesh, Russia, Saint Kitts and Nevis, Sothern Saint-Martin, Puerto Rico and Virgin Islands of the United States, Sint Maarten, Ile Europa, Guadeloupe and Martinique, and Suriname). Nine of those top scoring countries are in the Caribbean.

**COASTAL PROTECTION** - global score: 69 - range: 0-100

Target: Maintain or restore extent and condition of coastal habitats that protect against storm waves and flooding (coral reefs, mangrove forests, seagrass beds, salt marshes, sea ice) to their ~1980 values.

Reference point: The extent and condition of protective biological habitats (tropical coral reefs, mangrove forests, seagrass beds, salt marshes) and arctic sea ice is compared to their values in about 1980. Sea level rise, added as a new data layer for 2013, is an important pressure that will affect coastal protection.

Forty-seven (47) regions were not scored as they lack any of the protective habitats evaluated in this study. For the remaining 175 regions, the fairly low global score, 69, indicates that the extent and condition of assessed habitats has declined in many countries since the reference period, ~1980. Arctic sea ice, which protects coastal native villages from erosion by storm waves, has declined substantially owing to climate change, causing lower scores for arctic nations.

Non-zero country scores ranged from 4 (Poland) to 100. Fifteen (15) countries or territories scored 100: Benin, Netherlands, Belgium, French Guiana, Bangladesh, Curacao, Tuvalu, Pitcairn, Phoenix Group, Wallis and Futuna, Line Group, British Indian Ocean Territory, Howland Islands and Baker Island, Suriname and Saba. The next ten best scoring countries were: Oman, Togo, Germany and Brunei (all 99), Canada and Djibouti (both 98), Nauru and North Korea (both 97) and Faeroe Islands and Greenland (both 96).

The ten lowest, non-zero, scoring countries were: East Timor (17), Iran (16), Belize (10), Nicaragua (9), Guinea and Dominica (both 7), Sierra Leone and Guinea Bissau (both 6), Senegal (5), and Poland (4).

High scoring countries have conserved their tropical coral reefs, mangrove forests, seagrass beds and salt marshes to the extent and condition prevailing in about 1980.

The global score, 69, is likely to decline in the future. Scores may decline in seventy-nine (79) regions where the likely future scores are lower than the present status scores. Scores seem likely to stay the same or improve in sixty-four (64) regions (eighteen of which scored 100 for both present and likely future status). Remaining countries were not scored owing to lack of carbon storing habitats.

For the seventy-nine (79) countries potentially facing declining scores in the near future, strong actions will be needed to preserve protective habitats and reduce global warming.

For those and other coastal countries, maintenance or improvement of extent and condition of biological habitats can add many years of protection, but cannot protect low-lying areas if long-term sea level rise is severe.
Countries can independently take action that will maintain or increase protective biological habitats, but not sea ice. The only resilience measure that will maintain sea ice and its benefits will be the combined actions of many countries to reduce greenhouse gas emissions. A country acting alone would generally not be able to act at a scale that could markedly increase sea ice extent.

**COASTAL LIVELIHOODS & ECONOMIES**  
*global score: 82 · range: 3-100*  
**Target:** This goal aims to maintain the economic health of the marine workforce and coastal communities by maintaining coastal and ocean-dependent livelihoods (indicated by jobs), productive coastal economies (indicated by revenues) while also maximizing livelihood quality (indicated by relative wages).  
**Reference point:** The goal is for a region to have no net loss of jobs or wages in its marine sector and jobs must keep pace with growth in employment rates or sustain losses no greater than national increases in unemployment rates. Similarly, a region’s revenue from its marine sector should have no net loss over time and must keep pace with growth in the region’s GDP or sustain losses no greater than the national declines in GDP.

Nine (9) marine sectors are evaluated, including: Aquarium fishing, Commercial fishing, Mariculture, Marine mammal watching, Ports and harbors, Ship and boat building, Tourism, Transportation and shipping, Wave and tidal energy. Mineral extraction, including gas, oil, mining and others is not included as it cannot be sustainable, by definition, since even if carefully done, material is extracted faster than it can be replenished naturally.

Future evaluation of this goal will benefit from improved data, including global data on wages and on other marine-employment sectors that could be included.

The global score, 82, suggests that marine sectors are not keeping up with the overall economy in terms of jobs, wages and livelihoods. Several factors could be involved, including more rapid expansion of jobs and wages in non-marine industries including technology as well as lack of global data on marine sectors beyond the six evaluated in this study.

Country scores ranged from 3 (Eritrea) to 100 (thirty countries from every continent except Antarctica).

The thirty countries that scored 100 (Bangladesh, Oman, Israel, Gambia, Solomon Islands, Ecuador, Papua New Guinea, United Arab Emirates, Vanuatu, Panama, Saudi Arabia, Liberia, Kuwait, Belize, Sao Tome and Principe, Morocco, Chile, Slovenia, Albania, Turkey, Uruguay, Cape Verde, Tokelau, Cook Islands, Niue, New Zealand, Lebanon, Tonga, South Africa, Georgia) are broadly distributed geographically and include low income, lower middle income, upper middle income and high income nations.

The lowest scoring regions were: the Falkland Islands, Tristan da Cunha, Ascension and Saint Helena (all 45), Oecussi Ambeno (score 42), East Timor (41), Samoa (36), Saint Vincent and the Grenadines (33), Equatorial Guinea (13) and Eritrea (3). The Falkland Islands (population 2,932), and the islands of Tristan de Cunha (population 2,932), Ascension (population 880) and Saint Helena (population 4,255) are all British overseas protectorates remotely located in the South Atlantic Ocean. It is hard for Coastal Livelihoods & Economies to prosper in those areas. Oecussi Ambeno (population approximately 50,000) is a district of East Timor that is located within Indonesian West Timor (population 1,143,667). East Timor’s economy is struggling and the country is still recovering from armed conflict with Indonesia at the end of the twentieth century. Samoa and St. Vincent and the Grenadines, both heavily dependent on agriculture and tourism, differed in their scoring patterns. Samoa had very low scores for jobs and wages, while St. Vincent and the Grenadines scored low for revenue. In Equatorial Guinea, which had...
low scores for jobs, wages and revenue, economic development has been hampered by political and human rights conflicts, but reported recent economic growth may improve its score in coming years. Eritrea’s score, a 96% decline from 2012, reflected drastic declines, both in jobs and revenue.

Livelihoods sub-goal · global score: 81 · range: 0-100
Target: The goal is to maintain the number and quality of jobs in marine sectors.
Reference point: Livelihoods includes two equally important sub-components, the number of jobs and the average annual wages, each with its own reference point. The reference point for jobs—which is a proxy for livelihood quantity—is a moving target temporal comparison such that the number of jobs in a region’s marine sectors should keep up with the number of jobs in all economic sectors, adjusted for unemployment. The reference point for wages—which is a proxy for livelihood quality—is a spatial comparison in which a region’s marine sector wages are compared with the highest value observed across all reporting regions. New years of marine jobs data for the Tourism sector were used that were not available in 2012.

Fifty-one (51) countries scored 100. They were broadly distributed geographically as well as by per-capita income and level of development.

The ten lowest, non-zero, scores were: Cambodia, Guyana and El Salvador (all 49), Mexico (48), Benin (47), Andaman and Nicobar (45), India (45), Saint Vincent and Grenadines (44), Indonesia (40), Equatorial Guinea (9) and Samoa (3).

Economies sub-goal · global score: 83 · range: 0-100
Target: The goal is to maintain economically productive coastal communities.
Reference point: The reference point is a moving temporal comparison for revenue such that revenue from marine sectors within a region should keep up with revenue from all economic sectors year over year. A region should have no net loss of revenue from its marine sector over time and revenue must keep pace with growth in the region’s GDP or sustain losses no greater than the national declines in GDP. Updated revenue data were used for the tourism sector, aquarium fish trade, and mariculture.

Marine sector revenue kept pace with revenue from other sectors in sixty-three countries, all of which scored 100.

The ten lowest, non-zero, scoring countries were: Philippines (38), French Guiana (25), Guinea Bissau (24), Saint Vincent and the Grenadines (21), Equatorial Guinea (18); Falkland Islands, Tristan da Cunha, Saint Helena and Ascension Island (all 16) and Eritrea (5). Low scores indicate that a country’s marine communities have lost revenue from marine sector employment relative to revenue from other sectors.

TOURISM & RECREATION · global score: 39 · range 0-100
Target: Tourism and recreation are important parts of a vibrant coastal economy, so the goal is to attract the optimal sustainable number of tourists to coastal areas.
Reference point: The goal measures the proportion of the total labor force engaged in the coastal tourism and travel sector, factoring in unemployment and sustainability. All countries where tourism and travel employment made up 9.5% or more of the total labor force received a perfect score. This value was set by rank-ordering the countries and giving all countries above the 90th percentile a score of 100. Long-term sustainability of tourism was estimated by the World Economic Forum’s Travel and Tourism Competitiveness Index.

The 2013 reference point provides a more accurate assessment of tourism and recreation than was possible in 2012, because it strives to capture both domestic and local tourism, whereas the 2012 metric, which was based on tourist arrivals at international airports, only captured international tourism.
New data layers used in 2013 to estimate the number of people employed in a country’s tourism and recreation sector (hotels, airports, airlines, travel agents and leisure and services that deal directly with tourists) and its total labor force came from, respectively, the World Travel and Tourism Council (http://www.wttc.org/research/economic-data-search-tool/) and the World Bank http://data.worldbank.org/indicator/SL.TLF.TOTL.IN).

The low global score for Tourism and Recreation, 39, suggests that many countries could obtain substantially more benefits. The score could be an underestimate if data on employment in the travel and tourism sector do not capture all such workers. However, a likely reason underlying the low global score, as well as a number of national scores, is that many countries suffer from poverty, political turmoil, war or other volatile conditions that make tourism in some or all portions unhealthy, unsafe or unappealing and also make it difficult for those countries to provide infrastructure that might support increased tourism.

Country scores ranged from 0 (North Korea) to 100 (eighteen countries). The top twenty-four countries--which all scored 94 or above—were island nations, seventeen in the Caribbean region, three in Africa, two in Melanesia, one in South Asia and one in Europe. Those countries have a long history of tourism and the sector plays an important part in their economies, encouraging governments and citizens to prioritize actions that support tourism and protect the country’s brand as a tourist destination.

Countries with scores less than 10 were: Eritrea, Qatar, Djibouti, Equatorial Guinea, Somalia, Papua New Guinea, Ghana, Sudan, Myanmar, Ivory Coast, Nigeria, Libya, Suriname, Cameroon, Sierra Leone, Angola, Benin, Gabon, Haiti, Togo, Guinea, Republique du Congo, Democratic Republic of the Congo, and North Korea. Many of those nations have suffered from poverty, political turmoil, civil strife, war or other volatile conditions that make tourism unhealthy, unsafe or unappealing and also make it difficult to provide infrastructure that might support increased tourism.

**SENSE OF PLACE** · global score: 60 · range: 0-100

Target: Preserve features of coastal marine areas with special cultural, spiritual or aesthetic significance for inhabitants, visitors or others. This goal uses the status of Iconic Species and Lasting Special Places sub-goals to evaluate the importance given to Sense of Place and the potential benefits it provides. To score highly on this goal, populations of a region’s iconic species had to be at low risk of extinction and the proportion of its nearshore coastline in protection had to be near 30%.

The top ten scoring countries were an interesting mix of six remote and largely uninhabited or sparsely inhabited island territories, three northern European nations and one eastern European nation. They are: Estonia, Phoenix Group, Latvia, Poland, Lithuania, Howland Island and Baker Island, Prince Edward Islands, Macquarie Island, Heard and McDonald Islands and Jarvis Island (all 100).

The lowest, non-zero, scores were: Algeria and Sudan (both 25); Federated States of Micronesia, Qatar and Andaman and Nicobar Islands (all 24); Eritrea, Libya, Syria and Lebanon (all 23); and Bahrain (19).

The low average score, 60, indicates that most countries are not valuing or protecting the Sense of Place that could enrich the cultural, spiritual and aesthetic lives of their citizens and visitors.

**Iconic Species sub-goal** · global score: 60 · range: 0-93

Target: Maintain populations of all marine iconic species in the region.
Reference point: All iconic species present should be at minimal risk of extinction (‘least concern’ in IUCN “Red List”). The 2013 analysis used additional years of data not available in 2012.

The highest scores were: Jan Mayen (93), Norfolk Island (88), Réunion (82), Denmark (78), South Georgia and the South Sandwich Islands (77), Saint Pierre and Miquelon, Anguilla, Falkland Islands and Wallis and Futuna (all 76); and Gambia and South Korea (both 73).

The lowest, non-zero, scores were: Albania, Eritrea, British Indian Ocean Territory, Cyprus and Libya (all 47); Syria (46), Lebanon (45), Cambodia and Monaco (43), Israel (42), Kuwait (41), Bahrain (38), and Germany and Wake Island (37).

Scores could not be produced for twenty-seven regions owing to lack of data.

**Lasting Special Places sub-goal** · global score: 61 · range: 1-100

Target: Protect aspects of the coast that are important to culture, spirit and aesthetic appreciation.

Reference point: Few countries have official lists of places (if any) protected for their cultural and spiritual importance, especially for various subcultures or ethnic groups, so the Index uses places protected for other purposes to represent them, including protected areas, marine protected areas, UNESCO World Heritage marine sites, national parks and nature reserves and the United Nations list of protected places. Improved global data better suited to this goal will add value to assessment of this goal. The proxy reference for lasting special places is for 30% of the coastline from 3 nm seaward to 1 km landward to be in protected status. Three additional years of data were added to the database (from 2009 to 2012).

Fifty-one (51) regions scored 100. Two nations recorded significant improvements in their scores from 2012 to 2013. Sierra Leone’s score improved by more than 3,400% (from 0.23 to 8 points); four marine protected areas were designated in 2012, increasing the amount of area protected from almost none to slightly more than 11,000 square kilometers. South Georgia and the South Sandwich Islands’ score improved by 95 points from 5 to 100, after establishing a 1 million square kilometer marine protected area.

The lowest, non-zero, scores were: Saint Lucia, Haiti, Bahamas, Singapore and Algeria (all 3); Vanuatu and Cook Islands (2); and Samoa, Sint Maarten, Guyana and Tunisia (all 1). Designating additional areas to protect coastal ecological and cultural resources would strongly improve scores for those nations.

Fifty-one regions received scores of 0 or could not be scored.

**CLEAN WATERS** · global score: 78 · range: 31-100

Target: Eliminate pollution by chemicals, nutrients, pathogens and trash.

Reference point: The reference point is to have zero pollution from excess nutrients, chemicals, pathogens and trash. Since global data do not exist for these pressures, modeled or proxy data were used. The 2013 analysis used additional years of data for nutrient pollution, pathogen pollution, and trash that were not available in 2012.

Many high scoring regions were oceanic or at high latitude. Many, but not all low-scoring countries were in Western Africa where access to improved sanitation facilities is often poor and where trash pollution is high. Trash pollution also reduced the scores of remote Pacific island territories.

Seven (7) of the ten highest scoring regions scored 100. They were: Heard and McDonald Islands, Kerguelen Islands, Amsterdam and Saint Paul Island, Bouvet Island, Crozet Islands, Prince Edward Islands and South Georgia and the South Sandwich Islands. All are small, remote island
territories that are either uninhabited or have very low populations and are located in the South Atlantic, Southern Ocean or southern Indian Ocean. The Republic of the Seychelles, an island nation in the Indian Ocean with a population of 86,000, scored 96 and ranked 8th. Ranking 9th and 10th were two developed and populous nations, the United Kingdom (95) and Malaysia (93).

The ten lowest scoring regions were: Nigeria (49), Liberia (48), Guinea Bissau (47), Guinea (45), Iraq (44), Sierra Leone (43), Ivory Coast (41), Ghana (38) Benin (32) and Togo (31). Nine (9) of those countries are in western Africa. Pathogen pollution caused by poor access to sanitary facilities and trash pollution particularly affected scores.

The global Clean Water score, 78, may be higher than the public would expect given recent media attention to pollution from sources such as the Deep Horizon oil spill and Fukushima tsunami and nuclear disaster. However, effects of those regional events, even though grievous, have not spread to all oceans and countries, so they are not captured in global data. Where available, such information would greatly influence the scores of a more focused Ocean Health Index analysis that used country-or region-level data. Public attention has also focused on oceanic plastic pollution, especially the ‘Great Pacific Garbage Patch,’ but global data do not yet exist for plastics at sea. The Ocean Health Index therefore uses data on trash collected during beach cleanups as a proxy for plastics at sea, but beach clean ups do not collect microplastics, which are the major trash component of that and other ‘garbage patches’ that form in ocean gyres.

**BIODIVERSITY** · global score: 85 · range: 65-97

Target: Conserve species and habitats that form the rich variety of marine life

Reference points: A country’s marine species, as assessed by the IUCN or GMAS (Global Marine Species Assessment) are at minimal risk of extinction; and the extent and condition of assessed marine habitats has not decreased greatly since about 1980.

The global score, 85, might seem unexpectedly high given media coverage and public attention to the plight of endangered species and the likelihood that population growth, land use changes, climate change and other human-caused pressures are causing what has been termed “Earth’s 6th great mass extinction.” Remember, however, that Habitats are compared to their reference values in ~1980, so changes seen have occurred in only three decades. Similarly, criteria for IUCN estimates of extinction risk include population changes over 10 years or three generations (whichever is longer), so changes seen usually also represent short time periods. With those considerations in mind, a score of 85 is not as comforting as it might seem.

Country scores for Biodiversity ranged from 65 to 97.

The highest scores were: Finland (97), Sweden and Estonia (both 96), Canada and Montserrat (both 94), Lithuania, Sint Eustatius, Northern Saint-Martin, British Indian Ocean Territory, Cyprus, Sint Maarten, Heard and McDonald Islands, Saba, Macquarie Island, Romania, Saint Kitts and Nevis, Latvia, Georgia and Russia (all 93) and Denmark, Kerguelen Islands, Wallis and Futuna, Germany and Belgium (all 92).

The lowest scoring countries were: Norfolk Island, Somalia and Liberia (all 69); Pakistan (68); Ivory Coast, Republique du Congo and Democratic Republic of the Congo (all 67); Guinea Bissau (66), and Gabon, Sierra Leone and Senegal (all 65).

**Species sub-goal** · global score: 82 · range: 73-97
Reference Point: All Species present should be at minimal risk of extinction ('least concern' status in the IUCN "Red List"). The 2013 analysis used additional years of data not available in 2012.

The top scoring regions were: Finland (97), Sweden and Estonia (both 95); Poland, Montserrat and Latvia (all 93); Lithuania (92), Saint Lucia (91), and Northern Saint-Martin, Canada, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Cyprus, Cayman Islands and Greenland (all 90).

The lowest scoring regions were: Argentina, Guinea Bissau, East Timor, Oecussi Ambeno, Somalia, Angola, Libya, Cameroon, Western Sahara and Gabon (all 75), Equatorial Guinea, Guinea and Nigeria (all 74) and Uruguay (73).

**Habitats sub-goal** · global score: 89 · range: 51-100

Reference point: The extent and condition of Habitats that support large numbers of species and for which global data are available should at least be equal to their values in about 1980. Six habitats had sufficient global data to permit evaluation: tropical coral reefs, mangrove forests, seagrass beds, salt marshes, subtidal soft-bottom habitats and sea ice edge. Regions are only scored for habitats that normally exist within their EEZ.

Twenty-two (22) countries scored 100. Countries with high scores for Habitats included remote uninhabited oceanic territories as well as developed countries with significant percentages of undeveloped coastlines.

The lowest scoring countries were Liberia and Pakistan (58); Guinea Bissau and Grenada (57); Ivory Coast and Gabon (56); Norfolk Island (55), Republique du Congo and Democratic Republic of the Congo (54); and Senegal and Sierra Leone (51).

Low scores for the extent and condition of habitats would likely depress species scores, accelerating the decline in future scores for the Biodiversity goal.

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To learn more about ocean health and to view and explore results of the Index, visit [http://oceanhealthindex.org](http://oceanhealthindex.org). To view or download all data used in the project visit [http://ohi.nceas.ucsb.edu/data](http://ohi.nceas.ucsb.edu/data).