



**Global
Challenges
Foundation**

Ocean Health Index: An ocean governance framework to safeguard human well-being

Authors

Ben S Halpern, Erich J Pacheco, Melanie Frazier,
Julia Stewart Lowndes, Erin O'Reilly

The submission proposes to expand an index for coasts and marine ecosystems, designed to measure, monitor and communicate the current status of the benefits humans receive from well-functioning ocean ecosystems. The index assesses information from all ocean elements – ecological, social, economic and cultural – and translates complex relationships and context specific targets into easily accessible scores. It is currently being used for governance and policy-setting processes in various parts of the world. There is a global database providing readily-available source data, even to smaller countries. The index was developed for the global scale, but can also be applied at national and subnational scales. Index assessments highlight priorities, and the need for long-term decision-making and collaboration ocean management. The index also provides a flexible platform for stakeholders and agencies to share information and collaborate.





1. Abstract

A healthy ocean sustainably delivers a full range of benefits to humans now and in the future. The Ocean Health Index (OHI) is a coastal and marine ecosystem-based approach designed to measure, monitor and communicate the current status of the benefits humans receive from a healthy ocean. The OHI has been proven effective and is already being used at all relevant governance and policy-setting scales, from the subnational through the global, in countries such as China, Ecuador and the Baltic States. The OHI framework is a means by which countries can immediately operationalize Target 14.2 in an integrated manner as well as as positively respond to most of SDG 14 with positive impacts on many other SDGs.

The OHI at national and subnational scales is a complete framework for an ecosystem-based approach that takes into account all the ecological, social, economic and culture elements important to managing the benefits from a healthy ocean. For decision makers, the OHI is a powerful cross-sectoral and integrated ocean management decision-support tool, which enables municipalities and countries to independently identify management and policy priorities and monitor the efficacy of interventions. Already in use in 30 countries, the adaptable OHI independent assessments (OHI+) (ohi-science.org) help decision makers and managers design targeted management actions to improve overall ocean health and resilience, in line with SDG 14. At regional and global scales, the OHI streamlines data flows and coordinates data sharing.

OHI+ independent assessments are fully supported with a state-of-the-art toolbox, data and spatial analytics, and clear step-by-step guidance on everything from stakeholder engagement to data management. Annually, the global OHI assessment (oceanhealthindex.org) delivers an essential and highly cost-effective service by gathering data layers for all exclusive economic zones (EEZs) in the world. This global database provides a readily-available source of data that would be prohibitively expensive if obtained and updated annually by every country. This allows nations to begin their own independent assessments immediately with the best-available global data without the need to wait months or even years for sufficient local and national data. The annual global OHI assessment also creates a snapshot of the status of all global EEZs in order to track changes in ocean health everywhere in the world.

2. Description of the model

I. ESTABLISHMENT OF A GLOBAL ACADEMY FOR CLIMATE CHANGE

Sources of funding for the academy

Our relationship with the ocean is almost as old as our species. From food provision, coastal protection, livelihoods, energy, climate regulation, to cultural value, the ocean provides humans with a wide array of benefits and services. The oceans are essential to human well-being: they contain most of Earth's life, provide essential nutrition to 3 billion people, generate half of the oxygen we breathe, absorb 25% of the carbon we emit and accounts for 3.5% of the global economy. But, oceans must be healthy to deliver these benefits—they can only sustain us if we sustain them. As the human population grows towards an expected 10 billion, increasing pressures on the oceans threaten food security, climate stability,



coastal cities, livelihoods, the global economy and biodiversity. It is indisputable: a healthy ocean is an imperative for healthy people, healthy communities, and healthy economies.

CHANGING COURSE: AN INTEGRATED FRAMEWORK FOR OCEAN MANAGEMENT

To help meet these challenges, Conservation International (CI)[1], the National Center for Ecological Analysis and Synthesis (NCEAS)[2], and partners developed the Ocean Health Index (OHI)[3]—an innovative management framework that assesses all elements of ocean health—biological, physical, economic, and social—and provides governments, multinational organizations, and communities with the information they need to make sustainable decisions about ocean use. OHI defines a healthy ocean as one that ‘sustainably delivers a range of benefits to people now and in the future.’ By establishing a tangible definition of ocean health and pioneering a means to measure it, OHI charts a course toward healthier oceans and people. OHI measures how well countries are gaining maximum sustainable flows of key ocean benefits while safeguarding coastlines and marine waters, and supports integrated management of seafood production, biodiversity protection, marine jobs and revenues, tourism and biodiversity and protection of culturally important species and place.

Many countries world wide[4] are utilizing the OHI to help guide local steps to protect the waters on which they depend — and are seeing good results. Country-by-country and goal-by goal, OHI is steering the world toward ocean health. But we urgently need to capitalize on the momentum created by OHI. There will not be a second chance.

NAVIGATING CHANGE THROUGH THE OCEAN HEALTH INDEX

Methods: multi-scale ocean management from global to local

OHI measures the health of coupled human-ocean ecosystems in different contexts by accommodating local environmental characteristics, cultural priorities, and information availability and quality. It assesses a suite of ten benefits the ocean provides to humans using the best available information and translates complex socio-ecological relationships and context specific targets into easily accessible scores, on a scale from 0 to 100, that reflect how well a coastal region is utilizing the ocean in a sustainable way. A score of 100 indicates people are enjoying the optimal benefits and services from the ocean in a sustainable way. The OHI framework is a flexible and repeatable approach and the process is iterative so that management can track and respond to changes through time.

Methods for the OHI were developed at a global scale, combining over one hundred data sets to produce annual Index scores for 220 coastal nations and territories, Antarctica, and the High Seas using. Beginning in 2012, our team publishes the Annual OHI Global Assessment, which is updated with new information and improved methods to include the best available science. Using standardized methods and datasets, all scores in the global analysis are comparable place-to-place and year- to-year, since previous years are recalculated with new methods.

In the Global Assessments, each region (countries and territories) is scored annually at a national scale for each goal and subgoal (Figure 1). Scores are calculated based on four main components (Figure 2):



A goal's current status compared to a goal-specific target (reference point); The trend of its status for the previous five years; The pressures that reduce negatively affect a goal's status; and the resilience measures that counteract or lessen the effect those pressures.

A goal's score is the average of its subgoal scores (if any), except for Food Provision, which is the yield-weighted average of scores for Fisheries and Mariculture. Each region's overall score is the average of its goal scores. The area-weighted average of those regional scores forms the GlobalOHI score. An overall score for each goal is calculated as the area-weighted average of scores for that goal obtained by all regions.

These assessments identify the drivers affecting ocean health in each region, and the comparability of scores allows regions to observe their progress over time, their performance relative to their neighbors, and types of investments that could potentially raise ocean health scores and provide more social, economic and environmental benefits.

Global Assessments are important because they raise awareness about the perilous state of global oceans, highlighting the need for collective action, long-term decision-making, and collaborative management. Additionally, the assessments are strongly aligned with Multilateral Environmental Agreements and Sustainable Development Goals, and the use of common methods and language allows for comparisons between the countries. Lastly, global efforts foster greater transboundary collaborations between countries, as it was witnessed in the Baltic Sea and between Colombia and Ecuador. However, global measurements often have several limitations, including the relatively low quality of global ocean data and low relevance of the results at sub-national scales.

Understanding that most ocean management decisions happen at national and subnational levels, we developed the OHI Independent Assessment (OHI+) approach, which use the same framework as the Global Assessments, but allow for the exploration of variables influencing ocean health at smaller scales where policy and management decisions are made. In practice, the OHI process helps users establish management targets, identify locally important ocean characteristics, centralize relevant information (data & indicators), and recognize information and knowledge gaps. This enables scientists, managers, policy makers, and the public to better and more holistically understand, track and communicate the status of local marine ecosystems and to design strategic management actions to improve overall ocean health.

APPROACH: MAINSTREAMING OCEAN MANAGEMENT IN SUSTAINABLE DEVELOPMENT

Our approach to address threats to oceans and human well-being is simple yet structured. We combine three main approaches to mainstream ocean management in national development plans:

Participatory Ocean Health Management Process

Because effective ocean management is inherently a multidisciplinary process, we work with governments, communities, civil society, businesses, and scientific partners to manage ocean areas in an integrated manner, balancing for the long term the many ways that people interact with nature—from food production



and resource extraction to tourism and cultural connections. Our integrated ocean and coastal resource management capacity building system fosters better collaboration between multiple actors and empowers stakeholders with accessible information and tools. In addition to building capacity, we work with our partners to institutionalize processes for continuously managing ocean health, providing leaders and decision-makers with clear guidelines and starting points.

We strongly hold that integrated ocean and coastal management requires input from many partners and constituencies, so we strengthened participation by partnering with the Consensus Building Institute to create an innovative **Ocean Stakeholder Engagement Process**, which focuses on: 1) identifying site specific ocean and coastal needs and the groups with interests on those needs; 2) highlight areas of agreement and conflicts; 3) determining existing information and mandates; 4) building trust in the process by involving stakeholders in its design; 5) assess diverse management scenarios; and 6) reach and implement multi-stakeholder conservation agreements. By defining ocean health holistically across all sectors, OHI helps foster and facilitate collaboration among government agencies, management authorities, scientific disciplines and concerned stakeholders to bring increased attention, effort, and resources to the marine environment. While we have standardized our approach, we customize our solutions and strategies to meet the unique needs of each country, understanding that our efforts will be more effective by taking into account historical, cultural, political, and sociological elements into consideration.

Knowledge management: harnessing data science for oceans

Using cutting edge data science methods, we created the OHI Toolbox, which is built with cutting-edge software tools that are freely available and powerful for analysis, visualization, and communication. The Toolbox provides structure to capture all sorts of information — data, records, models, targets, and decisions — making it easy to share result and repeat the assessments. The OHI Toolbox offers an innovative approach for project collaboration, making the process transparent, reproducible, and easily communicated, which is paramount to informing policy and understanding how socio-ecological systems change over time.

Reshaping the fundamental role governance in ocean management

Even though, our relationship with the ocean is almost as old as our species, ocean management has largely been an uncoordinated endeavor. In fact, it wasn't until the 1982 U.N. Convention on the Law of the Sea that we collectively “define[d] the rights and responsibilities of nations with respect to their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources.”[5] Despite its massive size, extraordinary importance and value to human-well being, historically governance and management of the oceans has been fragmented and weak. The 60% of the oceans beyond national jurisdiction, ‘High Seas,’ is largely unmanaged, with policies and regulations existing for only a few human activities and poor enforcement even of those. The other 40% of the oceans that is owned and governed by countries produces most of the benefits to humans and is therefore subject to the most pressures from our activities, but, with a few exceptions, goals and governance are not coordinated between nations. Fragmented oversight has led to unsustainable and uneconomic use of ocean resources and deterioration of ocean conditions. **Simply put: the existing approach for ocean governance cannot effectively address this deteriorating situation.**



Our approach focuses on reshaping institutional arrangements by building trust and lasting relationships with governments to guide them towards 21st century ocean governance. Our efforts seek to foster inter-agency collaborations through coordinating bodies, align funding streams, engaging in effective integrated coastal zone management, conducting marine spatial planning, and institutionalizing long-term management in planning and fiscal cycles. But this is just the beginning. Changing political systems, administrative philosophies and management methods requires time, continuity and persistence. Our team of scientists and policy experts has already developed strong relationships with governments in all inhabited continents, multi-national agencies, and international organizations to demonstrate and implement the OHI as a monitoring framework for tracking progress toward Target 14 (Life Under Water) of the U.N. Sustainable Development Goals (SDGs) and the Convention on Biological Diversity. Those relationships must be continued; and additional relationships developed.

Results from the Ocean Health Index emphasize governance's central importance. Regions with stable and effective governance score much higher than regions where corruption, dictatorship, civil strife, war and poverty are endemic. This finding also underscores the importance of other ongoing CI projects that promote peace, social justice, gender equality and socially-responsible business, because progress in those areas makes it much easier for communities and nations to improve environmental and economic conditions.

CI's goal is to deploy our portfolio of ocean governance and policy tools at all scales of management (global, regional, national, local) in ways that improve the process and quality of decisions that will produce a sustainable mix of beneficial ocean outputs.

- [1] conservation.org
- [2] nceas.ucsb.edu
- [3] oceanhealthindex.org, ohi-science.org
- [4] China, Colombia, Israel, Canada, Ecuador, Mexico, Samoa, United States of America, Indonesia, New Caledonia, and the Helsinki Convention on the Protection of the Marine Environment of the Baltic Sea Area (Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden)
- [5] un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm

3. Motivation

I. ESTABLISHMENT OF A GLOBAL ACADEMY FOR CLIMATE CHANGE

Sources of funding for the academy

1. Core Values. Decisions within the governance model must be guided by the good of all humankind and by respect for the equal value of all human beings.

At CI, we measure success in human terms. Our ultimate goal is to protect the most fundamental things that nature provides to all of us: our food, water, livelihoods and a stable climate. Our mission is simple: Building upon a strong foundation of science, partnership and field demonstration, CI empowers societies to responsibly and sustainably care for nature, our global biodiversity, for the well-being of humanity.



In implementing OHI worldwide, CI emphasizes its strongly held belief that people need nature to thrive, which is reflected in our definition that “A healthy ocean sustainably delivers a range of benefits to **people now and in the future.**” The integrated nature of OHI places no preference or priority over any human activity or ocean derived benefit, but instead focusses on minimizing conflict between resource users by finding a cultural specific sustainable mix of outputs to support human development.

Further, our core values include:

Enhancing collaborations across scales to achieve measurable and tangible impacts
Facilitating effective communication and encourage shared learning
Upholding accountability and integrity
Ensuring respect for all cultures, ideals and beliefs
Working passionately to protect oceans ability to provide equitable distribution of benefits

2. Decision-Making Capacity. Decision-making within the governance model must generally be possible without crippling delays that prevent the challenges from being adequately addressed.

Collaborative decision-making is at the core of implementing OHI. By partnering with diverse stakeholders, coaching ocean leaders, and seeking input from a wide range of resource users, we facilitate participatory processes that yield better and longer lasting decisions. In particular, we guide stakeholders to collaboratively establish management targets (reference points) for each OHI Goal, providing management benchmarks that can be used to track progress. We guide stakeholders to apply SMART criteria when determining targets (specific, measurable, ambitious, realistic, and time-bound) and to seek consensus when establishing them. A consensus agreement is one that all participants can accept or live with. It is ideal that there is strong support for the agreement from all stakeholders. But it is not necessary that all stakeholders strongly support all elements of the agreement to reach a consensus based decision.

Furthermore, the OHI-Toolbox fosters collaboration by providing experts and leaders from various fields an environment to gather data in a central location, develop goal models, and identify natural targets. Often times, information availability makes the target selection process less subjective and thus easier to accept by stakeholders.

3. Effectiveness. In order to effectively address the global challenges and risks, the governance model must include means to ensure implementation of decisions.

OHI is been implemented in nearly 30 countries worldwide, including both developed (Canada and Sweden) and developing countries (Samoa and Ecuador). The objectives of each country vary depending on their needs and their experiences in ocean management. However, in all cases, we have witnessed tangible improvements in ocean management throughout all stages of the process. OHI helps identify geographic and thematic priorities in a country, and its iterative nature emphasizes informing decision-making with the assessment results after testing management options to determine the most adequate and cost-effective interventions to meet established targets. Using the assessment’s results, we guide stakeholders to reach agreements of what will be accomplished before reassessing in the future. Each agreement reached should be described in detail, considering



potential implications for specific groups that may be negatively affected by the decision, costs incurred, specific roles and responsibilities of stakeholders involved, and timeline for the implementation. Objective criteria for monitoring progress towards the agreements should be established, taking into consideration any resources necessary. In many cases stakeholder agreements must be approved by regulatory agencies or elected officials, in which case, all proposed recommendations should be organized in a document highlighting the benefits and costs of each agreement. It is recommended stakeholders meet periodically to review progress made towards joint agreements, which also promotes greater trust and collaboration among individuals and organizations

4. Resources and Financing. The proposed governance model must have sufficient human and material resources at its disposal, and these resources must be financed in an equitable manner.

Our efforts seek to institutionalize ocean management throughout the appropriate government agencies and institutions. The costs associated with the effective implementation of OHI represent an insignificant fraction the benefits societies gain from effective ocean resource management. Since the program focuses primarily on capacity building, transfer of knowledge, conducting assessments with existing information, and convening stakeholder meetings, the largest operating costs are dedicated human resources. As such, we are constantly encouraging our in-country partners to budget for, and allocate, sufficient human resources and capital for ocean and coastal management as an investment rather than as a cost.

5. General Security. The governance model must guarantee international security and prevent disputes from escalating into war or other large-scale armed violence. Nations and ethnic groups must be guaranteed protection from external attack and must receive assistance in handling internal disputes fairly.

Our approach to multi-stakeholder participatory decision-making borrows heavily from the concept of Environmental Peace Building. As populations grow and sea-levels rise, coastal migration will also increase, leading to higher population densities and further straining natural resources. In the ocean domain, fully exploited fisheries may collapse, coastal habitats may degrade further as they are converted, and pollution will continue to grow unmitigated. This is a recipe for conflict, violence, and war.

The OHI approach focuses heavily on collaborative management by bringing together stakeholders with often differing interests, identifying options for mutual gain, and establishing objective criteria for verification. By collaborating to reach agreements on the extraction, allocation, and production of ocean and coastal resources, stakeholders can ensure they sustainably maximize ocean productivity in the long-term. The iterative nature of the process ensures that stakeholders are constantly negotiating a sustainable mix of outputs that meets their needs while adapting to changing social, environmental, and economic conditions. This endeavor makes best use of limited resources while building social cohesion and resilience to change.

6. Flexibility. A successful governance model must allow revisions and improvements of its structure and components.

OHI+ was developed with the understanding that different countries have different



priorities of what marine aspects are more or less relevant, and as such, they will have differing objectives and targets for achieving a sustainable balance of ocean goals. Moreover, information availability also varies vastly between countries. So, we designed a system flexible enough to cope with the needs of countries with varying degrees of capacity and different political, socio-cultural, and economic systems. OHI provides a robust architecture for managing ocean and coastal resources, but the elements that are used to build the infrastructure will vary from place to place.

Further, as Figure 3 demonstrates, OHI is a cyclical process intended to be repeated throughout time to ensure proper adaptive management mechanisms are put in place. The iterative nature of the process aims at tracking progress towards targets, assessing the effectiveness of management interventions and policies, and establishing more ambitious targets over time, so that resources can be allocated cost-effectively.

7. Accountability and Transparency. It is a fundamental requirement of a successful governance model that it performs the tasks it has been charged with, and that decision-makers can be held accountable for their actions. This includes mechanisms against abuse of power, which can invalidate decisions and actions that exceed the mandate of the governance model, and which can step in when it is clear that decision-makers and relevant institutions are not doing their job correctly. This requires transparency and extensive insight into power structures and decision-making processes.

Participatory processes are aimed at improving accountability and transparency in governance by ensuring that no single player can act on their own without incurring severe social and economic losses. Collaborative ocean management also fosters relationship building and engagements between all participants, providing social incentives to decision-makers and managers to act on behalf of the collective well-being. Lastly, by establishing objective criteria to measure progress towards targets, all stakeholders are able to determine whether each responsible participant held up to their end of the bargain.