THE ASPEN HIGH SEAS INITIATIVE

Strategic Plan

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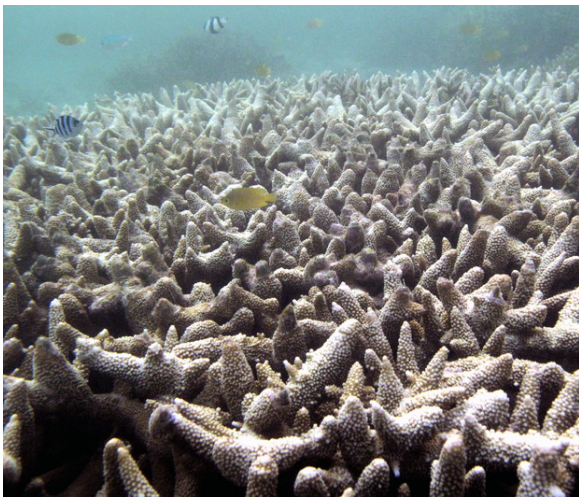
The Global Challenge

The ocean covers 70 percent of the Earth's surface, providing most of the oxygen we breathe and the fresh water we drink through saltwater evaporation to clouds to rain. The ocean determines our weather and climate – by absorbing and moving heat around globally in strong ocean currents. Without a healthy ocean, the Earth will not be habitable for human life.

The ocean also holds the vast majority of the habitable space for our planet's animal and plant life, with many species yet undiscovered. The ocean is also the pathway for 90 percent of global trade. The rapidly expanding "blue economy" has tremendous potential to create food, jobs and economic value if managed sustainably.

Fishing Trawler

The High Seas – areas beyond national jurisdiction – cover 64 percent of the ocean surface and 43 percent of the surface of the Earth and present an historic opportunity to restore and maintain the health of the entire ocean ecosystem. The High Seas are *Earth's last conservation frontier*, meriting concerted leadership, focus and resources to protect them. The time for action could not be more urgent.



A dying coral reef

Deep-sea mining

Shrinking ice caps, sea level rise, extreme storms and flooding linked to ocean conditions, ocean acidification, de-oxygenation, degradation of coastal habitats, plastics and other pollutants, over-exploitation of fisheries, the death of coral reefs and other declines in biodiversity, and new industries like deep-sea mining, all pose increasing risks to our ocean health.

There is mounting evidence from all corners of the globe that the health of the ocean is declining. There are huge floating islands of plastic waste, which are killing fish, marine mammals and sea birds. Man-made pollutants like PCBs are found in fish [1] in the deepest and most remote parts of the ocean, and trash is routinely seen whenever deep-sea photographs are taken.

Overfishing has become a significant problem across many of the world's fisheries, reducing biodiversity and resilience in ocean ecosystems. Depletion of apex predators such as tunas, billfishes, and sharks is particularly acute. Predators in the middle of the food chain – cod, halibut, groupers, skates and rays – and their habitats are also declining due to industrial trawling technologies, and new fisheries are targeting forage fish. Efforts to manage fisheries, particularly on the High Seas, are failing to stem the loss of global ocean biodiversity. [2]

Half of the world's coral reefs, mangrove forests, and seagrass meadows have disappeared or are in serious decline.[3] And as the ocean warms and becomes more acidic from absorbing increasing amounts of carbon dioxide, significant effects are being documented on critical small plants and animals that form the base of the ocean food chain and the photosynthesis that creates oxygen on Earth.[4]

It is becoming increasingly evident that the ocean is not "too big to fail".

Global Solutions Needed

There is a concerted international effort through the United Nations to ensure that 10 percent of the world ocean area is under protection by the year 2020. Although this worldwide effort is gaining momentum toward the goal, the global community is not on pace to meet it. In addition, ongoing efforts through various United Nations bodies are working to create legal mechanisms for protection of ocean areas in the high seas and deep seabed beyond national jurisdiction. There are also important efforts led by NGOs and philanthropy to protect ocean areas within and beyond national jurisdictions. But there are serious limitations to these approaches.

1 For high seas areas, there is very little international law that applies to ocean protection.

While progress is being made, there is still no clear legal mechanism for establishment or enforcement of ocean protected areas on the high seas under the Law of the Sea or other UN treaties.[5] Although the high seas cover 64 percent of the ocean's surface, it remains largely unprotected and a relatively small investment is made each year in high seas conservation compared to the magnitude of the task. At the same time, the dynamic footprint of industrial fishing is large, covering more than 65 percent of the ocean. Reforming high seas governance and managing human use of the oceans must remain a priority. The opportunity for mapping High Seas assets (or areas) is enormous given the host of new technologies rapidly providing new open ocean assessments and novel information.

2 There is limited protection and enforcement in many of the existing marine protected areas (MPAs) and marine managed areas (MMAs) within national jurisdiction.

Many of these areas have seriously limited protections, staffing, funding and enforcement. Large "managed" areas with varying levels of protection produce high costs and marginal results. Rapidly designating more of these areas without

sufficient investment in technological solutions for protection and support will only add to the problem. A recent study[6] of the effectiveness of marine protected areas shows that the most effective areas are large, isolated, sustained over time, well enforced, and fully-protected or "no take" (meaning no fishing) zones. Many recent studies[7] show that *no-take fully protected zones, typically called "marine reserves," work best for protection and recovery* of fish and other marine species, and significantly increase the fish populations outside their boundaries.

3 Significantly more fully protected marine areas are needed to ensure a healthy ocean.

A new analysis of more than 100 scientific papers[6] shows a remarkable consensus that *a goal of protecting at least 30 to 40 percent of the global ocean area* is necessary to ensure a healthy ocean ecosystem. Reaching this goal will also require new protections of high seas areas.

4 Monitoring activities and enforcing protections in marine reserves is challenging today due to the geographic scale of these new ocean areas under protection, their remoteness from harbors or other staging sites, and the alarming intensity with which illegal fishing occurs.

Preserving, safeguarding and monitoring marine biodiversity requires an increased commitment to developing innovative technology that protects ocean wildlife. New global satellite technologies that take advantage of the increasing communications coverage across oceans offer potential solutions. Identifying and following fishing vessels on the high seas is now a reality. Implanting tracking chips in fish that can highlight when and where they have been caught and where they go to market can ensure that fishers and fish are accounted for in new ways. Using automated vehicles and drones for modern maritime surveillance of designated marine reserves can ensure accountability when new reserves are created.

5 Finally, the global costs of adequately protecting large areas of the ocean are significant and there is a lack of management coordination

A global business plan for ocean conservation was conducted many years ago by former Managing Director of Goldman Sachs, Larry Linden.[9] His team found that investments in these global ocean problems are not anywhere near the necessary scale. Their rough budget estimate for sustained protection of just 5 percent of the

ocean was between $18 and $30 billion. All current government and NGO investments in ocean conservation combined would be large, but not approach this scale. Currently, global government investments for fishing subsidies are much greater than for ocean protection and a change in priorities that provides larger investments for protection of ocean capital could meet this enormous challenge.

The Linden team's other major finding was a lack of management coordination within the ocean conservation community. There are many governments, NGOs and academics working toward increased ocean protection, but their efforts are mostly small and fragmented. Although some of the major NGOs have created coalitions to collaborate on these problems, there is *still a critical need for increased leadership and funding on a scale that meets the challenge*.

The Aspen High Seas Initiative

Executive Overview

Establish the Aspen High Seas Initiative as a Collaborative Ocean Protection Policy, Media Engagement, and Technology Program

The Aspen High Seas Initiative will provide increased leadership in raising awareness, advancing strategic thinking, developing policy options, harnessing technology solutions, fostering collaboration, sharing best practices, and generating funding. The Aspen Institute is an organization that is nonpartisan and focused on enable conservation of the High Seas. The initiative will promote the big idea of high seas protection and simultaneously boost ongoing efforts for protection of oceanic waters within national EEZs most "ripe" for success.

Goals of the Initiative

Support the Big Idea of a High Seas Global Marine Reserve

Make the Case for Why Such Stewardship is Compelling

- Create a **High Seas Strategic Plan** with informed science & best opportunities for protection
- Foster the creation of a **United Nations Special Envoy for the Ocean**
- Create a **Global High Seas Agreement** among Nations to support Marine Reserves on the High Seas and a High Seas Global Marine Reserve
- **Support a UN Treaty** for High Seas biodiversity conservation that is ambitious, comprehensive and sets new standards for global accountability
- Build momentum by protecting **4 Areas of the High Seas based on science**
- **Coordinate with Current Efforts** – NGO, Government and United Nations
- Develop **Technology Solutions** for improved exploration, enforcement & accountability
- **Increase Resources** and Support for this global effort

Ignite Global Awareness of the Importance of the High Seas

Marshall Best Evidence of What's at Stake if High Seas Not Protected

- Build from road-tested formula of **Philanthropy + Film + Campaign = Ocean Conservation**, leveraging the success of the films *Mission Blue* and *Sea of Hope*
- Do **Filmmaking & Outreach** for each of the major components of this initiative

- **Develop Messaging** for ocean conservation and climate change – for example, "marine reserves are climate reserves"
- **Create a Brand measure** to promote public awareness of progress and the remaining challenge – a measure of the area of marine reserves, building toward the goal of 30-40 percent of the ocean fully protected
- **Develop Clear Campaign Goals** for protection of High Seas and EEZ marine reserves – for example, a "30 by 2030 campaign" – 30 marine reserves in the High Seas and EEZs working toward 30 percent of the ocean fully-protected by 2030.

Support Large EEZ Marine Reserves as High Seas Adjacencies

Move beyond managed areas to fully-protected Marine Reserves in EEZs

- Support existing and new efforts in **12 EEZ areas** based on biological importance and "readiness" for success for **protection, expansion or enforcement**
- **Identify Key Partners**, opportunities for collaboration, and gaps in support
- **Facilitate and Support Campaigns** and collaborations for each EEZ Marine Reserve
- Conduct **Science, Exploration, Biodiversity Surveys & Expeditions**
- Focus on **Local, Government, and Youth Engagement**

Invest in Technology Solutions

Harness Technologies to increase Exploration & improve Maritime Surveillance

- **Invest in technologies for exploration, observation & research** in the High Seas and EEZs
- **Utilize Global Satellite Tracking** technologies such as Automatic Identification System (AIS) that provide new opportunities to monitor and quantify high seas fishing efforts remotely
- **Invest in New Tagging "Chips"** to monitor poaching and traceability of highly migratory fish in protected, remote locations
- **Use Environmental DNA Technology** that provides rapid capacity for a census of species in a marine reserve in a single sampling trip to identify biodiversity
- **Conduct Rapid Census Methodology Campaigns** in marine reserves
- **Invest in developing the capacity to utilize Autonomous Vehicles and Drones** to improve surveillance tactics in remote marine reserves

Expand Youth Engagement

Focus on the Future by Promoting Ocean Stewardship

- Create **Ocean Conservation Corps** (OCC) – 1,000 youth ages 18-28 in a "service year" for ocean stewardship, who will educate and engage school-age children in ocean conservation and build a global network of 10,000 youth volunteers
- OCC will be part of the **Service Year Alliance** chaired by Gen. Stanley McChrystal, The **Corps Network**, and **Earth Conservation Corps**
- Support **Ocean X** – new undergraduate & graduate curricula to enhance ocean literacy, experiential learning opportunities, and stewardship

Provide Thought Leadership on Climate Change

Address climate mitigation and adaptation strategies

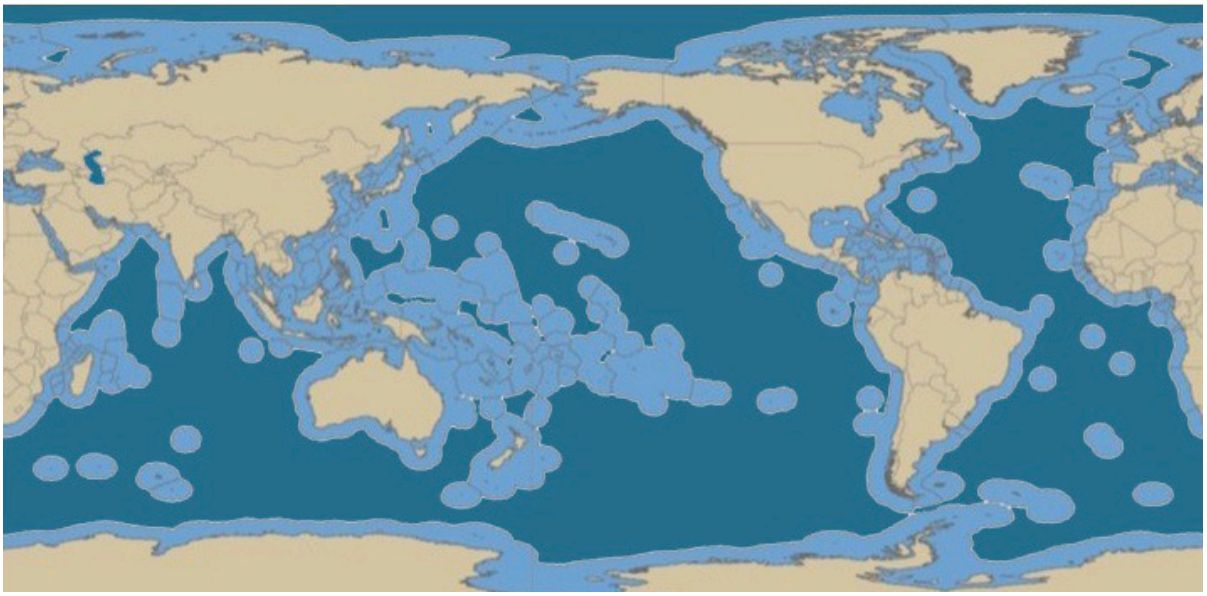
- Develop the theme that **Marine Reserves are Climate Reserves** to help restore balance
- Focus on **Ocean-related Climate Issues**, like sea level rise, ocean warming, and acidification
- Address **Global Economic, Agricultural, Social, and Defense** consequences
- Develop **Risk and Resilience & Protection and Mitigation** approaches
- Foster an **Ocean Sector that participates in Climate Change**, including the "We're Still In" campaign in the United States to fulfill the Paris Climate Agreement

The Big Idea of a High Seas Global Marine Reserve Make the Case for Why Such Stewardship is Compelling

Defining the High Seas

Under the United Nations Convention on the Law of the Sea (UNCLOS), most coastal and island nations have claimed 200-mile Exclusive Economic Zones (EEZs) off their shores, in which they have *sovereign rights* over the resources on the seabed and in the water column and jurisdiction over marine scientific research and environmental protection. They can control fishing, mining, oil and gas extraction and other resource-related efforts, but not shipping or other free passage of vessels through these waters.

EEZs cover almost 40 percent of the global ocean surface. The remaining open ocean areas are called the High Seas. The High Seas cover 64 percent of the ocean surface (and 43 percent of the surface of the Earth). The High Seas are *Earth's last conservation frontier*, meriting concerted leadership, focus and resources to protect them.



Potential EEZ areas out to 200 nm are shown in light blue; the high seas beyond 200 nm are in dark blue[10] (VLIZ).

Protecting the High Seas

Except for historically illegal activities such as piracy, slavery, and drug trafficking, there is very little law or regulation for protecting marine life in this "global commons" which belongs to all humankind. Industrial fishing is ubiquitous and

until recently difficult to monitor. There is woefully little funding dedicated to expanding efforts to conserve this vast ocean space.

Various efforts are underway. The United Nations has for the past decade been discussing a possible new treaty under UNCLOS to enable the establishment of High Seas Marine Protected Areas, to require environmental impact assessments, and establish other mechanisms to improve high seas governance. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is studying ways to extend the designation and protection of World Heritage Sites to areas of the High Seas.[11] Scientific efforts under the UN Convention on Biological Diversity (CBD) have described over 60 areas of high ecological or biological significance beyond national jurisdiction while documenting that much of Earth's diversity of plant and animal life still lies undiscovered in the shallow and deep waters of the high seas, some of it being destroyed by activities like deep-sea bottom trawling before it can even be discovered.[12]

The good news is that in July 2017, **the High Seas Alliance (a consortium of 35 NGOs and IUCN)** succeeded in convincing UN Member States (through a "Preparatory Committee") to recommend to the UN General Assembly that formal negotiations for the UN Treaty be launched as soon as possible. Official negotiations may start as soon as 2018. We will work collaboratively with the High Seas Alliance and other partners working on the high seas to scale up ambition, raise awareness, and stimulate and invest in the new technologies required for exploration, research, enforcement, surveillance, and protection of High Seas reserves.

The Aspen High Seas Initiative will join this international discussion, and bring additional support – in the form of leadership, convening, technology, expeditions, new science, youth engagement, film, outreach and resources – to advance these efforts. But we will aim to drive the conversation toward an emerging idea of *making the entire high seas, the Earth's global commons, a marine reserve where all fishing is banned*.

This approach will disallow 20 percent by value of today's global commercial fisheries operations, over 60 percent of which are conducted by just 10 developed nations [14] with heavy government subsidies. Protecting the high seas from fishing will benefit all maritime nations by increasing the fish and other marine life within their EEZ areas and will have no negative impact on local human populations engaged in subsistence fishing as none of them are close to the high seas.

A UN Special Envoy for the Ocean

When UNCLOS was adopted in 1982, a Special Representative for the Law of the Sea at the level of Under-Secretary-General was appointed to coordinate all discussions on Law of the Sea within the UN system. This provided the strategic leadership and political weight to enable rapid progress.

We will work toward creation of a similar high-level representative to coordinate discussions and actions toward promoting ocean health and resilience, including through marine reserves. Highly successful UN Special Envoys exist in other areas, such as the UN Special Envoy for Malaria, that brought global leadership, focus on clear goals, new support, better coordination, and accountability for remarkable results over the last decade. Coordination will be required across various UN Conventions, such as the Law of the Sea (UNCLOS), the Convention of Biological Diversity (CBD), the London Dumping Convention, International Maritime Organization regulations, and many others.

Global High Seas Agreement

In addition, we will pursue a Global High Seas Agreement among nations that supports a network of High Seas Marine Reserves and ultimately a marine reserve on the entire high seas. Recent findings show that closure of the entire high seas to fishing will create spillover effects and that 120 maritime countries would be expected to experience net gains in the landed values of their fisheries catches.[15]

Build Momentum and Awareness of the High Seas Through 4 Areas

To raise awareness of the importance of the high seas and to build momentum for a High Seas Marine Reserve, we will focus initial international attention on four iconic high seas areas. See *Appendix 1* for a global map and details on each:

- Pacific: "White Shark Cafe"
- Atlantic: The Sargasso Sea
- Central Arctic Ocean
- Sub-Antarctic Palmer Archipelago

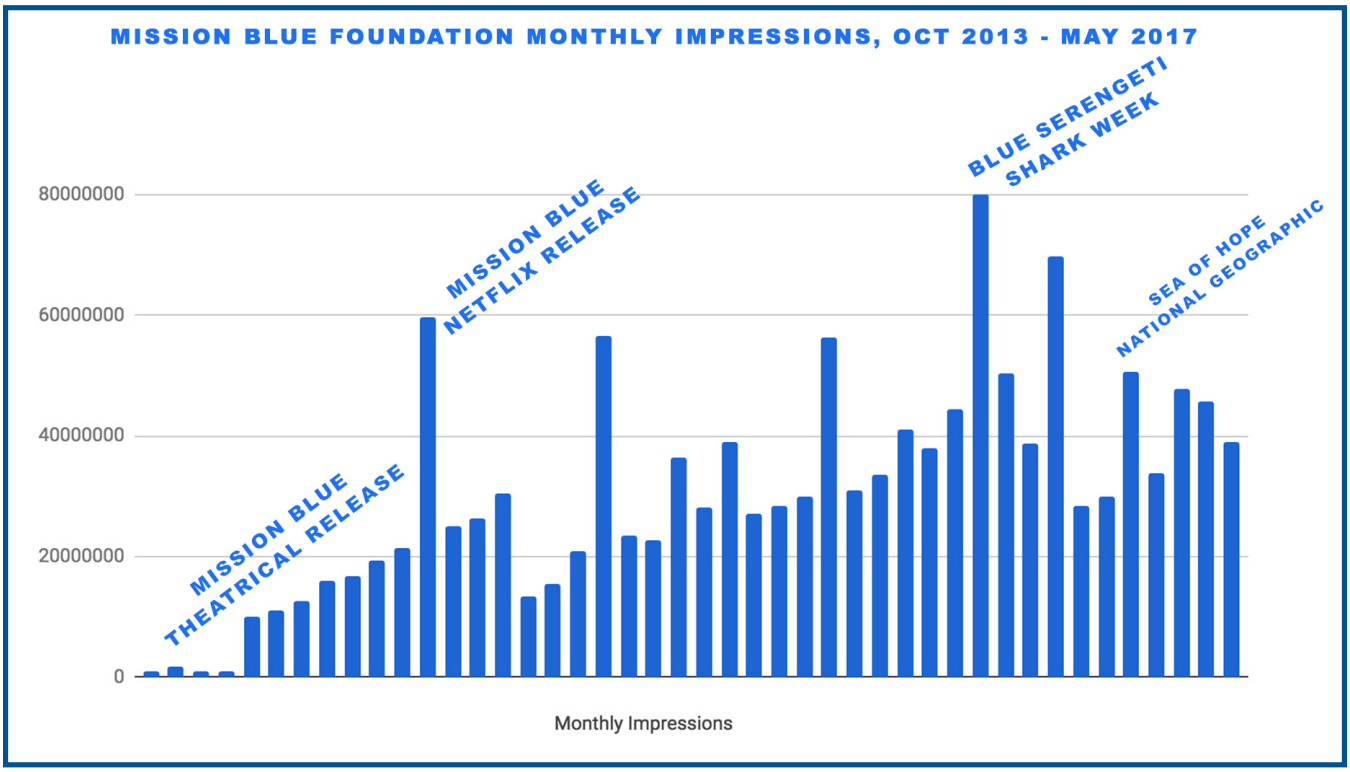
High Seas Pockets

We also will raise awareness of the existence of what we call "High Seas Pockets"– areas within the High Seas that are surrounded by the EEZs of one or more countries that could cooperate to provide some protection for them. See *Appendix 1* for global maps and details on each of the 14 High Seas Pockets.

Ignite Global Awareness of High Seas Importance

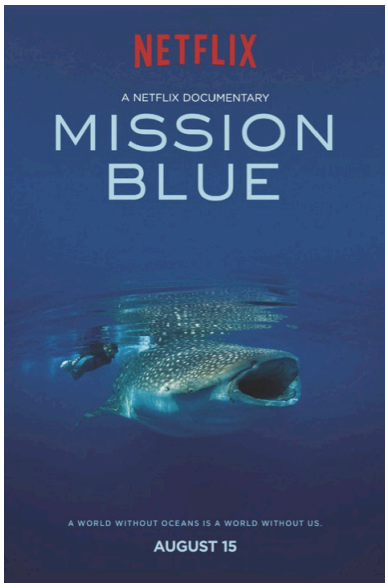
Ensure understanding of risks if High Seas remain unprotected

The initiative will bring to the High Seas our winning formula of adding philanthropic funding, and corporate sponsorship to exponentially multiply the power of broadcast and social media as a conservation tool. The following chart documents our model's impact through the reach of our films *Mission Blue, Blue Serengeti* and *Sea of Hope* as measured by engagement with Sylvia Earle's Mission Blue Foundation.



All aspects of the Aspen High Seas Initiative will be supported and enhanced by a robust and targeted filming and outreach effort. These efforts will knit the initiative together, and educate and engage key stakeholders, policymakers and the public.

Although an increasing number of impressive underwater films focused on a variety of conservation issues in different ocean areas add to the general public understanding of ocean conservation concerns, many do not focus on specific goals. The Aspen High Seas Initiative will build on the success of Emmy-Award winning and Netflix-distributed documentary film *Mission Blue* and the recent National Geographic film, *Sea of Hope: America's Underwater Treasures*, and *Discovery's Blue Serengeti*.



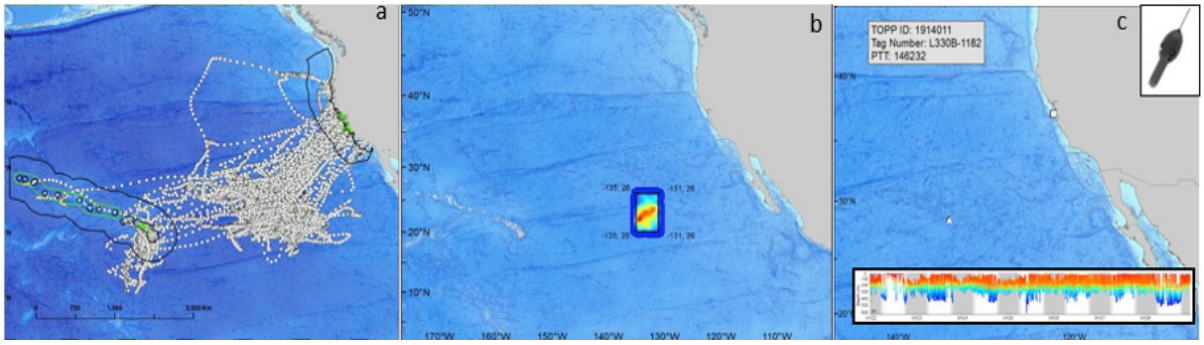
Our filmmakers will add to this momentum by *focusing on high seas areas, ecosystems, and species* of special interest to these waters. Initially, these efforts will focus on our *four chosen high seas areas* to raise awareness of the importance of protecting these places and toward the ultimate goal of a High Seas Marine Reserve. Our media will capture important governmental and international meetings working toward this goal. One example to bring significant public attention to the High Seas will be a first-ever voyage to the "White Shark Café," an area in the High Seas in the Pacific Ocean.

Our team will also *focus on the specific areas within EEZs that seem ready for full protection*. This important effort can quickly add to the total area of ocean protected while also addressing the processes of international negotiations necessary to create protection on the high seas. In each of the prioritized focus areas for fully protected marine reserves within national jurisdiction, there will be an expedition with Dr. Sylvia Earle, young people, and other members of the Aspen team and its partners to document the unique qualities of the area that require protection. Each film and the scientific data will be taken by Dr. Sylvia Earle and other leaders into meetings with both the local communities that have been supporting protection and high-level Government officials that can actually make a difference in protecting these areas. All expeditions *will include youth members* of the Ocean Conservation Corps, who will use their oceans and science communications training and social media skills to engage their peers in protection of these important areas.

Voyage to the White Shark Cafe

One example of a focused mission to explore a potential new area for World Heritage Site protection will be conducted in year one. In April of 2018, Dr. Barbara Block of Stanford will lead a team aboard the Schmidt Foundation owned vessel, the R/V Falkor to the White Shark Café, a pristine, open ocean region (subtropical gyre) halfway between the west coast of North America and Hawaii, in the eastern region of the North Pacific Subtropical Gyre. White sharks are warm-bodied, top predators in coastal and open ocean ecosystems that are distributed around the world. Like most sharks, they are long-lived, late to mature, and produce few young, making them vulnerable to overexploitation by high seas fishers.

From sophisticated electronic tagging, Dr. Block and her team have learned that each winter virtually all adult white sharks in the northeastern Pacific head for this region that is effectively an "oceanic desert". Relying on energy stores from feeding on coastal seal colonies in California and Mexico, they make the month-long journey from the cold rich California Current to their destination in the clear warm waters of the White Shark Café, where they are seen rapidly diving from the surface to the depths in the Café. Our voyage aims to discover what compels one of the ocean's largest predators to congregate in this unlikely and understudied ocean region in an effort to inspire protection for the area.



Satellite tags (a) reveal the positions (white circles) of white sharks tagged in the marine sanctuaries off the California Central Coast and the location of the White Shark Café (blue square in b). Single point reveals the visitation of an individual shark to the Café (c), and the inset box reveals the rapid highly oscillatory diving that occurs there (figure courtesy of Dr. Barbara Block).

Aspen will also tap top scientists and leaders to create a published measure that will track progress toward meeting the goal of 30-40 percent of the ocean being fully protected and will indicate areas within the High Seas and within national jurisdiction that need additional support, exploration, and enforcement to be designated as fully-protected marine reserves. Such accountability for results will be a key component of a global awareness campaign to show progress.

Support Large Marine Reserves within EEZs

Move beyond Marine Managed Areas to fully-protected Marine Reserves

The United Nations goal of 10 percent of the ocean protected by 2020 includes varying levels of protection in these areas, but scientists agree that fully protected areas are far more effective and that 30-40 percent of the ocean must be conserved to restore and maintain ocean health. *The Aspen High Seas Initiative will focus on attaining official designation and enforcement of fully-protected Marine Reserve status for large ocean areas within EEZs*. The initiative will collaborate with and support existing institutions and leaders who are working in each of the designated marine reserve areas.

Marine Reserves have differing definitions among different organizations, but *our focus and goal will be full protection and enforcement*. That means no commercial fishing, no dumping, no oil and gas exploitation, and no seafloor mining. These fully-protected marine reserves have been shown [16] to both protect and restore natural systems such as fish populations and coral reefs. Full protection can eliminate local stressors helping these systems to better adapt to climate change. Full protection is also easier to manage and enforce and the initiative will draw on the latest technology solutions to do so.

The Aspen High Seas Initiative will partner with many ocean conservation NGOs and coastal nations worldwide. We will offer centralized advisory support such as launching campaigns around ongoing efforts for selected areas, and provide extra planning/organization, legal, scientific, media and youth engagement support for them.

In addition to the four High Seas areas, we have chosen an initial list of 12 ocean areas within EEZs for our focus. They all have unique ecosystems and species, or characteristics such as major migration routes, or feeding and spawning grounds for marine species. They also have active involvement from local communities and NGOs and have good momentum toward being designated for full protection. Most of these areas have already been highlighted for future protection by NGOs, such as Mission Blue's Hope Spots [17], National Geographic's Pristine Seas [18], and Pew's Ocean Legacy Projects [19]. Our plan is to bring these places into full protection and enforcement over the period in which this plan operates.

Our initiative will provide tools and support to ensure that there are focused campaigns for protection, expansion or enforcement for each of them. These will include expeditions led by Dr. Sylvia Earle to add to the scientific knowledge of

these areas, as well as their problems and promise. Additional efforts by the scientific teams will create a rapid assessment protocol and team that can quickly catalogue the species being impacted by a closure, and distributions of apex predators. The expeditions will be filmed and shared with local protection advocates and the local general public to raise awareness of the need for increased protection. And Dr. Earle will take expedition film footage and scientific findings with her to meetings with government leaders in the concerned countries.

Our initial list of 12 areas is shown here, with details and a global map presented in Appendix 2:

1. Ascension Island, United Kingdom
UK committed, but needs to be codified and once officially designated, will need help in planning, implementing, community outreach and education, funding and enforcing

2. Outer Seychelles Islands
Government and NGOs working on "debt-for-nature swap" and additional technical assistance could be helpful

3. Republic of Palau
Protected, but resources needed for long-term strategies and efforts for enforcement, monitoring, sustainable finance, and marketing to ensure they receive the benefits from this bold conservation action

4. Islands of the Federated States of Micronesia
FSM joined other Micronesian nations in Micronesia Challenge. External support needed to ensure protection from commercial fishing

5. Subantarctic Islands of New Zealand
NZ Government considering some protections, but none yet against commercial fishing. External efforts to encourage formation of oceanic Marine Reserves

6. Kermadec Islands and Trench, New Zealand
NZ Government proposed protection, but needs official creation and implementation of the Marine Reserve

7. Revillagigedo Islands, Mexico
Four islands are a World Heritage Site, but need to expand areas currently protected and improve monitoring and enforcement

8. Easter Island, Chile
President announced formation of Easter Island Ocean Park, but assistance needed for actual protections to be codified for implementation, enforcement and ongoing community engagement

9. Galapagos Islands, Ecuador
While the Islands are well protected, the waters have small and limited protected areas, and there is commercial fishing allowed. More protection is needed.

10. Malpelo Island, Colombia
Protected and a Site of Natural Heritage, but still subject to illegal shark fishing. A viable strategy and resources needed for enforcement

11. Gardens of the Queen, Cuba
Largest marine reserve in the Caribbean. With opening up of Cuba to tourism and development, increased protections and buffer zones needed

12. California Current Complex, USA
The recent proposal to create a UNESCO World Heritage Site of the three National Marine Sanctuaries and various state reserves along the central coast of California

Invest in Technology Solutions

Harness Technologies to increase Exploration & improve Maritime Surveillance

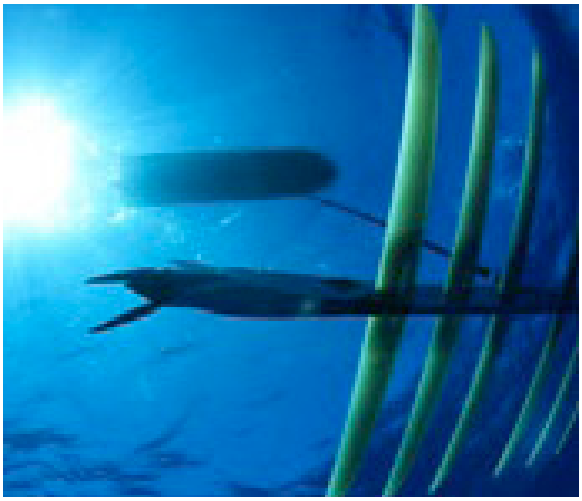
Integral to the success of the High Seas Initiative must be support to develop and apply submersible technologies to effectively explore, conduct research and monitor ocean ecosystems from the deepest depths to the surface waters above. Collaboration with institutions and companies that have existing equipment and fostering the development and operation of new systems dedicated for science-based exploration and conservation will help fill the enormous gaps in current knowledge, especially of the deep water regions of the High Seas.

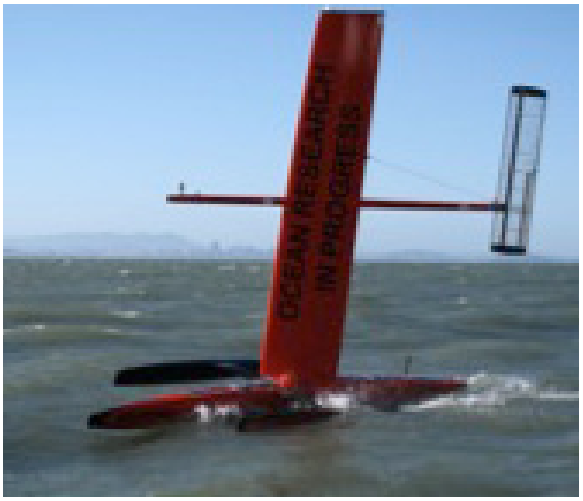
Most of the ocean is unknown and unexplored, due largely to the lack of effective working access below the upper 100 feet or so. One of the findings of the 10-year Census of Marine Life (2000-2010) was "the deeper we go, the less we know – but the more new discoveries we make." Less than 10 percent of the ocean floor has been mapped with the accuracy known for the land or for the moon, Mars, and Jupiter. Thousands of spacecraft and millions of aircraft, ships and shallow underwater systems exist, but fewer than 30 vehicles can take people 1,000 meters (3,300 feet) deep, fewer than a dozen can go to the average depth of the ocean – about the depth where the Titanic rests on the ocean floor 2 ½ miles down – and only two submersibles, one in 1960, the other in 2012, have taken humans to glimpse the deepest ocean seven miles down. Since the 1980s, remotely operated and unmanned autonomous robotic devices have enhanced vicarious access to the sea, mostly to support offshore oil, gas and mining interests, and two remotely operated vehicles made descents to the deepest place in the sea, the Mariana Trench. The entire fleet of subsea systems currently available for scientific exploration, research and monitoring is a fraction of what is needed to respond to the urgent demand for understanding not only the basic nature of most of Earth's oceanic biosphere, but also to document and measure the changes that are occurring beyond the reach of current instrumentation.

In addition to the use of technology for exploration, technology can play key roles in maritime surveillance. Forward-thinking academics, NGOs and governments now seek to protect endangered predator populations and reef areas by establishing protected marine reserves, or breeding area protections where no-take zones may allow depleted species to recover. Modern technology born from silicon chips and Earth-orbiting satellites can now provide marine reserves with continuous surveillance, allowing for enforcement of these areas.

New solutions for monitoring and resolving the conflicts of illegal fishing are on the horizon. For the first time, satellites are effectively being used to catch, prosecute and black-list fishing vessels. For instance, the largest fishing vessel in the world – the Lafayette – was tracked with satellite technology in 2015, which showed that it was engaged in illegal fishing activity in Chile's waters. Chile used the satellite evidence to bring a case against the vessel owners and the vessel was subsequently "black listed".

New electronic tags, wearables for fish and sharks, will provide real-time ocean observation technology, linking high seas animals to satellites. This promises to fill the gaps in surveillance technology, providing solutions for identifying illegal shark finning, improving surveillance patrols in marine reserves, and policing of tuna catches. For example, Stanford scientists are creating a novel tag that sends an immediate alert via Iridium satellite and reports its precise location when the animal carrying the tag (e.g., a sea turtle, tuna or shark) is caught and removed from the sea. By sending data rapidly via Iridium satellite and messaging services,





this "FAST" tag will advance the state of the art in wildlife tagging systems, and give scientists, wildlife managers and conservation officials an essential new tool to reduce the impact of illegal shark fishing in protected waters. Using such tags can act as a security device, pin-pointing illegal activity, with the added capacity to deter illegal fishers from entering in a marine reserve. The concept is comparable to the electronic security tags present in clothing stores.

The new generation of monitoring tools is needed to close the loop on regulating large marine reserves. These include autonomous vehicles that patrol for vessel incursions using ocean acoustics and photography, drones that take off in swarms

and patrol the skies, vessel monitoring observations using the Automatic Information System, radar and other technologies and "FAST" tags that report to patrol boats and drones that would then work together seamlessly to send an end user the location of a vessel intrusion, a picture of the vessel, and improve the efficiency of enforcement operations.

Create an Ocean Conservation Corps & Ocean X

Focus on the Future by Promoting Ocean Stewardship Among Youth

The Aspen High Seas Initiative will create a new, first-ever Ocean Conservation Corps. This new Ocean Conservation Corps (OCC) will be developed by the Service Year Alliance chaired by General Stanley McChrystal and The Corps Network. The OCC will also be developed at the college level by Stanford Professor Barbara Block and her colleagues and be interactive with their Ocean X initiative to expand ocean literacy, experiential learning and stewardship among college-age students.

Proud Member of
The CorpsNetwork
Strengthening America through service and conservation

EARTH CONSERVATION CORPS

The OCC will use the power of national service to raise awareness and action on ocean stewardship among the next generation. Each year, up to 1,000 young people ages 18-28 will have the opportunity to do a full year of national service working on ocean stewardship projects that are specifically designed to advance the goals of this Aspen High Seas Initiative. We also envision the OCC having international reach like the Peace Corps and Global Health Corps that deploy Americans and young people from other nations to work together on public problems. Consistent with successful existing national service programs in other areas, including land conservation, corps members will receive a living stipend

and, for those members who are supported by AmeriCorps, an education award for their service year. This corps, in turn, will educate and engage school-age children in ocean conservation and will mobilize 10,000 ocean stewardship volunteers globally through social media networks.

The OCC will offer part-time and volunteer opportunities for young people to engage. Through a continuum of outreach, education, training, and hands-on experience and service, the OCC will engage youth of all ages, backgrounds, and socioeconomic status in marine conservation science, service, and careers. It will pursue partnerships with existing national service programs, such as AmeriCorps, VISTA, Peace Corps, The Corps Networks' conservation programs and similar efforts in other countries to provide wider global reach for the youth involved in this Aspen High Seas Initiative.

OCC members will participate in expeditions to collect scientific data, improve their observational skills, and to experience the ocean. The trips will take place in the potential new marine reserves; be part of the filming and outreach process; place the students at the forefront of science communications and social media to prompt engagement and action by their peers; attend meetings with scientists, nonprofit leaders, photojournalists, filmmakers, policymakers and local stakeholders; and meet regularly (by video teleconference) with Dr. Sylvia Earle and other Leadership Council members to assess progress toward the goals of this Aspen High Seas Initiative.

Youth participation is increasingly important for educating and engaging the next generation in these critical ocean concerns. Young people possess the social media skills to organically create a powerful youth movement supporting our plan to create a High Seas Marine Reserve and to protect, expand and enforce marine reserves on the High Seas and in the EEZs.

OCC at Stanford will pilot the first college chapters that will use motivated undergraduates to participate in ocean conservation, Ocean X undergraduate and graduate curricula, and Stanford@Sea educational initiatives to expand opportunities for ocean literacy and cross-disciplinary training on ocean policy and science. Together, they will use the expedition oceanographic data to create a new ocean curriculum for college level participation. This effort has the potential to expand across U.S. campus life, linking to the network of more than 200 colleges and universities that the Service Year Alliance has created, to provide a rapid expansion of the Aspen High Seas Initiative among 18-28 year olds.

Provide Thought Leadership on Climate Change

Address Climate Mitigation and Adaptation Strategies

Accelerating climate change is having broad and worrisome impacts on the ocean, on its plant and animal life, on ocean currents, on the atmosphere, and on inland and coastal areas worldwide.

Efforts by the Aspen High Seas Initiative – creating a Global High Seas Marine Reserve, and ensuring designation and support for large, fully-protected marine reserves within national EEZs – will support healthy ocean ecosystems. These areas will be better able to provide the carbon storage and oxygen creation we all depend on to mitigate climate change. This Initiative will propel the notion that marine reserves are also powerful climate reserves. To do so, we will gather together top scientists, NGOs, and policymakers to solidify this case. The Initiative will support educational efforts via Ocean X and the Ocean Conservation Corps to increase climate literacy among the next generation of ocean leaders.

Hurricane

Coastal Flooding

But even with these efforts, we will see continued climate impacts such as increasingly destructive storms, major sea level rise damaging all coastal cities worldwide and coastal infrastructure like roads and port facilities, and geographic movement of temperature and rainfall zones with major impacts on agriculture. These changes will likely force massive evacuations and movements of human populations – often across national borders – in search of non-flooding and cultivatable land. These migrations will create significant economic disruption, civil strife, and national defense concerns.

The Aspen High Seas Initiative will *convene world experts to address these ocean-related climate concerns, and seek thought leadership on risk, resilience, and potential mitigation and adaptation approaches*.

Collaborative Ocean Protection Policy, Media & Technology Program of the Aspen Institute

The Aspen Institute is a globally-respected, nonpartisan convener of world experts with a track record of translating big ideas into reality. It is well-positioned to develop, elevate and sustain national and international conversation and action on ocean conservation. With the advent of partner Aspen Institutes in Europe, Latin America, and Asia, Aspen has the reach a global ocean initiative needs.

Aspen Ideas Festival

Aspen is explicitly an educational institution naturally suited for the storytelling aspects of this endeavor. It has an envied history of attracting individual, corporate and foundation philanthropy and media attention. Aspen is home to artists, scientists, and educators, business leaders, policy experts and politicians from

both sides of the aisle – leaders with skill sets and sensibilities to succeed. Aspen's most recent broad strategic initiative is to directly engage with youth, down to age 14. Consistent with this are our proposed creation of the first-ever Ocean Conservation Corps and Ocean X curricula to get youth directly involved in ocean conservation, and in spreading the message to their peers.

The ocean is so vast, the problems so widespread, the effective solutions so expensive, and the ocean conservation community still so fragmented that ocean efforts can benefit greatly from the support of a new and respected collaborator. What The Aspen High Seas Initiative will do is focus on areas where there is involvement of local and global communities, governments, NGOs, and United Nations groups, and where the prospect of full protection seems most promising. We will set clear goals for ocean protection, hold ourselves accountable for progress over time, and educate and engage the next generation who will carry on the work for decades to come.

Aspen is also experienced and well positioned to get the sometimes-competing NGOs with similar missions to work together. The Aspen High Seas Initiative will not attempt to organize the entire field, but collaborate smartly with NGOs and other stakeholders to achieve the specific outcomes of the plan.

Finally, Aspen is not viewed as an environmental NGO. As such, Aspen's enthusiastic embrace of this historic initiative lends credence to the notion that this is an important matter – not just for those of any one political persuasion, and not just for the green and blue environmental movements – but as a matter of global urgency for all. The Ocean Elders have issued a letter of support for the Aspen High Seas Initiative and its various components (*see Appendix 4*).

STAFFING AND BUDGET

Full-Time Staff

- Executive Director
- High Seas Manager
- Marine Reserves Campaign Manager
- Expeditions Manager
- Partnerships and Communications Manager
- Technology Solutions Manager
- Youth Engagement Manager
- Administrative Assistant
- Fellows and Interns

Multi-Year Duration: 2017-2030

Annual Costs

- Staff and Offices: $1.5 million per year
- Development of High Seas Strategy, Engagement and Leadership: $200,000 per year
- Campaigns to support Marine Reserves – 3 a year for first 4 years: $2.7 million per year
- Expeditions to High Seas areas and Marine Reserves: $1.5 million per year
- Filmmaking, Travel and Communications: $2 million per year
- Deployment of Technology for Exploration: $3 million per year
- Development of Technology Solutions for Enforcement: $3 million per year
- Establishing/supporting the Ocean Conservation Corps: $2 million per year
- Support for Development of Ocean X Curriculum: $1 million
- Support for legal expertise and work of the High Seas Alliance campaign for robust high seas biodiversity treaty: $1 million per year
- Convening support for Thought Leadership on Climate Mitigation and Adaptation: $100,000 per year

Total Costs: $18 million per year

Key Performance Measures

Set Campaign Goals: For example, 30 by 30 by 2030 Campaign

- 30 Marine Reserves Toward 30 Percent of Ocean Protected by 2030

Year One (June – Year End 2017)

- Soft Launch of Aspen High Seas Initiative at Aspen Ideas Festival (Jun 2017 – **Completed**)
- Secure initial $1.5 million to hire Executive Director and Team for Initiative (Aug-Sept 2017)
- Secure $5 million to begin implementation of other components (Aug-Dec 2017)
- Create a High Seas strategy, including creation of UN Special Envoy for the Ocean, Global High Seas Agreement, and other actions in partnership with the High Seas Alliance
- Complete expedition, science funding and filming for White Shark Café (Sept-Dec 2017)
- Release *World at War* Film to ignite global awareness and action to protect the High Seas
- Develop campaigns to support the first Marine Reserve in High Seas (Sept-Dec 2007)
- Develop campaigns to support the first 3 Marine Reserves in national EEZs ripe for formal designation, expansion or enforcement (Sept-Dec 2017)
- Schedule Expeditions for the four identified potential Marine Reserves in High Seas (Sept-Dec 2017)
- Schedule Expeditions for the first 3 Marine Reserves in national EEZs (Sept-Dec 2017)
- Create the Ocean Conservation Corps programs and plan enrollment of first youth Corps members (Sept-Dec 2017)
- Schedule films connected to each priority High Seas & Marine Reserve area (Sept-Dec 2017)
- Invest in Technology and Plan for Exploration and Enforcement Solutions (Nov-Dec 2017)
- Begin development of plan for climate change-ocean sector convenings (Dec 2017)
- Develop Aspen suite of tools – campaign development, legal support, and communications, etc… – that can be made available to leaders of marine reserve campaigns
- Begin development of Ocean X curriculum for undergraduate and graduate students (Oct-Dec 2017)

Year 2018

- Advance our High Seas Strategy, including creation of UN Special Envoy for the Ocean, Global High Seas Agreement, and other actions, in partnership with the High Seas Alliance
- Implement communications plan, including films and social media to ignite global action
- Implement campaigns to support the 4 marine reserve areas in High Seas
- Implement campaigns to support first 3 marine reserve areas in national EEZs
- Complete Expeditions and develop films for 4 High Seas marine areas
- Schedule Ocean Conservation Corps involvement in expeditions and filming
- Pilot test technology solutions for enforcement and market model
- First climate change/ocean sector convening of top leaders and scientists
- Implement Ocean X curriculum for undergraduate and graduate students

Year 2019

- Advance our High Seas Strategy in partnership with the High Seas Alliance
- Implement campaigns to support the 4 marine reserve areas in the High Seas
- Develop and implement campaigns to support the second wave of marine reserves within EEZs
- Release additional films related to key marine areas
- Schedule Expeditions and films for high seas and EEZ marine areas
- Schedule Ocean Conservation Corps involvement in expeditions and filming
- Expand technology for exploration and technology solutions for the development of a plan for data gathering, monitoring and enforcement of the protected areas
- Make ocean curriculum for undergraduate and graduate students widely available

Year 2020

- Advance our High Seas Strategy in partnership with the High Seas Alliance
- Implement campaigns to support the 4 marine reserves in the High Seas
- Develop and implement campaigns to support the third wave of EEZ marine reserves most ready for formal designation
- Ongoing implementation of communications plan, including films
- Schedule Expeditions and films for High Seas and EEZ marine areas
- Schedule Ocean Conservation Corps involvement in expeditions and filming

- Deploy Technology across Marine Reserves and build data systems to support enforcement and advertise utility of systems to increase usage beyond specific marine areas
- Expand Ocean X curriculum for undergraduate and graduate students and show connections to Ocean Conservation Corps

Year 2021

- Advance our High Seas Strategy in partnership with the High Seas Alliance
- Develop and implement campaigns to support the fourth wave of EEZ marine reserves most ready for formal designation
- Ongoing implementation of communications plan, including films
- Schedule Expeditions and films for these High Seas and other marine areas
- Schedule Ocean Conservation Corps involvement in expeditions and filming
- Expand Technology enforcement footprint

Year 2022

- Evaluate progress, approaches and budget
- Identify more geographic areas to support for marine reserve designation
- Update the high seas strategy
- Update the technology/enforcement
- Refocus film and outreach efforts on these new areas

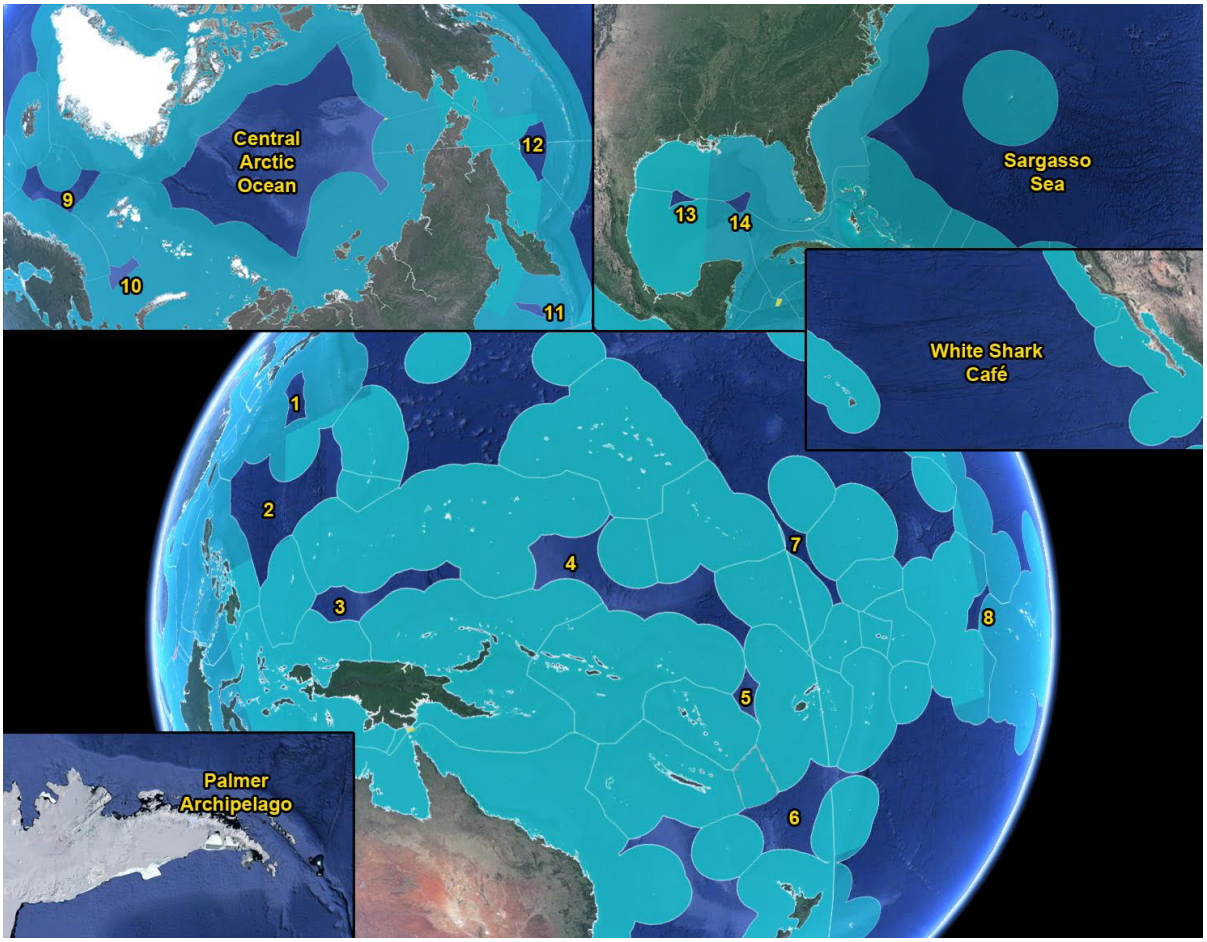
Years 2023 – 2030

- Refine strategy and approaches and continue with updated goals and budget

APPENDIX 1

Four High Seas Priority Areas For Campaigns for Protection & Enforcement and High Seas Pockets to Highlight Need for Collaboration

The Aspen High Seas Initiative will join the international discussion for protection of high seas areas, and bring additional support – in the form of leadership, expeditions, science, youth engagement, film, outreach and resources – to advance these efforts. We have chosen four iconic high seas areas where we will focus international attention on the high seas.



A global map showing locations (in blue) for the Aspen High Seas Initiative's initial list of priority areas beyond national jurisdiction (ABNJ) of coastal and island nations, on the HIGH SEAS, where we will focus attention on the importance of a marine reserve to ban all fishing on the high seas. These areas are described within this Appendix 1.

But we will aim to drive the conversation toward an emerging idea of *making the entire high seas area a "strongly-protected" marine reserve with no fishing of any kind allowed*.

White Shark Café, Pacific Ocean

A magnificent Great White Shark cruises near the ocean surface. Photo: Brian Skerry

White Sharks have been tracked in their seasonal migrations along the California coast. From satellite tagging we now know that most of the population spends half of the year around the northeast Pacific Ocean. This aggregation exists halfway between Hawaii and the southern California coast, and has been dubbed by the Block lab as the "White Shark Cafe." Satellite tagging reveals these sharks spend more time in this offshore habitat, officially called the subtropical gyre, than in coastal ones. The function of this oceanic area in the life history of white sharks remains unknown, though mating and feeding have been hypothesized. Theories for why the white sharks aggregate here include the interaction of oceanographic processes, including a set of frontal areas formed by the oxygen minimum layer to the south of the aggregation region. The Café is a low productivity offshore habitat and the availability of prey for the sharks is not known. Recently AIS technologies have identified increased efforts to longline in this region. Oceanographic studies are planned to better define the oceanography of this region. White sharks are protected internationally under the Convention on International Trade in Endangered Species (CITES, Appendix II) and are listed as vulnerable under the World Conservation Union Red List (IUCN). The White Shark Café region is currently being considered for of the new blue water World Heritage Site Designations by UNESCO.

Sargasso Sea, Atlantic Ocean

Sargassum seaweed from the Sargasso Sea Photo: LookBermuda

The Sargasso Sea, located within the northwestern Atlantic Ocean, is full of floating Sargassum seaweed. Often called the "golden floating rainforest of the ocean," this area hosts the world's only seaweed that floats unattached to the seafloor throughout its lifetime. This huge floating mat of seaweed hosts a unique collection of organisms including ten species that are endemic (found nowhere else on Earth); is the only breeding ground for European and American eels; and provides a protective home for loggerhead turtle hatchlings. Nine nations have signed a Hamilton Declaration to conserve the Sargasso Sea, but no legally-binding regulations exist for countries who have not signed.

Central Arctic Ocean

The central Arctic Ocean is the high seas area beyond national jurisdiction of all the surrounding nations. It is approximately 2.8 million square km, about the size of the Mediterranean Sea. It is a particularly vivid victim of climate change. As its thin covering of floating sea ice – an average of only 6 feet thick 20 years ago – continues to melt and break up, exposing the underlying waters to open ocean conditions for the first time in millions of years, the heat, light, chemistry, nutrients, currents, sea life – everything is starting to change as well. This is the only

The impacts of reduced sea ice are severe. Photo: Christopher Michael via toolkit.climate.gov

remaining place on the high seas free of commercial fishing, but as the ice continues to melt and open up the waters, international effort will be needed to keep it that way.

Palmer Archipelago, Antarctica

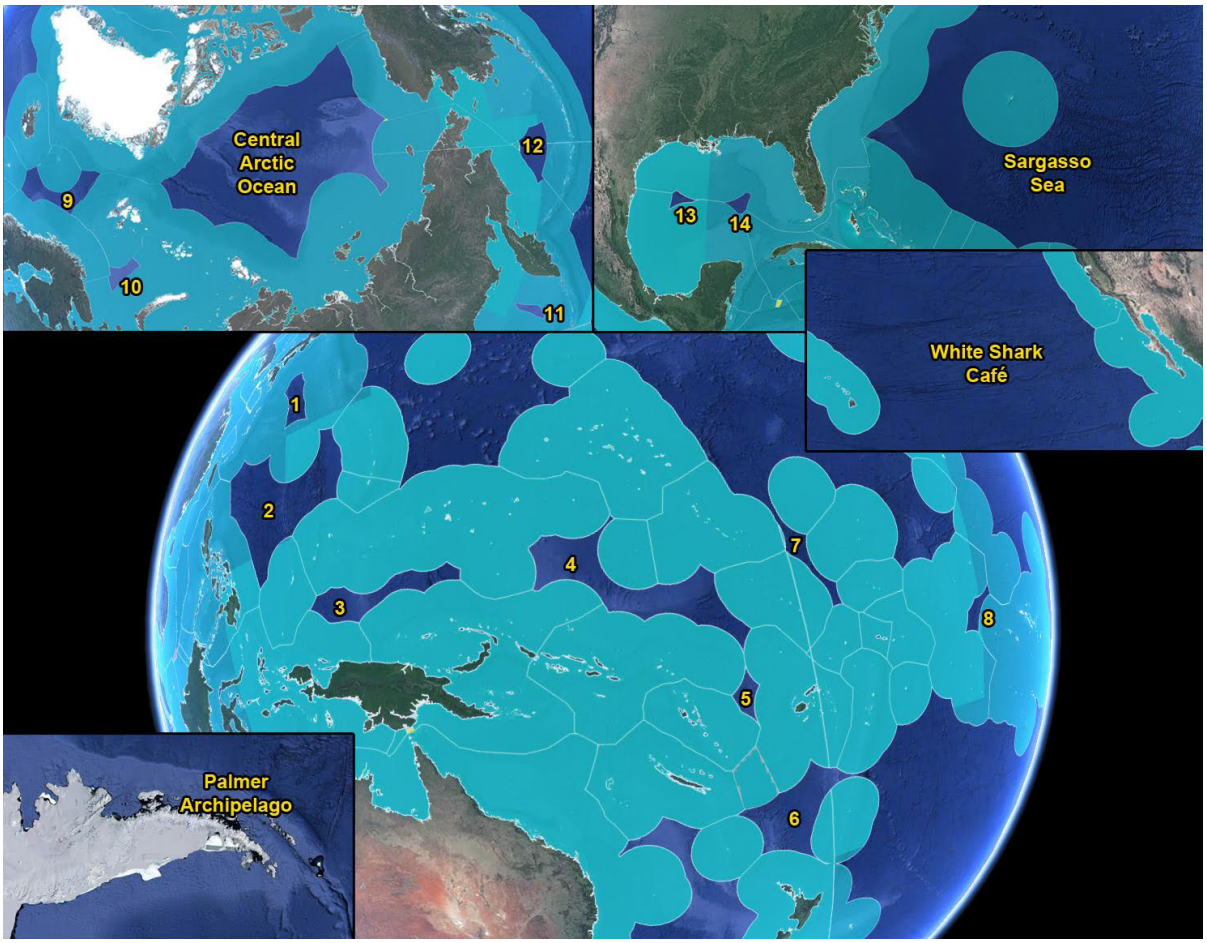
The Palmer Archipelago, also known as the Antarctic Archipelago, is a group of islands (Anvers, Wiencke, Brabant, Trinity and Doumer) off the northwestern coast of the Antarctic Peninsula. It currently is recognized as one of the fasting warming areas on the planet with extreme consequences (e.g., loss of the Larsen ice shelfs). The region supports critical habitats for many endangered penguins, pinnipeds,

Evening in Gerlarhe Strait- a channel separating the Palmer Archipelago from the Antartic Peninsula. Photo: Mike Reyfman, see: mikereyfman.com

and whales. Large colonies of penguins and seabirds feast on krill that thrive in this unique area. The confluence of ice, currents, mixing and unique upwelling provide enormous productivity of marine life that gathers seasonally here and then migrates vast distances across the southern ocean.

High Seas Pockets

Maps and coordinates below show the 14 places in the world ocean where areas of high seas beyond national jurisdiction are completely or nearly completely surrounded by the EEZs of neighboring countries. The surrounding countries can foster agreements to limit their own activities in their neighboring high seas areas, but these agreements do not bind any nations that do not sign.



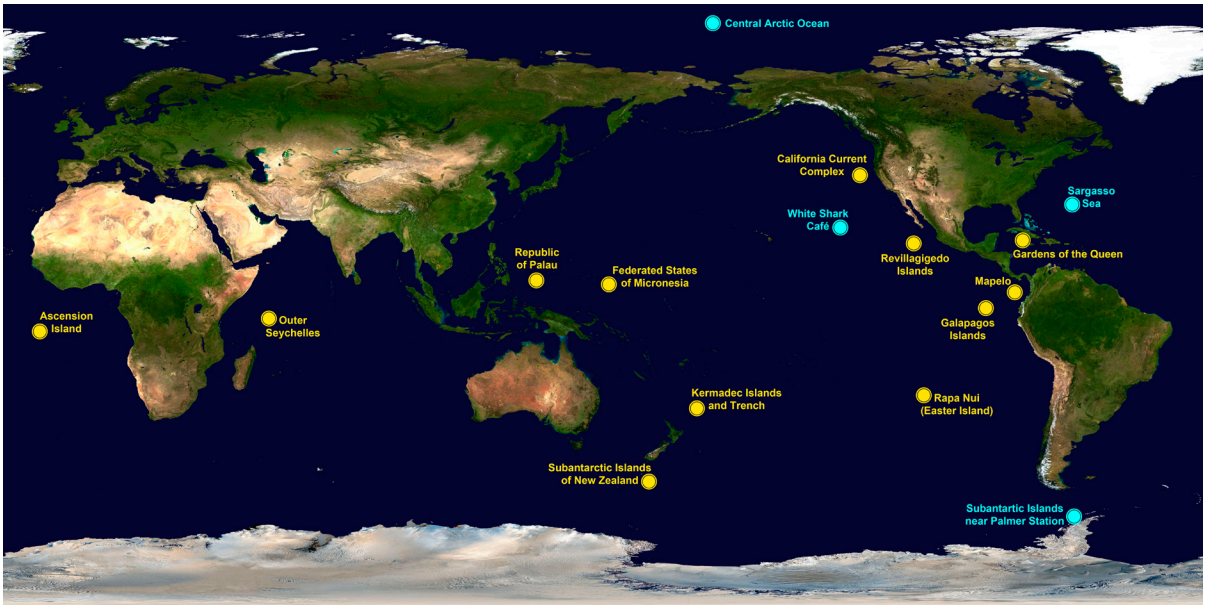
Maps and coordinates in the world oceans

CC	Coordinates	Bordering EEZs
1	26°N, 136°E	Japan
2	15°N,133°E	Japan, Philippines, Palau, FSM,U.S.
3	2.5°N, 144°E	FSM, Palau, Indonesia, PNG
4	5°S, 165°E	FSM, PNG, Nauru, Kiribati, Tuvalu, Solomons, Fiji
5	15.5°S, 173°E	Solomons, Vanuatum, Fiji
6	27.5S, 175E	France, Australia, New Zealand, Fiji, Tonga
7	4°S, 178.5°W	Kiribati,, U.S., Tuvalu, New Zealand, Samoa
8	14°S, 158°W	Cook Islands (=New Zealand), Kiribati, France
9	70°N, 4°E	Norway, Jan Mayen, Iceland, Faroe Islands
10	75°N, 40°E	Russia, Iceland, Norway
11	53°N, 149.5°E	Russia
12	57°N, 179°E	Russia, U.S.
13	25.5°N, 92.5°W	U.S., Mexico
14	25.5°N, 87°W	U.S., Mexico, Cuba

APPENDIX 2

Twelve (12) Priority Areas Ready for Marine Reserve Protection, Expansion, or Enforcement within National Jurisdiction

In addition to promoting a Global High Seas Marine Reserve and building momentum in 4 High Seas areas, the Aspen High Seas Initiative will work to attain official designation of Marine Reserve status for large ocean areas within EEZs. Our focus will be to boost ongoing efforts toward creation, expansion, implementation, and enforcement of Marine Reserves. Our goal will be full protection for these areas.



This is a global map showing locations for the Aspen High Seas Initiative's initial list of priority areas. Locations highlighted in YELLOW are areas within national jurisdiction (Exclusive Economic Zones) of coastal and island nations where we will focus our efforts toward fully-protected Marine Reserves. These areas are described within this Appendix 2.

We have chosen an initial list of 12 ocean areas for our focus. They all have unique species or ecosystems of importance, or characteristics such as major migration routes, or feeding and spawning grounds for marine species. And they all have active involvement from local communities and NGOs and good momentum toward being officially designated for protection.

Partnering with others already involved in these areas, we will launch focused campaigns for each of them, including expeditions, films, youth participation, and government engagement.

Ascension Island, United Kingdom

Marlin are among the pelagic species of fishes that inhabit the waters surrounding Ascension Island. Photo: BBC

In the middle of the South Atlantic Ocean lies tiny Ascension Island, one of the 14 Overseas Territories administered by the United Kingdom, and home to the largest population of Green Sea Turtles in the world, as well as some of the last healthy populations of large pelagic fishes and several species of seabirds. Thanks to efforts by the Blue Marine Foundation, Royal Society for the Protection of Birds (RSPB), Pristine Seas, and Pew, the UK government has committed to closing more than half of the waters surrounding the island – nearly a quarter-million km2 (90,000 mi2) or nearly the size of the UK itself – to all forms of commercial fishing. The process for codifying this protection is still underway, however, and needs additional community education and outreach with islanders to ensure long-term support. Once officially designated, this area will also need help in planning and funding required implementation and enforcement strategies.

Outer Seychelles Islands

Desroches Island in theOuter Seychelles. Photo: Ker & Downey

There are five coralline island groups, consisting of 72 cays and atolls, in the EEZ of the Republic of Seychelles known as the "Outer Seychelles". Located in the northwestern Indian Ocean, this area supports high productivity of marine life due to upwelling of cold, nutrient-rich waters. Several conservation NGOs, including The Nature Conservancy, are working with the government to provide full protection for 30 percent of the waters in this area in a "debt-for-nature" swap. Additional technical assistance could be helpful.

Republic of Palau

The iconic Rock Islands of Palau are world-famous both for their beauty and their protection. Photo: Peter R. Binter

Renowned by divers around the world for its spectacular coral reefs, the waters around the Republic of Palau are home to one of the highest concentrations of marine biodiversity on Earth. Led by visionary President Tommy Remengesau Jr., together with help from Pew, Pristine Seas and others, Palau has become a world leader in marine protection, setting aside a reserve spanning half a million km2 (190,000 mi2). The Palauan government has committed to protecting 80% of the waters of its Exclusive Economic Zone from any form of resource extraction, including fishing and mining. The remaining 20% is reserved as a small domestic fishing zone for the local population. This protection is officially designated, but Palau needs capacity assistance – experts can help advise and train Palau to develop long term strategies and efforts for enforcement, monitoring, sustainable finance, and marketing to ensure they receive the benefits from this bold conservation action.

Islands of the Federated States of Micronesia

Extraordinary levels of diversity inhabit the coral reefs of Micronesia. Photo: Sonia J. Rowley

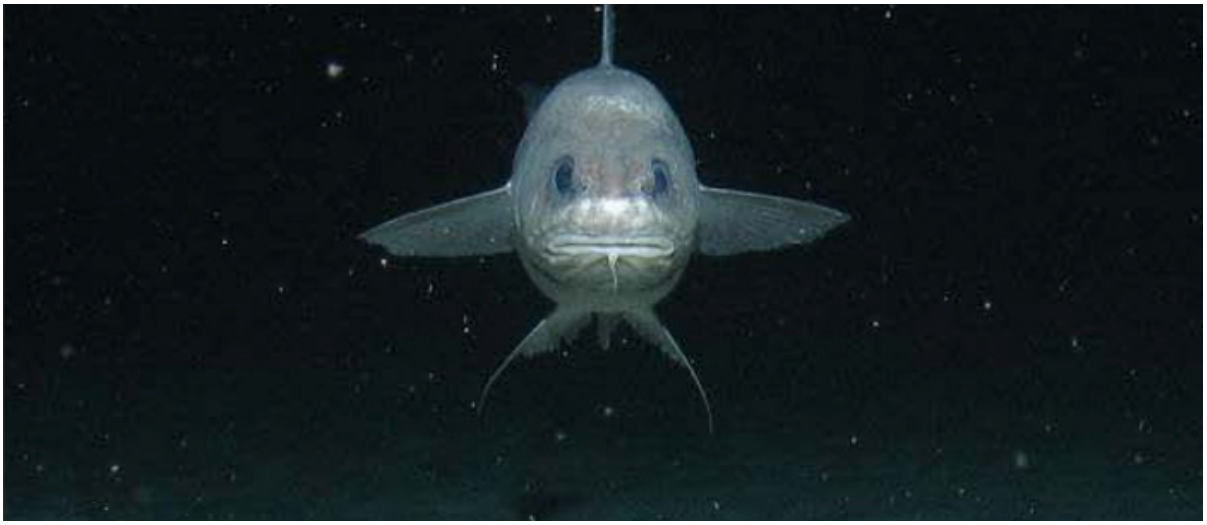
Over 600 islands and atolls, and countless coral reefs comprise the vast Federated States of Micronesia (FSM). Sprawled across 3.35 million km2 (1.3 million mi2) within the FSM EEZ are some of the richest and most pristine tropical marine ecosystems on Earth. Commercial fisheries from Japan and other countries have historically extracted vast numbers of tuna, removing a vital piece of the marine food web and at times inhibiting sustainable fishing methods practiced by indigenous islanders. More recently, FSM has joined four other Micronesian nations as part of the "Micronesia Challenge," which endeavors to conserve at least thirty percent of marine resources across the entire region. External support can assist in this excellent plan, including the creation of expanded buffer zones to ensure that FSM meets the 30% target of protection and that local fishing is adequately protected from commercial fishing efforts. The Micronesian Conservation Trust and Ocean 5 have played key roles in these efforts.

Sub-Antarctic Islands, New Zealand

Remote southern ocean islands of New Zealand are home to extraordinary marine life.
Photo: Wolfgang Kaehler ©

Isolated in the Southern Ocean, the New Zealand Sub-Antarctic islands and their surrounding seas are among the least human-modified environments anywhere in the world. Such extreme isolation has helped shape the biodiversity of these oceanic islands and surrounding marine habitats, with many rare, endemic (found nowhere else on Earth), and threatened mammal and bird species found here. But, environmental change is happening faster in Polar Regions than elsewhere, leaving this ecosystem vulnerable. The New Zealand Government is considering some protections on the islands, but none yet against commercial fishing in the surrounding waters. External efforts to encourage a Marine Reserve in these waters are needed.

Kermadec Islands and Trench, New Zealand



Life encountered diving in the Kermadec Trench. Photo: James Cook, Cruise 62

The Kermadec Trench is a submarine channel in the floor of the southern Pacific Ocean just to the east of the Kermadec Islands and northeast of mainland New Zealand. The Kermadec is Earth's second deepest oceanic trench, plunging more than ten km (6.2 mi) deep beneath the ocean's surface—about five times deeper than America's Grand Canyon. This unique geographic feature includes a string of hydrothermal vents that have supported a fascinating array of deep-sea bacteria, mussels, worms, shrimps, and deep corals that are thriving in extreme conditions. The New Zealand Government has proposed protection for this area and Pew has played a key role in advancing it, but more external support can help to ensure the official creation and implementation of this Marine Reserve.

Revillagigedo Islands, Mexico

Official Declaration of World Heritage to the people of Archipelago, Revillagigedo Islands. Photo: Presidencia de la República Mexicana

The Revillagigedo Archipelago of Mexico includes four volcanic islands (Socorro, San Benedicto, Roca Partida, and Clarion) far offshore south of Baja California. The islands are a World Heritage Site with no fresh water or human habitation. The deep waters surrounding the islands are known for their populations of large sea life, including whales, dolphins, sharks, and manta rays. This is a transit area for sharks that are threatened by illegal fishing. External support can assist in expanding the surrounding ocean areas currently protected, and improving monitoring and enforcement. Mission Blue and Pristine Seas have been working to advance this important work.

Easter Island, Chile

Rapa Nui (Easter Island) is famous both for its cultural history and its unique marine life.
Photo: Bjørn C. Tørrissen©

Located in the remote southeastern corner of the tropical Pacific, Rapa Nui (Easter Island) is renowned for its cultural history, including the iconic stone *moai* (statues) along its shores. But this tiny island is also home to some of the most unique communities of marine life in the world, with one of the highest rates of marine endemism (species found nowhere else on Earth), extensive populations of migratory species, and spawning grounds for large fish species. In October 2015, the President of Chile announced formation of the Easter Island Ocean Park covering the entire 200 nautical mile EEZ around the island. This prohibits all fishing and other extraction of marine resources, but allows a ring of 50 miles offshore for domestic fishing by the local population. But actual protections are not yet codified or implemented. Assistance in implementation, enforcement and ongoing community education and education will be needed. Pew Bertarelli, Mission Blue and others have been advancing this important work.

Galapagos Islands, Ecuador

Holding a special place in the history of science as one of the inspirations for Charles Darwin's theory of evolution, the Galapagos Islands host many endemic species (found nowhere else on Earth). The islands themselves are well protected, with access not allowed without trained local guides. But the waters also host a unique collection of animals, including the world's only marine iguana and the only penguins living near the equator. The waters of the Galapagos have small and

limited marine areas of protection, but there is robust commercial fishing allowed within the Ecuadorian waters surrounding the Galapagos. The Helmsley Trust has played a key role in this work. More protection is needed.

Birthplace for the theory of Evolution, the Galapagos Islands are international treasures. Photo: NASA

Malpelo Island, Colombia

Malpelo is a tiny, uninhabited volcanic island with cliffs that plummet 4,000 meters (13,000 ft) to the surrounding seafloor. The island is famous for large aggregations of marine life, and plays an important role in the breeding cycle of many large pelagic fishes (including whale sharks and tuna), as well as many newly discovered species. The Colombian National Government declared Malpelo a marine protected area in 1995, and since then the protection has expanded several times, culminating in 2007 with the designation by UNESCO as a Site of Natural Heritage. Currently, the total territory of the reserve is about 6,400 km2 (2,470 mi2). It is still subject to illegal shark fishing, however, and a viable strategy and adequate resources are needed for enforcement efforts. The Malpelo Foundation and Mission Blue have played key roles in this work.

Malpelo Island off the coast of Columbia Photo: NOAA

Gardens of the Queen, Cuba

Gardens of the Queen has some of the healthiest coral in the Caribbean.
Photo: C. Camusso via Getty Images

Jardines de la Reina ("Gardens of the Queen") is an archipelago off the southern coast of Cuba, formed by more than 600 cays and islands. In 2002, Jardines de la Reina was established as a national park extending on a general north-west to south-east direction, paralleling the Cuban coast for 150 km (93 mi) from Cayo

Breton to Cayos Mordazo. It is the largest marine reserve in the Caribbean, with no commercial fishing allowed and limited and strictly regulated ecotourism. This has led to impressive preservation of the fish, corals and other marine life in pristine condition. With the opening of Cuba to increased tourism and development, increased protections – including an expanded area as a buffer zone against new threats – may be needed in future to preserve this area.

California Current Complex, USA

The California Current Conservation Complex now being proposed for a UNESCO world heritage site is a contiguous group of three large federally-designated marine protected areas encompassing the marine and coastal waters of approximately 10,675 square miles along 450 miles of shoreline. The region encompasses the Monterey Bay National Marine Sanctuary, the Greater Farallones National Marine Sanctuary, and the Cordell Bank National Marine Sanctuary, together with two U.S. National Parks (Point Reyes and Golden Gate) and several California state reserves. The oceanographic and topographic conditions of the region combine to create nutrient rich waters that support a highly diverse biological community of fishes, sharks, invertebrates, marine mammals and seabirds. Overall, this regions supports more than 200 species of shorebirds and seabirds, at least 560 species of fish, more than 450 species of marine algae, 31 phyla of invertebrates, over 25 species of sharks, and 5 species of turtles, and 34 marine mammal species. Called the "Blue Serengeti," extensive electronic tagging of top predators (Block et al. Nature 2011) has revealed this region to be extraordinary as a gathering spot for top predators including tunas, sharks, seabirds and whales.

APPENDIX 3

Brief Biographies, Co-Authors

Sylvia Earle

Dr. Sylvia Earle is President and Chairman of Mission Blue/The Sylvia Earle Alliance. She is a National Geographic Society Explorer in Residence, and is called "Her Deepness" by the New Yorker and the New York Times, Living Legend by the Library of Congress, and first Hero for the Planet by Time Magazine. She is an oceanographer, explorer, author and lecturer with experience as a field research scientist, government official, and director for several corporate and non-profit organizations. She is the former Chief Scientist at NOAA and is featured in the films *Mission Blue* and *Sea of Hope*.

David Shaw

David Shaw is Managing Partner of Black Point Group, Founder & CEO of IDEXX Laboratories, founding CEO & Chair of Ikaria Pharmaceuticals, and has played leading roles in creating or developing more than a dozen start-ups. Shaw is Founding Chair of the Sargasso Sea Alliance, Treasurer, Trustee and Fellow of the American Association for the Advancement of Science, a Director of the National Park Foundation, and Executive Producer of the film, *Second Century Stewardship*. Shaw was named Wave Maker at the 2016 Blue Ocean Film Festival, and the Executive Committee of the Sargasso Sea Alliance (SSA) was named "2013 International Sea Keepers of the Year."

Barbara Block

Dr. Barbara Block is Charles & Elizabeth Prothro Professor in Marine Sciences at Stanford University and the Co-Founder of the Tuna Research and Conservation Center, a partnership with the Monterey Bay Aquarium. She is a physiologist and biological oceanographer who has led over 100 expeditions. Her research focuses on how large pelagic fishes utilize the open ocean environment and their resilience to climate change. Block is a leader in developing cutting-edge technology solutions for tracking marine pelagic fish and is currently developing new technology for the enforcement of marine reserves. She is a recipient of the National Science Foundation Young Investigator Award, a MacArthur Fellowship, a Pew Marine Conservation Fellowship, a Rolex Enterprise Awardee, and most recently has received the Benchley Award for her science and conservation efforts. Dr. Block has helped produce three films on high seas fish, including National Geographic's *Pursuit of the Giant Bluefin*, and Discovery's *Great White Highway* and *Blue Serengeti*, and is founder of the philanthropic fund TAG A Giant.

John Bridgeland

John Bridgeland is Founder & CEO of Civic Enterprises, former Director of the White House Domestic Policy Council under President George W. Bush, and former Member of the White House Council for Community Solutions under President Barack Obama. Bridgeland is Co-Founder of the Franklin Project, Vice Chairman of the Service Year Alliance, the first CEO and current Vice Chairman of Malaria No More, Co-Chair of the Future of Work Initiative at the Aspen Institute, and Co-Convener of the Grad Nation campaign. Bridgeland also served on the National Park System's Advisory Board, helped develop the Centennial Initiative and Challenge to strengthen National Parks, and co-led the Cabinet-Level Review of Climate Change for the White House in 2001. He is Executive Producer of the film, *Sea of Hope*.

Elliot Gerson

Elliot Gerson is Executive Vice President of the Aspen Institute, responsible for its Policy Programs, Public Programs and relations with international partners. The Institute's more than 30 Policy Programs focus on both domestic and international issues and provide neutral venues, do nonpartisan analysis, foster candid dialogue among leaders, advocate new policy and promote best practices. Gerson also administers the US Rhodes Scholarships, was a Rhodes Scholar, a U.S. Supreme Court clerk, practiced law in government and privately, held executive positions in state and federal government and on a presidential campaign and was president of start-ups in health care and education, and of two leading national insurance and health-care companies.

Linda Glover

Head of GloverWorks Consulting with varied clients: from putting the seafloor into Google Earth; writing the Framework for Ocean Observing for the Global Ocean Observing System; writing/editing two books for National Geographic; advising the Defense Department on intelligence enterprise approaches. For the US Government: led shipboard ocean science; published papers on paleo-climatology; led studies for a Presidential commission on ocean policy; led Navy's data declassification efforts under VP Gore; and negotiated with G-7 Major Maritime Powers on Law of the Sea.

Robert Nixon

Academy Award nominee and Emmy Award winning filmmaker Robert Nixon leads film crews to the Earth's furthest corners to capture humankind's connection to our environment and highlight the urgency of making peace with nature. Nixon has produced more than 50 documentaries including *Mission Blue*, *Sea of Hope*, *Gorillas in the Mist*, and *America the Beautiful*. Nixon founded the Earth Conservation Corps, a national service organization in Washington, DC that engages the most vulnerable youth in cleaning up the Anacostia River and putting them on a path to employment. He received the President's Service Medal from President Bill Clinton.

Sarah Nixon

Sarah Nixon is an Emmy Award winning filmmaker and Executive Producer of many films, including *Mission Blue, Blue Serengeti*, and *Sea of Hope*. Nixon helped found the Earth Conservation Corps and has been a driving force in developing national and volunteer service programs to help vulnerable youth and veterans returning from Iraq and Afghanistan. Nixon has played a leading role in mobilizing youth to participate in marine expeditions and other events to boost ocean literacy and engagement.

Robert C. Orr

Dr. Robert C. Orr serves as Dean of the University of Maryland School of Public Policy, United Nations Under Secretary-General, and Special Advisor to the UN Secretary-General on climate change. Prior to joining the University of Maryland, Orr served as the Assistant Secretary-General for Strategic Planning in the Executive Office of the United Nations Secretary-General from 2004 to 2014, and was the Principal Advisor to the Secretary-General on many issues, including climate change. Orr joined the United Nations from Harvard University where he served as the Executive Director of the Belfer Center for Science and International Affairs at the Kennedy School of Government. Orr was Deputy to the United States Ambassador to the United Nations and Director of Global Affairs at the National Security Council.

Richard Pyle

Dr. Richard Pyle has worked in the Ichthyology collection at Bishop Museum in Hawaii since 1986. He is an Associate Researcher, Database Coordinator, and Dive Safety Officer for the Museum. His main field of expertise involves the taxonomy and biogeography of coral-reef fishes. His other areas of interest include the use of advanced diving technology to document biodiversity inhabiting deeper regions of tropical coral reefs, and also the development of computer database systems (and associated data standards) for managing biodiversity information.

Esau Sinnok

Esau Sinnok is an Arctic Youth Ambassador from Shishmaref, Alaska, where he has seen the effects of sea level rise and climate change firsthand. He also is a youth organizer and trainer for the Alaska Center for the Environment. Sinnok has spoken at The White House as a Champion of Change for Climate Equity and participated as an Ambassador in the Global Climate Summit in Paris. Sinnok is currently studying Tribal Management at the University of Alaska Fairbanks.

Brian Skerry

Brian Skerry is an award-winning photojournalist specializing in marine wildlife and underwater environments, and a contributing photographer for *National Geographic* magazine, covering a wide range of subjects and stories since 1998. He has spent

more than 10,000 hours underwater over the past 30 years. Skerry has covered a wide range of stories for *National Geographic*, from cover stories on the harp seal's struggle to survive in frozen waters to the alarming decrease in the world's fisheries. His latest monograph, *Ocean Soul*, has received worldwide acclaim. Skerry has presented at venues such as TED Talks, the National Press Club in Washington, D.C., the Royal Geographical Society in London, and the Sydney Opera House in Australia.

Mary Ellen Sprenkel

Mary Ellen Sprenkel is CEO of The Corps Network, which oversees more than 33,000 young people in national service programs across the United States. Under Mary Ellen's leadership, in 2010 more than $63 million of American Recovery and Reinvestment Act projects were granted to Service and Conservation Corps throughout the country by 15 federal agencies. These projects provided youth with jobs and service opportunities while connecting them to public lands including national parks and forests. She has played a leading role in the development of the 21st Conservation Service Corps legislation and has 10 years of experience on Capitol Hill.

Appendix 4

July 19, 2017

Aspen High Seas Initiative
The Aspen Institute
One Dupont Circle, NW, Suite 700
Washington, DC 20036

Dear Leaders of the Aspen High Seas Initiative,

We applaud your recent announcement of the Aspen High Seas Initiative and commend the collaborative spirit you are bringing to this effort. We would like to support its implementation.

Given the overwhelming scientific consensus that at least thirty to forty percent of the global ocean area must be protected to preserve a healthy ocean ecosystem, we enthusiastically embrace your support for the big idea of creating a High Seas Marine Reserve and the mechanisms you envision – a United Nations Special Envoy for the Ocean and a Global High Seas Compact among nations – to help bring that idea to fruition. The High Seas are a *global commons* that should be fully protected and those protections, fully enforced. A healthy ocean ecosystem is essential to a habitable planet, in providing most of the air we breathe and the fresh water we drink, in regulating our weather and climate, and in holding most of the Earth's animal and plant life. Further, a healthy ocean will play an increasingly direct and central role in the health of the global economy.

We look forward to collaborating with you on the specific areas within the High Seas that you have identified. Furthermore, we are eager to work together on the areas within the Exclusive Economic Zones of various countries to create and expand fully protected marine reserves, and enable enforcement of these protections through scientific expeditions, films, technology, and the engagement of young people. We are enthusiastic about your plans to create an Ocean Conservation Corps and OceanX curriculum for undergraduate and graduate students to educate and engage the next generation in ocean conservation.

We stand ready to support the Aspen High Seas Initiative and look forward to working with you to fulfill its important mission. We must all work together to support this magnificent blue heart of the planet and we cannot begin too soon.

Sincerely,

The Ocean Elders

Dr. Bertrand Piccard | Sir Richard Branson | Capt. Don Walsh | Dr. Rita Colwell

Dr. Walter Munk | Dr. Sylvia Earle | Catherine Novelli

Ted Turner | Nainoa Thompson | Graeme Kelleher | Dr. Frederik Paulsen

Jean-Michel Cousteau | Sven Lindblad | Wade Davis | Gerry Lopez

Appendix 5

Literature Cited or References

1. Jamieson, A.J. et al, 2017. *Bioaccumulation of persistent organic pollutants in the deepest ocean fauna*. Nature Ecology & Evolution 1, Atricle #0051.

2. Census of Marine Life. See also: https://www.washingtonpost.com/posteverything/wp/2014/06/03/the-end-of-fish/?utm_term=.a2b5c5012135.
See also: https://www.nature.com/nature/journal/v423/n6937/full/nature01610.html; Guillermo Ortuna Crespo, Daniel C. Dunn, Handling Editor: Morgane Travers-Trolet: A Review of the Impacts of Fisheries on Open-Ocean Ecosystems, ICES J MarSci 2017 fsxo84. DOI: 10.1093/icesjms/fsxo84

3. Census of Marine Life.
See also: https://www.washingtonpost.com/posteverything/wp/2014/06/03/the-end-of-fish/?utm_term=.a2b5c5012135.
See also: https://www.nature.com/nature/journal/v423/n6937/full/nature01610.html

4. Mackey, KRM et al, 2015. *Response of Photosynthesis to Ocean Acidification*. TOC 28, 2.
And online at http://dx.doi.org/10.5679/oceanog.2015.33.

5. Gjerde, KM et al, 2016. *Protecting Earth's last conservation frontier: scientific, management and legal priorities for MPAs beyond national boundaries*, Aquatic Conservation: Marine and Freshwater Ecosystems 26 (Suppl. 2): 45-60.

6. Edgar, JG et al, 2014. *Global conservation outcomes depend on marine protected areas with five key features*. Nature 506 (7487): 216-220.

7. Roberts, C et al, 2017. *Marine reserves can mitigate and promote adaptation to climate change*. Proceedings of the National Academy of Sciences. Published online at www.pnas.org/cgi/doi/10.1073/pnas.17101262114
www.pewtrusts.org/en/projects/pew-bertarelli-ocean-legacy
Barcott, B, 2915. *The Unfilfilled Promise of the World's Marine Protected Areas*. Published online at E360.yale.edu/features/

8. O'Leary, B et al, 2016. *Effective Coverage Targets for Ocean Protection*. Conservation Letters v. 9, #6, pp 398-404.
See also: http://www.pewtrusts.org/en/research-and-analysis/analysis/2016/03/21/protecting-30-percent-of-the-ocean-brings-multiple-benefits
See also: http://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2016/08/world-conservation-congress-motion-53-vote-yes-to-support-protection-for-30-percent-of-the-ocean

9. Glover, LK and SA Earle, 2004. *Defying Oceans End* (Chap 2). Island Press, 283pp

10. *Global EEZ Map* from Flanders Marine Institute/Vlaams Instiut voor de Zee (VLIZ) at www.vliz.be

11. Freestone, D et al, 2016. *World Heritage in the high Seas: An Idea Whose Time Has Come*. World Heritage Reports #44, United Nations Educational, Scientific and Cultural Organization, 69 pp.

12. Glover, LK and SA Earle, 2004. *Defying Oceans End (Chap 2)*. Island Press, 283pp
Gianni, M, 2004. *High Seas Bottom Trawl Fisheries and their Impacts on the Biodiversity of Vulnerable Deep-Sea Ecosystems*. Report prepared for the IUCN/WCU/NRDC/WWF/CI.
Pusceddu, A. et al, 2014. *Chronic and intensive bottom trawling impairs deep-sea biodiversity and ecosystem functioning*. Proceedings of the National Academy of Sciences (PNAS), 111, 24, pp 8861-8866.

13. Sumalia, UR et al, 2015. *Winners and losers in a world where the high seas is closed to fishing*, Nature Scientific Reports 5, Article #8481, published online.
White , C and C. Costello, 2014. *Close the High Seas to Fishing?* Public Library of Science, 12 (3). Published online at 10.1371/journal.pbio.1001826

14. Sumalia, UR et al, 2015. *Winners and losers in a world where the high seas is closed to fishing*, Nature Scientific Reports 5, Article #8481, published online at: https://www.nature.com/articles/srep08481.

15. Ibid.

16. Roberts, C et al, 2017. *Marine reserves can mitigate and promote adaption to climate change*. Proceedings of the National Academy of Sciences. Published online at www.pnas.org/cgi/doi/10.1073/pnas/101262114
www.pewtrusts.org/en/projects/pew-bertarelli-ocean-legacy

17. see https://www.mission-blue.org/hope-spots

18. www.pristineseas.com

19. www.pewtrusts.org/en/archived-projects
www.pewtrusts.org/en/projects/pew-bertarelli-ocean-legacy