Ocean Climate Action Plan

A Policy Framework for Developing the U.S. Blue Economy in the 21st Century

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Ocean Climate Action

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Table of Contents

Executive Summary

The COVID-19 pandemic and the subsequent economic shocks, coupled with the struggle for racial equity and the rapidly growing threats of the climate emergency, have converged to create a historic juncture in American history. It is imperative that major investments are made to promote robust economic growth that can lift the country out of recession and promote environmental justice, so that we can make America better than it was before the pandemic struck. These policies must be smart and forward-looking or else this once-in-a-generation opportunity to reshape our economy and remedy underlying social inequities will be wasted.

Now is the time to make bold and strategic investments that help decarbonize American industry, promote innovation that creates new jobs and businesses, and directly address the injustices that ravage the nation. **The Ocean Climate Action Plan (OCAP)** is a policy framework to accomplish these goals, by developing the U.S. blue economy in the 21st century with two principle objectives:

1. **To use ocean and coastal resources to reduce greenhouse gas emissions and draw atmospheric CO_2 down to safer levels**
2. **To enable coastal communities to more effectively and equitably adapt to climate impacts**

We use the World Bank definition of the blue economy, which defines it as the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems."

OCAP addresses four issue-areas:

1. **Coastal Adaptation and Financing**
2. **Clean Ocean Energy**
3. **Ports, Shipping, and the Maritime Sector**
4. **Sustainable Fisheries, Aquaculture, and Marine Biodiversity Conservation**

OCAP includes the best ideas from individuals and organizations across industry, academia, conservation, government, indigenous groups, communities at risk, and youth organizations (who will bear the brunt of future climate change impacts). The policy recommendations included in this document should appeal to all political viewpoints, as ensuring a healthy and vibrant ocean and coastal economy and ecology is firmly in the national interest. In fact, variants of many of the policies outlined in this document have already been introduced in legislation in the U.S. House of Representatives or Senate, but have yet to become law.

Coastal states[1] contain most of the U.S. population and produce most of the nation's GDP, and these figures will only grow over the coming decades.[2] However, with the combined climate impacts of ocean warming and related sea level rise, harmful algal blooms, and increased storm impacts, as well as ocean acidification and deoxygenation, the coastal regions of the U.S. are particularly vulnerable to major disruptions that threaten large segments of the economy.[3]

In order to build coastal resilience and restore ocean health, new policies and investments are required that promote innovation in multiple key blue economy sectors. While climate change will impose significant costs on coastal communities across the U.S., developing a dynamic blue economy can reduce those costs and also provide significant opportunities for economic growth that will build sustainable new industries and create many new jobs.

In the Ocean Climate Action Plan justice and equity concerns are integral to the entire framework, with a special focus on generating broad-based prosperity that provides opportunity and recompense not only to the major population centers and wealthiest regions, but also to marginalized and disadvantaged communities, including communities of color, that tend to be at greater risk of pollution and climate impacts.

[1] In the U.S. coastal states are those adjacent to the Atlantic Ocean, Pacific Ocean, Gulf of Mexico, and the Great Lakes.

[2] Coastal shoreline counties produced 40% of the nation's total jobs and contributed 46% of the gross domestic product in 2016. In a NOAA report (https://aamboceanservice.blob.core.windows.net/oceanservice-prod/facts/coastal-population-report.pdf) it was reported that 40% of the U.S. population lives in coastal counties, a 39% increase in population in coastal shoreline counties was reported from 1970 to 2010, and an 8% increase in population was projected for 2010 to 2020.

[3] See the Fourth National Climate Assessment, Chapter 8: Coastal Effects, https://nca2018.globalchange.gov/chapter/8/.

I. Overview

I.1. Background

Throughout 2019 individual members of Congress and many presidential hopefuls issued a slew of climate change proposals (including the Green New Deal) that generated significant media and public attention and discussion. However, these proposals were focused almost exclusively on terrestrial resources **with little attention paid to the ocean and coasts.**

According to the most recent IPCC report on the Ocean and Cryosphere,[4] climate change is accelerating and the future for marine ecosystems and coastal communities is severely threatened if significant actions to both reduce atmospheric CO_2 levels and adapt to a warmer planet are not taken immediately. With most of America's population centers and economic growth concentrated in coastal areas, **any future national climate policy must have a strong blue economy focus.**[5,6]

To fill this policy gap, Jason Scorse, Director of the Center for the Blue Economy at the Middlebury Institute and David Helvarg, Executive Director of Blue Frontier, outlined what a climate policy that focused on ocean and coastal resources should include. They published their first article on the topic in March, 2019 in the online conservation science magazine Mongabay.[7]

Subsequently, they had dozens of conversations with leaders across the country and realized that a larger effort to build a national coalition and consensus for an **Ocean Climate Action Plan (OCAP)** was needed. This culminated in the first OCAP meeting in Monterey, CA on October 18, 2019. The meeting was attended by 60 of the state's leading ocean and coastal experts, including representatives from industry, finance, academia, government, conservation groups, and youth activists. Keynote speaker California Controller Betty Yee emphasized how important developing the blue economy is for the state and how she is prioritizing aggressive climate policy to ensure California's continued economic prosperity. Controller Yee's speech was preceded by two representatives from Heirs To Our Oceans, a youth group dedicated to marine conservation. In addressing climate change, they emphasized that it is the younger generations who will bear the brunt of the energy and infrastructure decisions we make today.

[4] See the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate: https://www.ipcc.ch/srocc/.

[5] See https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy.

[6] See OECD report on the ocean economy out to 2030, which includes a lot of information and the potential economic benefits of blue economy industries: http://www.oecd.org/environment/the-ocean-economy-in-2030-9789264251724-en.htm.

[7] See https://news.mongabay.com/2019/03/putting-the-blue-in-the-green-new-deal-commentary/.

The California meeting was followed by a national webinar on April 29, 2020 attended by over 750 people (a planned DC meeting was cancelled due to the pandemic). The event featured keynote presentations by Senator Jeff Merkely (D-OR), Congresswoman Deb Haaland (D-NM), Congressman Joe Cunningham (D-SC), and Ocean Heir Francesca de Oro from Guam.

In both the October and April meetings the discussions focused on four issue areas:

1. **Coastal Adaptation and Financing**
2. **Clean Ocean Energy**
3. **Ports, Shipping, and the Maritime Sector**
4. **Sustainable Fisheries, Aquaculture, and Marine Biodiversity Conservation**

The feedback from both of these meetings has been incorporated into this final report, along with input from environmental justice groups and impacted communities, a youth advisory council, and many leading conservation groups. These recommendations represent the collective wisdom of hundreds of the leading marine and coastal organizations, businesses, government officials, activists, and researchers across the nation.

The proposed investments outlined in the OCAP report are meant to form the basis for national legislation and policies that will make America a world leader in the innovative blue economy industries and community-based initiatives that will define the 21st century. These new investments will protect and sustain existing ocean-dependent businesses, while developing and expanding new ones, leading to new sources of well-paying and stable jobs, sustained economic growth, and the restoration of our most prized coastal and marine habitats.

Variants of many of the policies outlined in this document have already been introduced in legislation in the U.S. House of Representatives or Senate, but have yet to become law. The Appendix includes an overview of legislation introduced from 2018 through spring 2020 that relates to OCAP's priorities, along with a gap analysis that assesses the missing pieces.

OCAP presents a unified and comprehensive vision for U.S. ocean-climate policy that ensures that ocean resources are put to use to dramatically reduce atmospheric CO_2 levels, and that coastal communities across the country are able to effectively and equitably adapt to coastal climate impacts (including rising sea levels, greater frequency and intensity of storms and flooding, harmful algal blooms, and ocean acidification).

One of OCAP's central tenets—repeated throughout this document—is that investments and economic support must be made available to meet these needs, with special attention paid to and in collaboration with the most vulnerable communities of color, low-income groups, and tribal/Indigenous entities[8] in our coastal regions.

I.2. Definition of the Blue Economy

We use the World Bank definition of the blue economy, which defines it as the "sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystems."[9] The blue economy is not synonymous with all economic activity that occurs on the oceans or uses of ocean resources, nor simply technological innovation involving ocean-based industries.

The blue economy represents a narrower band of economic activity that is restorative to ocean and coastal ecosystems and promotes broad-based economic opportunity. For example, offshore oil and gas extraction is not a blue economy activity, as it contributes greatly to greenhouse gas emissions and directly threatens marine habitats; nor are large fin-fish aquaculture facilities that require greater input of wild fish as feed than they produce in farmed output, thereby reducing fishery sustainability.

The dire threat of climate change requires this more precise definition of the blue economy so that investments and financing are channeled into the types of economic activity that mitigate greenhouse gases and ameliorate coastal climate impacts.

I.3. OCAP's Boundaries

The Ocean Climate Action Plan (OCAP) is a policy framework to achieve two objectives:

1. **To use ocean and coastal resources to reduce greenhouse gas emissions and draw atmospheric CO2 back down to safer levels**
2. **To enable coastal communities to more effectively and equitably adapt to climate impacts**

OCAP is focused on generating broad-based prosperity that provides opportunity and recompense not only to wealthier coastal regions, but also to marginalized and disadvantaged communities who, because they are more vulnerable, also tend to express greater concern about climate change. For example, recent polling found that 69% of Hispanics or Latinx are "alarmed or concerned" about climate change along with 57% of African Americans and 49% of Whites.[10] From a practical standpoint, OCAP is only achievable when it fully integrates the economy, the environment, and equity.

For the purposes of this document U.S. oceans include the Atlantic, Pacific, Gulf of Mexico, and the Great Lakes region. However, OCAP does not address every issue that afflicts the nation's seas, coastlines, and Great Lakes regions. Illegal fishing, invasive species, marine plastics, and many other issues present serious problems to the marine environment that require policy attention; but they are presently outside the scope of the OCAP framework.

I.4. OCAP is Nonpartisan

The Ocean Climate Action Plan is a nonpartisan document that represents the best ideas from across the political spectrum for ensuring the sustained strength of the U.S. economy and conserving the nation's environmental legacy.

One of OCAP's core premises is that our ocean and coastal economies suffer from pervasive **market failure**[11]; many externalities from industry are not properly priced in the market, many offshore industries are currently being stymied due to regulatory uncertainty over property rights, and large gaps in information lead to inefficient decisions about ocean and coastal resource use. Correcting these market failures in order to spur rapid innovation in the blue economy is one of OCAP's top priorities. Ensuring that markets function efficiently is a deeply conservative objective.

At the same time, OCAP views correcting market failures as an incomplete solution to the climate challenge and the many social injustices that climate change exacerbates. Therefore, OCAP also pays close attention to environmental justice concerns[12], and sees a need for large public investments in key blue economy sectors. Making the market system more equitable is a deeply liberal objective.

[8] Throughout this document references to tribal and Indigenous entities is meant to be inclusive of a variety of governance institutions that include but are not necessarily limited to American Indian tribal governments (federally and non-federally recognized), Native Hawaiians, and other Indigenous groups within what are currently considered U.S. territories.

[9] See https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy.

[10] https://climatecommunication.yale.edu/publications/race-and-climate-change/.

[11] Definition of market failure: https://www.britannica.com/topic/market-failure.

[12] Environmental justice should be understood to mean issues of access as well as the management of environmental risk and harm.

Combined into a unified whole, OCAP contains both conservative and liberal economic philosophies that are mutually reinforcing. Correcting market failure leads to more efficient, innovative, and sustainable economic growth, while smart public investments lead to even greater innovation, inclusion, and prosperity. Taking environmental justice concerns seriously ensures widespread participation in this new prosperity and greater social cohesion in a time of climate crisis, both of which are necessary and just.

I.5. Blue Economy Financing Principles

Developing the new blue economy for the U.S. is going to require at minimum hundreds of billions of dollars of investment–both in new dollars and a redirection of existing capital flows. Not all of this money can come from the public sector; much of the investment will have to be funded by the private sector. In order to ensure that private sector money is channeled into truly sustainable projects, the U.S. should join the International Platform on Sustainable Finance[13], sponsored by the IMF and World Bank, as well as adopt the 14 principles outlined in the Declaration of the Sustainable blue economy Finance Principles.[14]

These principles include a precautionary approach to ecological risk, a diverse portfolio both with respect to types of projects as well as scale, and an emphasis on developing local projects that are transparent and collaborative. A commitment to these principles will help set the U.S. on a course for true leadership in the new blue economy, and help create finance standards that direct capital to restorative and climate-friendly development.

[13] See https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en#ipsf.

[14] See https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/declaration-sustainable-blue-economy-finance-principles_en.pdf.

I.6. Next Steps & Goals

This **Ocean Climate Action Plan** presents a comprehensive framework for U.S. ocean-climate legislation and policy that our coalition wants enacted at the federal level. The next step is to translate these priorities into actual bills in the House of Representatives and the Senate, and get them passed and signed by the President. In addition, complimentary legislation at the state level will be pursued.

In addition to legislative efforts, there is a tremendous amount that the President can do through Executive Orders, administrative actions, and choosing the right personnel to staff the key agencies that oversee our ocean and coastal resources and the Great Lakes region. OCAP takes an "all of the above" approach to policymaking and is actively pursuing all channels by which OCAP's priorities can become federal and state policy.

A good way to stay connected to these efforts is through our websites and social media platforms, found at bluefront.org and centerfortheblueeconomy.org. We look forward to working with everyone until OCAP's priorities are the law of the land, and the U.S. begins in earnest developing its blue economy from sea to shining sea.

II. Issue Area #1: Coastal Adaptation and Financing

Key Objectives

Objective #1: To ensure that low-income, vulnerable, and tribal coastal communities, as well as U.S. territories, are provided with economic support to retreat from unstable shorelines and/or transition to climate resilient development.

Objective #2: To catalyze a large-scale dynamic living shorelines industry that employs hundreds of thousands of workers across the U.S. and restores the nation's most threatened coastal ecosystems to provide climate resilience.

Objective #3: To reform the National Flood Insurance Program so that it is financially sustainable and promotes climate resilient development.

Objective #4: To significantly improve storm water management to reduce coastal flooding and pollution risks for coastal communities.

Key Talking Points

- Many shoreline communities must make plans to shift development back from the coastlines; armoring the shorelines is a temporary and costly solution that only delays inevitable retreat.
- Throughout the U.S. living shorelines provide not only superior climate resilience than grey infrastructure, but generally at lower cost; in some cases, grey and green infrastructure are complementary and the best solution is a hybrid mix.
- Living shorelines not only offer protection for critical infrastructure and communities, but provide many ecological benefits, including cleaner water, increased biodiversity, and more greenspace, all of which have myriad health benefits and benefit the coastal tourist economies.
- The living shorelines industry can provide good high-paying jobs to Americans of all education levels, while restoring our nation's coastal habitats.
- The National Flood Insurance Program is broken—it doesn't promote sensible long-term climate resilient development nor is it financially sustainable.
- Poorly managed storm water systems are incredibly wasteful and inefficient, leading to increased flood risk and damages, as well as toxic pollution in coastal communities; improved systems can both save money and improve public health.

II.1. Introduction

The policies and investments outlined in this section are for the purpose of ensuring that coastal communities across the country are able to effectively and equitably adapt to coastal climate impacts (rising sea levels, greater storm frequency/intensity, ocean acidification, and deoxygenation), and that economic support is available to all to guarantee these development needs; it is imperative that special attention is paid to vulnerable, racially diverse, and low-income areas.

II.2. National Flood Insurance Program (NFIP) Reform

Currently, NFIP is failing in multiple ways to adequately promote coastal resilience or promote social justice. The program as currently structured is not financially sustainable,[15] and it isn't promoting the type of innovation and forward-looking guidance to communities to allow them to use the best available science to promote climate resilient development in low-risk areas. The program's incentives are poorly constructed and require major reform; as currently construed NFIP represents the largest market failure in the coastal real estate sector. The following are the OCAP's suggested changes to NFIP:

1. All NFIP policies should be priced based on accurate actuarial rates, and these actuarial tables should be updated every 5 years; for properties where accurate actuarial rates would represent a more than 15% increase in the insurance premium, these increases should be phased in over a period of 3-5 years, with lower-income groups given the most time to adjust to the higher rates (those who cannot afford the rate increases should be given priority for federal buyouts—see point #4 below).[16]
2. No new NFIP policies should be issued for properties built in areas at high risk for sea level rise and flooding.
3. The program should be required to use flood maps that have the best available scientific data on likely sea level rise and future storm impacts, and they should be updated every 5 years. Areas where climate impacts are likely to become worse over time should be flagged.

[15] The U.S. Government Accountability Office stated in their 2019 High Risk Report (https://www.gao.gov/highrisk/national_flood_insurance/why_did_study#t=1) that "as of September 2018, FEMA's debt stood at $20.5 billion despite Congress having canceled $16 billion in debt in October 2017. Without reforms, the financial condition of NFIP could continue to worsen."

[16] The Biggert-Waters Flood Insurance Reform Act of 2012, which represented a rare moment of bipartisanship in this period, was largely repealed shortly after it was passed because some property owners were hit with very large increases in insurance premiums immediately after its passage. In order not to repeat this same mistake, special care must be paid to ensuring that those faced with higher premiums are given adequate time to respond, and also additional assistance where necessary.

4. Payments to repetitive loss properties should be capped and these caps reduced significantly over a short time frame. Second home and vacation rental properties should be flagged.
5. Federal buyout programs should be greatly increased and 'sister cities' programs initiated that link inland communities, including adjacent counties, with coastal residents that seek to relocate. Such a system should include the transfer of development rights from coastal regions to other inland areas. Disadvantaged communities that face increased climate risks should be given priority for buyouts, with a goal of maximizing the number of properties bought out each year. A certain amount of the funding for buyout and managed retreat should be designated to U.S. island territories and tribal nations that face particularly severe climate impacts. All land that is bought out under these programs must be zoned for coastal resilience projects that provide public benefits, and no new residential and/or commercial development allowed. Assistance to local coastal governments should be made available to help mitigate the negative impacts to local property tax revenue as residents retreat from the coasts, during the transition period.
6. New federal funding to support the development of managed retreat plans and climate resilience should go to communities that have broad-based representation from all income, racial, and ethnic groups.
7. National mandatory disclosure laws should be put into place that require disclosure of past flood damages, money received by federal agencies for disaster relief, and the current flood risk/sea level rise profile for all residential and commercial properties to all potential buyers.

II.3. Promoting Living Shorelines

OCAP views large scale restoration of living shoreline ecosystems—beaches, marshes, wetlands, eelgrass, kelp forests,[17] dunes, reef systems, etc.—as crucial for both mitigation and adaptation to climate change. Many of these ecosystems sequester large amounts of carbon, while also protecting critical infrastructure from storm impacts and sea level rise.[18]

[17] For the benefits of kelp forests for climate change see: https://www.sciencedirect.com/science/article/pii/S2590332220302098.

[18] NOAA study finds 'living shorelines' can lessen climate change's effects: https://www.noaa.gov/media-release/noaa-study-finds-living-shorelines-can-lessen-climate-change-s-effects.

Living shorelines not only offer protection for critical infrastructure and communities, but provide many ecological benefits, including cleaner water, increased biodiversity, and more blue and green space, all of which confer myriad valuable emotional, social, and physical health benefits.

With the right incentives, the existing wetlands and estuary restoration industry can be expanded into a much larger and innovative living shorelines sector, with the potential to employ many thousands of additional U.S. workers from all educational backgrounds. Engineers, planners, landscape architects, and coastal biologists are needed for this work, as well as laborers with specialized skillsets.

Currently, the impediments to the widespread development and scaling of living shorelines are primarily informational rather than economic.[19] Many insurance providers, individual actors, whether residential property owners or businesses, don't have sufficient experience with living shoreline infrastructure to adequately trust that they will protect their properties and provide long-term resilience, while there is vast operational data on hardened infrastructure, such as seawalls. This informational asymmetry is a major market failure in the coastal resilience sector, which OCAP seeks to correct. In addition, oftentimes it is a mix of green and grey infrastructure that provides the best overall value and coastal resilience.

OCAP's recommendations for promoting living shorelines nationally are:

1. Fund the Army Corps of Engineers to begin living shorelines demonstration projects in all regions of the U.S. to test different living shorelines systems, and make all data publicly available. Also, charge the Corps with developing engineering standards for all categories of living shorelines. These standards will create a science-based and consistent set of performance metrics for living shorelines that can be used to compare different options against their grey infrastructure alternatives, and also include green-grey hybrid scenarios. (It is important to note that historically the Army Corps has been responsible for many coastal engineering projects that have been extremely detrimental to coastal ecosystems and coastal resiliency; the efforts noted above will help to shift the Army Corps in a more sustainable direction.)
2. Lift the Army Corps rule for the 'cheapest disposal' of dredged sediment, which is often then dumped out at sea; instead require all clean sediment dredged by the Corps to be put to beneficial reuse for coastal restoration in partnership with states.
3. Provide federal funding to state governments to develop living shoreline projects in all at-risk coastal counties; provide funding to monitor impacts on local fisheries.

4. Create a national database of public coastal armoring projects that includes living shoreline projects, grey infrastructure projects, and green-grey hybrids that is easily accessible and free to the public, with an opt-in option for private projects. This will allow for the analysis of different types of armoring with respect to effectiveness as well as cost. Responsibility for keeping the database current should fall on a new Living Shorelines Division within the Army Corps, in cooperation with coastal state agencies.
5. Engage Indigenous ecological land and ocean-based knowledge and practices on a regional basis to inform living shorelines demonstration projects.
6. Streamline and standardize 'blue carbon'[20] protocols for living shorelines so that developers and land owners can more easily apply for carbon credits in both state and national climate programs. Create a national map of coastal carbon hotspots to target for protection and restoration funding.
7. Require consideration of living shoreline alternatives in all National Environmental Policy Act environmental impact statements that address coastal storm barriers.
8. Provide federal funding to states for the development of living shorelines K-12 curriculum, and vocational and community college programs to develop the industry and train the new coastal ecosystem restoration workforce.
9. Expand the Coastal Barrier Resources Act (CBRA) so that no federal money subsidizes development on what remains of our most fragile coastal habitats.

II.4. Improving Storm Water Management

Storm water has both climate mitigation and adaptation elements. Transporting water to cities is very energy-intensive,[21] and therefore, any water that can be stored during storms can reduce future energy use, which decreases greenhouse gas (GHG) emissions. In addition, damages from flooding due to storm water crises are very costly, and include public health impacts when sewage systems overflow or get backed up. Finally, pollutants from inland areas that end up in coastal ecosystems decrease overall system resiliency, which is already being strained by climate change.

[19] See Tradable Permits for Shoreline Protection: Reshaping Regulation Under the Coastal Act for the Era of Sea Level Rise prepared by the Center for blue economy and The Nature Conservancy (https://www.middlebury.edu/institute/sites/www.middlebury.edu.institute/files/2018-10/10.12.18.Shoreline%20Tradable%20Permits%20Working%20Paper--originalpublishdate--Sept.2016.pdf).

[20] See https://oceanservice.noaa.gov/facts/bluecarbon.html and https://www.thebluecarboninitiative.org/about-blue-carbon.

[21] According to the Center for Sustainable Systems, University of Michigan, "2% of total U.S. electricity use goes towards moving and treating water and wastewater, a 52% increase in electricity use since 1996." (http://css.umich.edu/sites/default/files/US%20Water%20Supply%20and%20Distribution_CSS05-17_e2019.pdf)

OCAP's recommendations for promoting better storm water management are:

1. Require the installation of permeable surfaces in urban areas, which absorb storm water and recharge aquifers, that capture an 85th Percentile storm as a U.S. EPA baseline standard in all states.
2. Create financial incentives to reduce erosion, nutrient runoff and flooding caused by agricultural practices by encouraging no-till soil management, riparian setbacks, dry farming, and other effective farming practices.
3. Fund the development of watershed restoration plans that take a comprehensive view on managing storm water.
4. Prioritize storm water management that protects low-income communities from property damage and health risks.
5. Maintain or enhance water quality for all National Marine Sanctuaries to ensure they act as "hope spots" for biodiversity in the face of climate change.

II.5. Protecting Critical Coastal Infrastructure—transportation, energy, water, and communications

Coastal climate change impacts that threaten critical infrastructure will severely harm the economies of coastal communities, and often disproportionately harm vulnerable populations, whose livelihoods are easily disrupted and often dependent on hourly wage labor. Many communities, especially smaller ones, do not have sufficient public funds to build more resilient infrastructure, and therefore, face a downward spiral of lower quality services, followed by property value declines and a lower tax base, and then a further diminished ability to adapt to climate change.

OCAP makes the following recommendations regarding critical coastal infrastructure:

1. Restrict siting of new critical infrastructure such as airports, power plants, sub-stations and waste water treatment plants in coastal areas at risk from sea level rise and storms, and provide federal matching funds to help relocate existing infrastructure to higher ground; prioritize protecting vulnerable communities and critical coastal ecosystems.
2. Link greater cost sharing for climate resilient investments from private developers with permitting for higher density development in already built and less risky areas (this higher density can help promote housing affordability).

III. Issue Area #2: Clean Ocean Energy

Key Objectives

Objective #1: To catalyze large scale deployment of offshore wind power in the U.S. that rivals the EU.

Objective #2: To ensure that the approval process for offshore wind projects is both streamlined and that appropriate checks are put in place to protect critical offshore habitats—both above and below water—and biological and cultural diversity.

Objective #3: To ensure that a robust program of research, development, and incentives is created to determine the commercial viability and scalable deployment of additional renewable ocean energy systems such as wave, current, tidal, and thermal.

Key Talking Points

- The U.S. currently lags well behind the rest of the world in its offshore wind industry, with only one small project (off of Block Island) currently operating in all of U.S. territory.
- The U.S. has significant wind resources that can provide a large segment of 100% clean electricity for the nation that will help meet its climate goals, provide reliable low cost power, and foster energy independence.
- Offshore leases can provide billions of dollars to the federal government in new revenue while generating clean power and more jobs, including easily transferable jobs from the offshore oil and gas industry.
- Contrary to popular perception, most proposed offshore wind development in the U.S. would not significantly impact coastal viewsheds or negatively impact property values.

[22] To limit global warming to 1.5°C, the IPCC reports that "global net human-caused emissions of carbon dioxide (CO_2) would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050." (https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/)

[23] This is action that can be taken administratively without Congressional approval.

[24] Bipartisan letters, one led by New Jersey Republican Frank LoBiondo (https://beyer.house.gov/uploadedfiles/drilling_letter.pdf) and the other led by Florida Republican John Rutherford (https://rutherford.house.gov/sites/rutherford.house.gov/files/documents/Letter%20to%20Secretary%20Zinke%20.pdf), were written to voice opposition to offshore oil and gas drilling and were each supported by 100 members of congress.

[25] In Europe there are 3,072 grid-connected offshore wind turbines, spanning 11 countries, which equals a total of 10,393 megawatts of capacity as of 2015. For a comparison, the United States has the potential for over 4,000 gigawatts of offshore energy, which could power the country four times over if utilized.

[26] There have been examples in the recent past where terrestrial windfarms were sited in areas that conflicted with significant Indigenous cultural landscapes (see this example: https://journals.sagepub.com/doi/abs/10.1177/194277861400700204?journalCode=huga& from during the Obama era). While this should be easily avoidable in federal waters, which are 3 miles+ off the coastline, precautions should nonetheless be put in place in order not to make the same mistakes.

III.1. Introduction

Mitigating climate change requires the rapid decarbonization of the U.S. economy.[22] This requires both a reduction in fossil fuel use and a rapid increase in clean energy solutions. With respect to the former, **OCAP recommends an immediate moratorium on all new offshore oil and gas leases across the U.S.**[23] Not only do these projects threaten to increase our reliance on fossil fuel at a time when this dependence needs to be reduced, but oil spills pose great risks to coastal ecosystems and the economies that depend on them. Republican and Democratic leaders in coastal states oppose increased offshore drilling because they know that coastal property values and tourism are dependent on clean, healthy coastal waters.[24] Additionally, many current leases are tied to volatile fossil fuel prices that create unpredictable revenue streams, which in a time of declining fossil fuel prices, do not produce the revenue windfall that they did in the past.

There is, however, support for increased offshore renewable energy development, which is clean, carbon-free, and doesn't pose significant risks to water quality, wildlife, and coastal economies. Despite having tremendous untapped wind energy potential on all coasts (which could power the entire U.S. economy four times over) [25], the U.S. offshore wind energy industry lags far behind many of its closest competitors in the EU. Additionally, offshore wind energy can attract significant new investments particularly when scaled to 100 GW energy production. Producing 100 GW offshore wind energy will not only offset carbon emissions, it will also create new jobs in manufacturing, construction, and maintenance of offshore wind farms in coastal communities. Therefore, OCAPs policy recommendations have been written to support the strategic research, development, and investment necessary to scale and expand offshore wind energy.

III.2. Policies to Promote Offshore Wind Production in the U.S.

In order to rapidly accelerate the production of offshore wind energy OCAP makes the following recommendations:

1. Institute national guidelines for the siting of offshore wind turbines in federal waters (and the Great Lakes) that do not undermine the Navy, commercial navigation, regional planning agencies, National Marine Sanctuaries and Monuments, tribal/Indigenous sovereignty[26], and/or the commercial fishing industry. Create transparent, and simple mechanisms to allow companies to rapidly develop offshore wind installations in federal waters. (Currently, the lack of clear and transparent guidelines for the transfer of federal offshore property rights to private industry is the primary market failure currently inhibiting the development of the

U.S. offshore wind industry).

2. To the extent that marine spatial planning has already determined the best areas for offshore wind power in a region, keep those records updated with the best available science, and fill in any gaps in regions that have not yet been adequately mapped; the goal is to have all of the key usable offshore wind hotspots across the U.S. mapped and leases made available immediately.
3. Develop offshore renewable targets for wind energy in all coastal states where offshore wind is competitive with other forms of renewable power. Governors can set these targets through executive action or through a designated representative of Ocean Planning Bodies. Such targets should encourage upgrading transmission line infrastructure and offshore wind energy business opportunities in coastal communities.
4. Develop micro-power grids to link offshore renewable power to smaller and more isolated coastal communities and tribal and Indigenous nations. Linking these coastal communities to offshore power will build coastal energy resilience and community support for offshore projects.
5. Develop public outreach campaigns to educate the public about the low visibility impacts of fixed and floating turbines many miles off the coast to counter false narratives about negative wind power impacts.
6. Ocean Planning Bodies should consult with top EU industry leaders and governments who are leading the world in offshore wind production.
7. Provide federal funding to help upgrade electrical infrastructure in coastal areas to facilitate the spread of offshore wind production.

III.3. Other Forms of Offshore Renewable Energy (e.g. tidal, wave energy, and ocean thermal energy conversion)[27]

Most offshore renewable energy technologies apart from wind are not yet economically and/or technically viable, but they may be in the near future. Federal R&D funds should be invested in other offshore renewable technologies, including pilot wave, tidal[28], and deep water ocean thermal projects, with the goal of scaling by 2030 any technologies that meet strict life-cycle impact standards.

[27] In addition, R&D funding for Ocean-based CO2 Removal (CDR) technologies (e.g. macroalgae, ocean alkalinity enhancement, assisted upwelling, etc.) may be warranted if scientific consensus deems them viable, safe, and scalable; see http://www.gesamp.org/publications/high-level-review-of-a-wide-range-of-proposed-marine-geoengineering-techniques.

[28] See this document on Nova Scotia's tidal energy sector, which can be a model for the U.S.: https://energy.novascotia.ca/featured-stories/top-10-things-you-need-know-about-tidal-energy-nova-scotia.

IV. Issue Area #3: Ports, Shipping, and the Maritime Sector

Key Objective: To rapidly accelerate the decarbonization of U.S. ports and the shipping industry, and in doing so, dramatically improve air and water quality in adjacent communities.

Key Talking Points

- Air and water pollution from U.S. ports presents a significant health threat to many U.S. cities and adjacent, predominantly low-income, communities of color.
- Many ports, particularly in Los Angeles, Long Beach, and San Diego, are leading the way towards clean power and climate resilience.
- The U.S. needs national standards to upgrade U.S. ports both to meet our climate goals and to protect vulnerable communities from excessive pollution.
- We need U.S. leadership and incentives to change shipping standards in design, fuels, and propulsion with the aim to decarbonize commercial shipping by 2050.
- Ports can serve as outstanding blue economy innovation hubs that strengthen the regional economy.[29]

IV.1. Introduction

Currently, along with transporting 90 percent of imported consumer goods, U.S. ports produce a significant amount of the nation's air pollution and greenhouse gas emissions[30]—both from ships and the trucks/trains that transport the cargo inland. In coastal areas around the country, the communities that are located adjacent to ports are often low-income and/or communities of color, which bear the brunt of the elevated levels of air pollution.[31] In addition, GHG emissions from ships are growing as global trade increases. Therefore, continued innovation in the port and maritime sector should be viewed in the context of the larger industrial innovations in the transportation sector that must be accelerated in order for the U.S. to meet its GHG reduction targets, as well as to promote environmental justice within its borders.

[29] See the Port of San Diego's Ocean Entrepreneurship Program: https://www.portofsandiego.org/waterfront-development/blue-economy.

[30] According to the Third IMO Greenhouse Gas Study in 2014, "For the period 2007–2012, on average, shipping accounted for approximately 3.1% of annual global CO2." (http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Documents/Third%20Greenhouse%20Gas%20Study/GHG3%20Executive%20Summary%20and%20Report.pdf#page=32)

[31] See Public Health Impacts section of the ruling by the EPA for Control of Emissions From New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder. (https://www.federalregister.gov/documents/2010/04/30/2010-2534/control-of-emissions-from-new-marine-compression-ignition-engines-at-or-above-30-liters-per-cylinder#p-15)

IV.2. OCAP's Recommendations for Ports, Shipping, and the Maritime Sector

In order to bring all U.S. ports into the 21st century OCAP makes the following recommendations:

1. Create national standards for Clean Air Action Plans at all U.S. ports (based on the progress made by the Ports of Long Beach and Los Angeles).[32] These standards should include:
    - Matching federal grants for the electrification of U.S. port infrastructure;
    - Production of emissions inventories at least every three years, which include emission reduction goals for criteria air pollutants and GHGs as well as an accompanying implementation plan;
    - Clean energy upgrading and decarbonization of all intermodal transport including tugs, cargo loaders, trucks, trains, and inland warehouse operations; - Making shore power available–and mandatory within 10 years–at all major container, bulk cargo, and cruise ports to reduce vessel idling; for certain vessel categories, such as tankers, and where shore power usage is impracticable, such as at anchorage, emission capture systems must be deployed and used in the near term;
    - Vessel speed reduction programs for ocean-going vessels to a maximum of 10 knots when entering sensitive areas to reduce emissions (and also reduce whale strikes);
    - Thorough involvement in the planning process by members of adjacent impacted communities to ensure public participation and reduce litigation.
2. Provide federal funds for investment in green infrastructure at ports and for goods movement activities, including zero-emission inland shipping loans and grants.
3. Fund job retraining and placement programs for port workers displaced by automation.
4. Link new renewable energy sources directly to ports/port infrastructure.[33] Also provide needed research and development grants and economic development assistance to states, cities, and small businesses to develop these green energy systems.

[32] See the San Pedro Bay Ports Clean Air Action Plan: https://cleanairactionplan.org.

[33] See NY State's plan to link new offshore wind to ports: https://www.nyserda.ny.gov/About/Newsroom/2019-Announcements/2019-10-02-New-York-State-Launches-Process-to-Upgrade-Port-Infrastructure-to-Support-Expanding-Offshore-Wind-Industry; solar power installations at the Port of Seattle: https://www.portseattle.org/projects/solar-power-port.

5. Adapt standards for U.S. public port authorities to match or surpass the International Association of Ports and Harbors Environmental Ship Index program for clean ships.
6. Move beyond federal standards for low sulfur-emission fuels within U.S. territorial waters. Instruct the EPA to set reduction in GHG emissions from shipping to achieve 50% reduction by 2035 and 100% by 2050.[34,35]
7. In the near term, require all ships operating in the U.S. portion of the North American Emission Control Area to publicly report annual fuel consumption and GHG emissions, including CO_2 and methane, to support future federal, state, and local emission reduction policies.
8. Make American shipyards leaders in global innovation and competition by promoting production of zero emission vessels (ZEVs) and making ZEVs a requirement for all new Navy, Coast Guard, NOAA and other federal ship building projects by 2035.
9. Mandate that companies develop and implement a plan to transition all cruise ships that call on U.S. ports to zero-life-cycle-emission vessels by 2030.
10. Require that (where feasible), all ports install living shoreline defenses (or green-grey hybrid systems) instead of hard armoring in response to climate change impacts, and rely on the most up-to-date sea level rise forecasts.

[34] https://www.portoflosangeles.org/environment/air-quality/environmental-ship-index.

[35] http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx.

V. Issue Area #4: Aquaculture, Sustainable Fisheries, and Marine Biodiversity Conservation

Key Objectives

Objective #1: To support U.S. fisheries, including those managed by tribal nations, adapt to climate impacts and maintain economic viability.

Objective #2: To catalyze rapid growth and innovation in a new sustainable seafood industry, which includes aquaculture, mariculture, and plant and cell-based seafood alternatives.

Objective #3: To establish a network of Marine Protected Areas covering at least 30% of U.S. Exclusive Economic Zone waters to provide public benefit and increase climate resilience.

Key Talking Points

- Current U.S. fisheries policy was not designed with climate change in mind; it needs to be updated now that species are migrating to new regions as ocean waters warm and acidify.
- A new sustainable seafood industry has the potential to produce tens of thousands of new jobs, while improving environmental quality and the U.S. trade balance.
- The economic and ecological value of the U.S. system of Marine Protected Areas can be greatly enhanced with new climate standards for management, research, and designation.
- Marine Protected Areas not only promote climate resilience and improve fisheries, but are boons to regional tourism, as they improve biodiversity and ocean recreation options.[36]

[36] See: https://www.americanprogress.org/issues/green/reports/2019/06/03/470585/marine-protected-areas-help-fisheries-ocean-ecosystems/.

V.1. Introduction

Climate change poses unique challenges to the fishing industry, aquaculture, and the health of marine ecosystems that support these economic activities. With waters warming and ocean acidification and deoxygenation increasing, many species are moving to areas outside of their normal ranges, or are threatened by changes in their food supply.[37] In addition, pollutants from land-based sources, particularly agriculture, threaten these fish habitats, decrease their resiliency, and kill large numbers of fish through eutrophication every year. This makes both marine species management and fishing increasingly complex. Fishing is also a very energy-intensive industry, from the energy required to power the boats to the refrigeration needed to transport the product.

Aquaculture and plant and cell-based alternative seafood, all of which are relatively undeveloped in the U.S.[38], have the potential to produce large quantities of seafood for the U.S. population, which would reduce pressure on wild fish catch, as well as the need for U.S. seafood imports (thereby improving the U.S. trade balance, while also reducing dependence on carbon-intensive and often illegal product riddled with labor abuses). In addition, alternative seafood production (under certain conditions—see below) can be very low or even net-negative in carbon emissions.

Marine protected areas (MPAs) are also an important tool for sustaining fisheries and increasing biodiversity, which fosters climate resilience. Economic studies of the value of highly and fully protected MPAs show considerable returns on investment. Each $1 invested in creating protected areas, can return up to $20 in benefits, which include benefits to neighboring fisheries, reduced greenhouse gas emissions, the establishment of storm buffers, profitable eco-tourism opportunities, new MPA management jobs, and gains from new scientific discoveries.[39]

[37] See this article in Bloomberg: https://www.bloomberg.com/news/features/2020-02-18/climate-change-is-reshaping-atlantic-fisheries-and-sending-this-fluke-fight-to-court; this post by the Environmental Defense Fund: http://blogs.edf.org/edfish/2020/03/06/fishery-managers-look-to-the-future/; and this article in Science Daily: https://www.sciencedaily.com/releases/2020/03/200305203559.htm.

[38] See NOAA U.S. Aquaculture Highlights from 2016: https://www.fisheries.noaa.gov/national/aquaculture/us-aquaculture.

[39] See Brander et al. 2015, "The benefits to people of expanding Marine Protected Areas," available here: https://www.issuelab.org/resources/25951/25951.pdf?download=true&_ga=2.227198557.1167454837.1558640107-1857028723.1558640107.

V.2. OCAP's Recommendations for Aquaculture, Fisheries, and Marine Biodiversity Conservation

To promote sustainable seafood production while protecting marine biodiversity, OCAP recommends the following policies:

1. Update the Magnuson-Stevens Act to help ensure that the fishery management process is adapting to, and planning for, the impacts of climate change, including adequate management of new, emerging, or migrating fisheries, early detection of shifting stocks, monitoring of bycatch, and promoting resilience of fish populations.
2. Create a Seafood Sustainability Index (SSI) that uses life-cycle analysis with true cost accounting (that includes the costs of externalities) to assess new seafood production technologies in the U.S.—i.e. low-trophic aquaculture & mariculture, and alternative seafood.[40] Proposed projects could be scored similar to LEED certification, with tiers such as platinum, gold, etc.
3. Provide new federal funding for R&D for projects that score high on the SSI, as well as streamline regulatory approval to get new highly sustainable projects up and running quickly.
4. Provide new federal R&D funding to explore potential symbiotic links between agriculture and aqua/mariculture (e.g. using nutrient run-off from farms to grow algae).
5. Provide federal funds to distressed fishers to help them transition to harvesting new low trophic or farmed species (such as shellfish or sea vegetables), and funding to help develop new markets for these food products.
6. Increase habitat protection and restoration for marine species and ecosystems threatened by climate change and biodiversity loss (i.e. ensure that they have sufficiently large and safe migratory corridors, breeding sites, and nurseries), including the restoration of salt marshes, coral reefs, mangroves, and other habitats that act as essential fish nurseries.
7. Support the 30x30 global initiative[41] to protect 30% of our oceans by 2030 through a network of highly protected marine areas to build climate resilience.
8. Update the National Marine Sanctuaries Act to ensure that the Sanctuaries System is adapting to and planning for climate change, including mitigating and managing climate impacts to Sanctuary resources.

[40] See https://www.gfi.org/seafood for a short discussion on 'alternative' seafood. An added benefit of alternative seafood is that the research and production can be done anywhere, so that inland states could directly benefit from this form of blue economic development.

[41] See https://www.woi.economist.com/the-need-to-protect-at-least-30-of-the-ocean-by-2030/.

9. Engage Indigenous land and ocean-based knowledge and practices to inform conservation policies and projects within bio-regions, and work in conjunction with marine scientists in information gathering and marine fisheries policy development.[42]
10. Link aquaculture sites to emerging blue carbon markets in order to generate additional financial incentives.
11. Increase small-business loans and support for sustainable aquaculture, sustainable fishing, and alternative seafood startups; this could be accomplished through an expansion of USDA's Natural Resource Conservation Service, Farm Service Agency, Agriculture Research Service, and/or expanded Sea Grant programs.

VI. Appendix: Current OCAP-related Federal Legislation and Gap Analysis

The appendix analyzes legislation introduced in the U.S. Congress from 2018 to spring 2020 relating to any of the four OCAP issue areas, and assesses key legislative gaps. To access the appendix, visit: **https://go.miis.edu/ocap-gapanalysis**

[42] For an excellent example of indigenous knowledge being deployed to build climate resilience off of the coast of Oregon see: https://www.kcet.org/shows/tending-nature/episodes/protecting-the-coast-with-the-tolowa-dee-ni.


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Ocean Climate Action

Middlebury Institute of International Studies at Monterey
Center for the Blue Economy

OCAP Youth Advisory Council

Blue Frontier Campaign
Seaweed Rebel