

Action Agenda for a Blue-Green Future

U.S. Federal Ocean-Climate Recommendations for 2021



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Bringing the Power of the Ocean to the Fight Against Climate Change

Greenhouse gas pollution is the greatest threat to the ocean and the communities that rely on it. Sea level rise and storms are threatening coastal zones and taking a disproportionate toll on those who are already facing social and economic inequities. Meanwhile, ocean warming, deoxygenation, and acidification are profoundly damaging ocean ecosystems (1). It is notable that an increase of only 1.5 degrees Celsius over preindustrial temperatures will cause coral reefs to decline by 70 to 90%, while a temperature increase of 2 degrees Celsius will destroy them almost completely (2).

The next Administration and Congress will have an enormous responsibility. In the wake of the pandemic and its economic fallout—and following years of environmental rollbacks—they need to look beyond an economic reset and toward a sustainable future, setting the country on a steep trajectory to phase out greenhouse gas pollution by midcentury. The power of the ocean can support this work in two ways: by activating ocean communities and by adding ocean solutions to the portfolio of climate action.

First, ocean communities—from nongovernmental organizations and ocean industries to coastal community organizations and individual ocean advocates—are increasingly poised to mobilize behind the suite of policies necessary to reach net-zero carbon dioxide emissions no later than 2050. With no single panacea for the climate crisis, what the ocean needs is not an “all-of-the-above” energy strategy but an all-of-the-above climate strategy with policies to decarbonize sectors from transportation to

electricity; provide financing to develop sustainable negative emissions technologies; protect and restore natural carbon sinks; and promote justice for communities that are on the front lines of climate impacts and affected by the transition to a clean economy.

Second, the ocean is a source of sustainable—and often overlooked—climate solutions. The Administration and Congress should adopt an ocean-smart climate strategy that aims to maximize ocean-based mitigation measures—such as decarbonizing the shipping sector and protecting and restoring coastal ecosystems that sequester carbon—as well as adaptation measures that increase the resilience of frontline communities and ecosystems to unavoidable ocean-climate impacts.

Structure of this Report

Each section of this report focuses on a key area of ocean-based mitigation or adaptation that the Administration and Congress should pursue to complement the full suite of climate policies necessary for economy-wide decarbonization. These include advancing blue carbon storage, reducing emissions from offshore oil and gas, supporting offshore renewable energy, and reducing emissions from shipping and ports; they also include advancing climate-smart marine protected areas, managing flooding and sea level rise, developing climate-ready fisheries, and improving ocean and coastal water quality.

Given the severity of the climate crisis, the next Administration should be expected to take action on climate immediately—and it should not overlook the ocean-climate nexus. Throughout, this report highlights key ocean-climate actions that the Administration should address in 2021. Additionally, as the Administration considers issuing executive orders on general climate action, it should include ocean-climate policy as an integral piece. For example, Administrative directives should cover blue carbon ecosystems in the context of natural climate solutions, shipping in the context of transportation, and offshore wind in the context of renewable energy. The Administration should also consider a stand-alone executive order on ocean-climate action, which would support and complement its broader climate action plan.

Topline recommendations for executive actions from each section of this report include:

Advancing blue carbon storage

- Direct agencies to only allow the destruction or degradation of blue carbon ecosystems when no reasonable alternatives exist in order to achieve no net loss of blue carbon ecosystems.
- Develop a unified approach for blue carbon system quantification and planning.

Reducing emissions from offshore oil and gas

- Revoke or replace E.O. 13795 of April 28, 2017 (“Implementing an America-First Offshore Energy Strategy”).
- Do not expand Offshore Continental Shelf (OCS) leasing in the 2022–2027 offshore leasing program.
- Prevent future leasing by permanently withdrawing areas of the OCS using executive authority under section 12(a) of the Outer Continental Shelf Lands Act.

Supporting offshore renewable energy

- Direct the increased deployment of sustainably sited offshore wind projects through agency actions that enhance permitting certainty, strengthen stakeholder and review processes, and mitigate environmental impacts.
- Implement a comprehensive planning and siting strategy for power transmission for offshore renewable energy.
- Direct the Bureau of Ocean Energy Management (BOEM) to increase data transparency.

Reducing emissions from shipping and ports

- Support high ambition proposals for greenhouse gas emissions reductions within the International Maritime Organization.
- Enact a speed restriction of 12 nautical miles on vessels entering the U.S. Exclusive Economic Zone (EEZ).

Advancing climate-smart marine protected areas

- Commit to protecting 30% of U.S. lands and waters by 2030 (30x30) and ensure existing and future protected areas are managed for climate adaptation and mitigation and biodiversity conservation.
- Initiate a transparent process to move the country toward the 30x30 goal with meaningful input from Tribes, stakeholders, and the public.
- Authorize and fund the National Academy of Sciences to evaluate whether and to what extent existing marine protected areas and other area-based management designations in the United States are managed for climate change adaptation and ecosystem resilience and to recommend management changes.

Managing flooding and sea level rise

- Create a Sea Level Rise and Flood Management Task Force.
- Conserve flood-prone undeveloped coastal areas to reduce impacts of sea level rise and storm surge events.

Developing climate-ready fisheries

- Provide comprehensive guidance to managers for how to incorporate climate change into management.
- Accelerate the use of proven science and management tools that can improve understanding of anticipated changes and plausible outcomes, and identify management options to prepare and adapt fisheries in response.

Addressing ocean acidification and coastal water quality

- Invest in science to understand and manage nonpoint pollution in aquatic environments experiencing climate impacts.
- Provide funding for storm- and wastewater infrastructure upgrades to accommodate current and future anticipated conditions.

The report closes by discussing the opportunity that the Administration will have not only to implement a domestic ocean-climate agenda but also to set a global example. Rejoining the Paris Agreement and formulating the U.S. emissions reduction target for 2030 should be the immediate steps in climate diplomacy. There are also several near-term actions the Administration could take to lead the international movement for ocean-climate stewardship.

Advancing Blue Carbon Storage

Overview

A key part of avoiding additional carbon dioxide emissions and an opportunity to support natural carbon storage is to achieve zero net loss of biodiverse, coastal “blue carbon” systems, including seagrasses, salt marshes, and mangroves. Per unit area, blue carbon stocks sequester an extremely large amount of biological carbon in organic material, and store some of this carbon in their roots for decades to millennia. For example, U.S. tidal wetlands, including both marshes and mangroves, sequester a net 8 Mt/y CO₂ (3). North America’s tidal marsh wetland soils and estuarine sediments store approximately 1.3 Gt C in the top meter of soil and sediment (3). Destroying blue carbon systems exposes buried organic material to oxygen, allowing microbes to digest the material and release carbon dioxide. In the United States, wetlands losses of nearly 14,000 acres per year have been recorded (4). Globally, 1-2% of tidal marsh area is being lost each year, contributing to an estimated 0.45 Gt CO₂ annually from the disturbance of all blue carbon systems (5).

Zero net loss of blue carbon systems will avoid additional carbon dioxide emissions from this source and potentially enhance natural carbon storage in coastal environments. Protections for blue carbon systems must be strong, allowing human uses compatible with conservation and management objectives, and consistently applied nationwide. Loss of blue carbon systems to coastal development must only be in extreme cases where no other reasonable alternatives exist, and compensatory restoration must be used to replace, rehabilitate or acquire the ecological and functional equivalent of lost blue carbon systems.

Overall, steps to achieve zero net loss cannot include token efforts to replace lost systems. Destroyed blue carbon systems cannot be replaced by newly established systems in socioeconomically or politically convenient locations that lack environmental conditions

(e.g., salinity, water circulation, and other species) required by carbon-storing plants. The carbon dioxide lost when one blue carbon system is destroyed cannot be quickly recaptured by another blue carbon system, because these systems sequester carbon at slow rates that require long periods to permit substantial accumulation. Degraded blue carbon systems can be restored, although the sequestration and additional services they provide will likely not meet or exceed those of the original ecosystem. Coastal blue carbon systems provide additional functions, such as hosting high biodiversity, filtering and processing runoff from land, and helping buffer storm waves and sea level rise, which also support climate change adaptation and environmental justice efforts.

Although relatively new and still evolving, there are a variety of accounting protocols and policy guidance for incorporating blue carbon storage and sequestration into climate mitigation strategies. The most commonly used accounting protocol is the International Panel on Climate Change (IPCC) 2013 Wetlands Supplement, which provides methods for the inclusion of mangroves, salt marshes and seagrass ecosystems into national greenhouse gas inventories that are reported to the UNFCCC. However, U.S. federal agencies have not yet adopted a consistent approach to inventorying, monitoring, and quantifying the services provided by blue carbon systems that would provide a robust basis for assessing U.S. aquatic environments' role in mitigating climate change. As carbon accounting methods mature, there will be an increased need for uniform and accurate accounting of carbon stored, carbon losses avoided, and carbon recaptured by both natural and engineered/restored systems.

Blue carbon is just one type of ocean carbon storage. More research is necessary to understand whether opportunities exist to enhance natural carbon storage by open-ocean ecosystems, which would expand the array of ocean nature-based solutions that contribute to both mitigation and adaptation. As in the coastal zone, open-ocean plants and the ocean food web remove carbon dioxide from the atmosphere and transport it to the deep ocean and seafloor. Together, biological and chemical ocean processes currently take up 23%, or approximately 9 Gt C yr⁻¹ of annual emissions from fossil fuel burning and land use change (6). Since the Industrial Revolution, the ocean carbon sink has mitigated 74 ppm of atmospheric carbon dioxide, slightly more than the amount of atmospheric carbon dioxide increase associated with oil burning (73 ppm) (6). Much of this carbon uptake is controlled by geochemical processes and results in ocean acidification, but some uptake is controlled by biological processes. Questions remain about how open-ocean food webs may change due to rising ocean temperatures and acidification, and to decreasing ocean oxygen content and nutrient supply, which together may alter biological carbon capture and storage in the ocean.

Administrative/Executive Actions

- **Develop a unified approach for blue carbon system quantification and planning.** Any agency that has the authority to interact with or alter wetlands, seagrass systems, and mangroves (e.g., USACE, DOI, USGS, EPA, NOAA) should quantify their annual carbon storage and total sequestration using the same methods. Whether to disrupt, restore, or preserve systems that store carbon naturally, and how to manage them to achieve maximum carbon storage along with maximizing other ecosystem services they perform, should be evaluated on the same metrics across Federal agencies.
- **Direct FEMA to prioritize the restoration of lost wetland areas** and recovery and retention of blue carbon systems over creating hardened infrastructure (e.g. seawalls) in disaster recovery efforts.
- **Charge federal agencies to explicitly include natural storage of carbon** in their work to protect, maintain, and restore wetlands under existing relevant statutory authority (e.g., NEPA, Natural Resources Damage Assessment (CERCLA and OPA), the Clean Water Act, the Harbors and Rivers Act, ESA, CZMA, etc.) (7). The primary protection of wetlands occurs through Section 10 of the Harbors and Rivers Act, ACOE and Section 404 of the Clean Water Act. These programs have been diluted by recent administrative actions. Thus, a reevaluation of these programs should be done to restore and enhance their authority for wetland protection. This consideration of natural carbon storage must also be accompanied by attention to climate change impacts on blue carbon systems, such as sea level rise, warming, and changing patterns of runoff from land.
- **Direct agencies to only allow the “destruction or degradation of blue carbon ecosystems when no reasonable alternatives exist”** and thereby strengthen the no-net-loss principle to avoid casual losses compensated by token and ineffective restoration. When loss of blue carbon systems is completely unavoidable, an appropriate compensatory restoration location should be agreed upon by at least two federal agencies. The same functions and services provided by the original ecosystem, including (but not limited to) carbon storage, water filtration/retention, and biodiversity, should be also provided in the restored system. Follow-up monitoring and reporting should be required for 8-10 years to ensure that the restoration goals are being met. Establish a national goal to achieve no net loss of blue carbon systems by 2030.
- **Require the U.S. Army Corps of Engineers (USACE) to prioritize using dredged material where it is suitable for marsh restoration and creation.** This will require using material in the most beneficial way rather than the most inexpensive way. Use of dredged material may also include dune building that promotes nature-based adaptation.

Congressional/Legislative Actions

- **Reauthorize and fully fund the National Estuary Program** for another 10 years, which already operates a nationwide blue carbon research and monitoring program studying the effects of wetland degradation and restoration.

- **Pass legislation focused on blue carbon and coastal wetlands.** This includes H.R. 5589, the Blue Carbon for our Planet Act, which creates an Interagency Working Group (IWG) focused on blue carbon system conservation; and H.R. 4093, H.R.4044/S.3171, and H.R. 3919, legislation aimed at restoring wetlands for coastal resilience. (These pieces of legislation are discussed in the report of the House Select Committee on the Climate Crisis, “Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America.”) In relevant legislation, ensure that coastal resilience and restoration projects support replacement of hardened shorelines with living shorelines, and that they build workforce capacity by training local living shoreline experts. Special emphasis should be given to projects that particularly benefit underserved communities.
- **Support and incentivize state Coastal Programs to develop new strategies for preserving areas of wetlands within their states.** Provide funding for the state Coastal Zone programs to develop and track wetland preservation and restoration.
- **Sustain natural carbon storage research and monitoring by investing federal funding for relevant scientific agencies.** Prioritize understanding and quantifying the carbon storage function and co-benefits offered by both blue carbon systems and open-ocean food webs, and the risks posed to each by ongoing climate change.

Ensuring Success

A strong preference toward maintaining and creating blue carbon systems, using uniform evaluation and decision-making criteria, must be in place to ensure success. This can be achieved by understanding the benefits provided by blue carbon systems via research investments, and by creating programs to train specialists and retain living shorelines via existing and new management and restoration efforts. In addition, management of coastal development and zoning must include the engineering and preservation of living shorelines.

Milestones

- First hundred days: Establish a blue carbon interagency working group (IWG) that would begin guiding relevant agencies to integrate consideration of blue carbon into their work.
- First hundred days: Direct FEMA to prioritize the use of living shorelines and recovery and retention of blue carbon ecosystems in disaster recovery efforts.
- First hundred days: Review USACE and EPA’s authorities for protecting wetlands, with a view to restore and enhance these authorities to protect these areas for their blue carbon value.
- First hundred days: Require USACE to evaluate its restoration authorities for providing for restoration and creation of new wetlands.
- First hundred days: Require USACE to change its policy on the disposal of dredge material, to use it in the most beneficial way, such as, wetland restoration or creation, rather than the most cost-effective disposal method.
- First year: Fund relevant scientific agencies to support blue carbon research and monitoring, specifically looking at anticipated losses and cost-effective restoration techniques.

Reducing Emissions from Offshore Oil and Gas

Overview

Offshore oil and gas activities create overlapping threats to the ocean. Spills and other pollution directly threaten important ecosystems, resources and communities. At the same time, emissions from burning the oil and gas produced contribute to climate change and ocean acidification. The pollution and health effects from these activities disproportionately affect disadvantaged communities and communities of color. The continued viability of the ocean depends on reducing greenhouse gas emissions, which requires a rapid and responsible transition from fossil fuels to renewable energy sources. Laws, regulations and policies must be updated to ensure a fair and just transition away from oil and gas operations on the Outer Continental Shelf (OCS) and to properly account for climate change and other impacts to the ocean and communities.

Administrative/Executive Actions

- **No expansion of OCS leasing in the 2022-2027 five-year leasing program.** Develop and implement a new five-year OCS leasing program for 2022 to 2027. The new program should schedule no new OCS oil and gas leases in Planning Areas along

the Atlantic and Pacific coasts, in the Eastern Gulf of Mexico (GOMESA Moratorium Area), and in the Chukchi and Beaufort seas, Gulf of Alaska, Aleutian Islands, Bering Sea and Bering Strait (24 of the 27 Planning Areas).

- **Prevent future leasing.** Use the authority under Section 12(a) of the Outer Continental Shelf Lands Act (OCSLA) to permanently withdraw from leasing OCS areas along the Atlantic and Pacific coasts, the Eastern Gulf of Mexico, and the Gulf of Alaska and Bering Sea.
- **Revoke or replace E.O. 13795.** Revoke or replace Executive Order 13795 of April 28, 2017 (“Implementing an America-First Offshore Energy Strategy”). The Secretary of the Interior should revoke or replace Secretarial Order 3350 on the same subject.
- **Modernize the implementation of OCSLA to account for climate change impacts and the need for a just transition away from fossil fuels.** The Bureau of Ocean Energy Management (BOEM) and the Bureau of Safety and Environmental Enforcement (BSEE) should update and modernize the regulations and policies that implement OCSLA and related statutes to fully account for climate change-related impacts, just transition principles and safety and environmental protection. The agencies should reverse deregulatory efforts, including rollbacks to BSEE’s 2019 Well Control Rule (and potentially to the Arctic Drilling Rule).
- **Increase transparency by restarting the Open Government Initiative.** Reinvigorate the Administration’s commitment to open, transparent government. This work could include restarting the Open Government Initiative, including the process to join the Extractive Industries Transparency Initiative.

Congressional/Legislative Actions

- **Modernize OCSLA:** Congress should enact changes to OCSLA and related legislation to foster a just transition away from fossil fuels to renewable energy. Changes to the law should also account for climate change-related impacts and prioritize safety and environmental protection.
- **Moratorium on new leasing in select OCS areas.** Congress should prevent new leasing in OCS areas along the Atlantic and Pacific coasts, the Eastern Gulf of Mexico, and the Gulf of Alaska and Bering Sea.

Milestones

- First week: President announces the repeal/replacement of executive order 13795 (including effectively reinstating 12(a) withdrawals that permanently protect key OCS areas from leasing).
- First hundred days: President stops development of 2019-2024 five-year program.
- First hundred days: BOEM and BSEE announce proposed rulemaking to advance modernization of regulations that implement OCSLA and related statutes.
- First hundred days: President announces re-starting of the process to join the Extractive Industries Transparency Initiative.

Supporting Offshore Renewable Energy

Overview

Offshore wind is a critical part of making a rapid transition to clean energy and meeting low-carbon electricity goals. Once successfully deployed, it will be a key source of renewable energy to densely populated coastal areas with high energy demands, while also creating well-paying, local jobs and displacing dirtier energy sources that have disproportionate impacts on communities of color and other marginalized groups. The U.S. wind industry is still in its early stages, and reaching a goal of net-zero in the electricity sector will require a dramatic increase in the pace and scale of offshore wind development. There is currently only one 30 MW (5 turbine) pilot scale offshore wind project in the United States, the Block Island Wind Farm off the Coast of Rhode Island. This project proved that offshore wind projects could acquire permits and triggered increased interest in offshore development, but represents a mere fraction of the offshore wind deployment that is needed. Recent calls to double offshore wind by 2030 are ambitious but achievable: the 2015 Department of Energy “Wind Vision” report found the potential to develop 22 GW by 2030 and 86 GW by 2050.

The opportunity and demand for development is growing, especially in the Northeast and Mid-Atlantic regions where there are currently 16 active leases and interest in developing additional leases. Many states in these two regions have committed to acquire a

specific number of megawatts from offshore wind projects to meet their state climate mitigation goals and are motivated to make progress. As the technology for floating offshore wind platforms advances, more development is expected in deeper waters offshore including the Gulf of Maine and along the West Coast. Commitments to expanded offshore wind also offer the opportunity for sustainable, well-paying green jobs and new economic development for local communities.

Hurdles remain to deploying responsible offshore wind at the levels necessary to meet clean energy goals, and success is far from guaranteed. Renewable energy experts have recommended a variety of policies, such as establishment of a national clean energy standard, strengthened tax credits, and investments in power transmission and technology research, that would address some of the energy policy, infrastructure, and financial barriers to offshore wind. Wind energy supporters are working on efforts to establish more robust infrastructure and supply chains to support offshore wind construction, operation, and maintenance. Effectively addressing these issues is critical to our ability to increase the pace and scale of offshore wind development, and should be a priority for policymakers. But even with these policies in place, key regulatory risks must be addressed in order to achieve the level of clean energy production needed from offshore wind.

Planning and permitting for successful buildout of offshore wind

A major impediment to progress on offshore wind has been regulatory risk, driven by questions of tradeoffs among uses and a variety of legal, regulatory, and cooperation obstacles. In the United States, wind is both a critical part of our renewable energy portfolio, and also represents a new, large-scale industrial development in the ocean that can be associated with challenging conflicts. Strengthening planning, engagement, permitting and monitoring practices will help mitigate or avoid negative consequences of wind infrastructure construction, and provide the increased certainty developers need to successfully deploy offshore wind at the scale needed to meet clean energy goals.

Permitting of these projects is rather new to the relevant federal management agencies. Under-resourced and under-staffed federal agencies are struggling to adapt in real time to successfully plan for and permit an entirely new industry, resulting in a significant amount of uncertainty in the permitting process. Our ability to advance offshore wind development thoughtfully depends significantly on our success in overcoming these obstacles.

Thankfully, the necessary foundations for successfully increasing certainty in the regulatory process are already available. Regional ocean plans have been developed for the Northeast and Mid-Atlantic that provide the information to properly site offshore wind farms in a way that reduces local impacts to ecological resources and minimizes conflict with other ocean uses. A similar regional process is underway for the West Coast and a number of others (nine regions in total for the U.S. EEZ) have made progress toward data collection and spatial visualization. These planning efforts have built trusted working relationships with state, federal, fishery management council, and Tribal government leaders, members of Congress, and stakeholders as they worked together to define a shared vision for a regional ocean space. Still, there is a need for key federal permitting agencies, in particular BOEM, to use information available in the existing plans. Spatial conflicts with other ocean interests (such as the maritime and fishing industries, which have already resulted in permitting challenges and development delays) can be avoided with proper early coordination and a clearly defined permitting process that works for all parties.

The recommendations that follow are specifically targeted at using these existing foundations as a launching pad to deliver successful clean energy results. With leadership from the Administration and Congress, we can deploy offshore wind at scale that meets our clean energy needs, and in a manner that serves the needs of all stakeholders and the marine environment.

Administrative/Executive Actions

- **Direct the increased deployment of sustainably sited offshore wind projects through agency actions that enhance permitting certainty, strengthen stakeholder and review processes, and mitigate environmental impacts.** This direction should encourage agencies to use existing and emerging regional approaches to planning and siting, and to actively improve federal agency coordination through the work of the Ocean Policy Committee's Ocean Resource Management Subcommittee. It should direct federal agencies, including but not limited to BOEM and led by the Ocean Policy Committee's Ocean Resource Management Subcommittee, to review the regulatory process and timeline and develop specific recommendations that would increase certainty for wind developers and ensure conservation of ecosystem health. As part of the review, consideration should be given to facilitating robust stakeholder engagement (including engagement of Tribes and affected vulnerable communities) starting early in the permitting process and continuing during construction and operational phases, ensuring that data developed and collected for permitting and monitoring is made publicly available and providing adequate time for states, Tribes, fishery management councils, and developers to review, comment, and obtain meaningful feedback on environmental documents.

- **Comprehensively address power transmission for offshore renewable energy.** Evaluate actions to ensure the permitting and siting process for offshore transmission lines, offshore substations, and onshore interconnection points within the grid are fully analyzed as part of a comprehensive approach to siting offshore energy. This should also include clarifying the specific roles and responsibilities for each federal agency, including BOEM and the Federal Energy Regulatory Commission (FERC), to ensure clarity and efficiency in the planning process. Coordination among states will also be critical. Coordinating with states and regional transmission organizations to understand and address grid capacity onshore and needed improvements is also important. This comprehensive approach could be done in conjunction with the development of a National Offshore Wind Transmission Plan.
- **Direct BOEM to increase data transparency.** As a condition of permitting, direct BOEM to require that data developed through offshore energy (oil, gas, wind) permitting be made publicly available.
 - The data should contain associated metadata standards in easy to understand formats through the Marine Cadastre and regional ocean data portals.
 - BOEM should coordinate data formatting with National Oceanic and Atmospheric Administration (NOAA), relevant Integrated Ocean Observing System (IOOS) regional associations, and Regional Ocean Partnerships, where applicable.
 - Data should be provided in appropriate formats, regionally standardized, and synthesized where applicable for distribution to public data systems.

Congressional/Legislative Actions

Congress should encourage BOEM to support increased offshore wind deployment by taking a regional approach to offshore planning and leasing, and by avoiding or minimizing environmental impacts (including cumulative impacts) and user conflicts. Specific actions Congress could take include:

- **Codify key components of comprehensive ocean management.** Codify Regional Ocean Partnerships and continued engagement of federal agencies, the White House level interagency Ocean Policy Committee, the use of regional ocean data portals, and the requirement for state and federal agency coordination. Many of these components are contained in the Regional Ocean Partnership Act and the Blue Globe Act, but other components including codifying the Ocean Policy Committee should be advanced. Both bills have bipartisan support in Congress.
- **Fund science and direct robust federal agency engagement.** Support the science and federal agency engagement necessary to minimize any environmental impacts from construction and operation of offshore wind by providing adequate funding for:
 - NOAA including NOAA Fisheries Science Centers
 - Integrated Ocean Observing System (IOOS)
 - Regional Ocean Data Portals and associated Regional Ocean Partnerships

Promote robust engagement from federal agency staff including BOEM, Coast Guard, and NOAA with regional science entities such as:

- Regional Wildlife Science Entity (RWSE), which intends to deliver science focused on the interactions of offshore wind development and wildlife including monitoring and evaluation of cumulative impacts.
- Responsible Offshore Science Alliance (ROSA), which was recently launched to advance regional research and monitoring of fisheries and offshore wind interactions.

Ensuring Success

The U.S. must advance offshore wind resources as a key part of achieving a national goal of 100% clean future (net zero emissions) by 2050 or earlier. To meet this goal, the pace of buildout must increase significantly, while also being done thoughtfully considering the environment, other ocean uses, and coastal communities. In our effort to decarbonize, we must remember that these are major infrastructure projects being placed in our offshore ocean environment and will involve tradeoffs. Proactive efforts will be needed to avoid or minimize impacts to habitat, fisheries, maritime transportation, and marine mammals, and to limit conflicts with other uses associated with siting, construction (e.g. pile driving supports for the turbines in the marine environment and burying the transmission cables needed to transmit the energy to land), and operation. Offshore wind leases and turbine placement should be

determined by a robust and transparent stakeholder process that incorporates early engagement and input from diverse user groups as well as federal, state, Tribal, fishery management council, and local governments. This process and structure is already defined through federal ocean policy and regional ocean planning through Regional Ocean Partnerships. While improvements to the federal ocean policy can be made by this Administration, these mechanisms can be leveraged to ensure offshore wind success. Permitting agencies must also have sufficient resources to carry out a robust and efficient permitting process that fully considers the environment and user needs.

Finally, note that wind is not the only potential source of offshore renewable power. Fixed structure wind is currently the only offshore technology sufficiently developed to deploy at scale in the United States, but there are a variety of marine and hydrokinetic energy technologies currently in development as well as advancements being made on larger offshore wind turbines and floating turbines that have the potential to reduce cost investments. Additional resources, such as tax credits and increased research and development, will be important to ensure continued development of other offshore energy technologies.

Milestones

- **First hundred days:** Administration issues direction to increase deployment of sustainably sited offshore wind projects through agency actions that enhance permitting certainty, strengthen stakeholder and review processes, and mitigate environmental impacts.

Reducing Emissions from Shipping and Ports

Overview

Shipping transports over 90% of global trade by volume, but has impacts on both our oceans and our climate. As a sector, shipping accounted for approximately 2.6% of global carbon dioxide emissions in 2015, roughly equivalent to Germany's national emissions (8). Shipping to and from U.S. ports by all vessels of all flags represented approximately 4.1% of all international shipping emissions in 2015 (38.9 million metric tons of carbon dioxide equivalent) (9). Additionally, maritime shipping accounts for a significant and growing portion of black carbon, a potent short-lived climate pollutant. After carbon dioxide, black carbon is the second largest source of shipping's contribution to climate change, and has an especially adverse impact on the Arctic. The next Administration should work to reduce the sector's present greenhouse gas emissions, and develop long term strategies to urgently move the industry towards full decarbonization.

Administrative/Executive Actions

- **Support high ambition proposals for greenhouse gas reduction within the International Maritime Organization (IMO).** The Administration should play a central leadership role in directing the global shipping industry to transition towards full decarbonization as soon as possible. In 2018, the IMO adopted the Initial IMO strategy on the reduction of greenhouse gas emissions from ships. The strategy envisions reducing greenhouse gas emissions from shipping by "at least" 50% by 2050 compared to 2008 levels (10). However, in order to meet the goals of the Paris Agreement, full decarbonization must occur by 2034 in order to remain below 1.5 degrees Celsius, or by 2052 to remain below 2 degrees. The Administration should direct the U.S. delegation to the IMO, led by the United States Coast Guard (USCG), to support short term actions that immediately reduce shipping's greenhouse gas emissions, such as setting a strong operational goal-based measure that progressively reduces the carbon intensity of shipping. In addition, the U.S. delegation to the IMO should urge for increased ambition in any updates to the IMO Strategy.
- **Direct agencies to prioritize and coordinate the decarbonization of shipping and ports (11).** As the established Ocean Policy Committee is already tasked with outreach to ocean stakeholders and identifying priority ocean research and technology needs, the Ocean Resource Management Subcommittee is ideally placed to coordinate discussions between ports, shipping companies, technology companies, and state and federal agencies on this issue. The Ocean Resource Management Subcommittee, in coordination with the Committee on the Marine Transportation System and consultation with stakeholders, should develop an implementation plan to coordinate recommendations for decarbonizing U.S. shipping and ports.
- **Enact a speed restriction of 12 nautical miles on vessels entering the U.S. EEZ.** Reducing vessel speeds by 20% can reduce emissions by up to 34%, with incidental reductions in some air pollutants, and potential reductions in underwater noise.

- **Mandate onshore power where available.** Not only would this reduce carbon emissions in port areas from ships, it would also curb black carbon and other forms of air pollution, which would benefit underserved port communities. On-shore power is especially effective for vessels such as ferries or cruise ships that dock for extended periods of time. At present shore power is not available at most ports, and any mandate should be accompanied by additional grants to assist ports in the necessary infrastructure upgrades.
- **Direct the Committee on the Marine Transportation System to convene an expert roundtable to identify synergies that could address challenges in achieving green ports,** including needs for the development of offshore wind and renewable energy and port reception infrastructure upgrades to ensure that waste is properly managed.

Congressional/Legislative Actions

- **Expand financing for green ports infrastructure and zero emission fuels in infrastructure and economic recovery packages.** Congress should expand the existing grants that are available for port infrastructure that reduces greenhouse gas emissions, air pollution, or facilitates the full transition to zero emission shipping. While programs, such as the Ports Infrastructure Development Program (PIDP), exist to provide grants or loans to port infrastructure, and the Diesel Emissions Reduction Act (DERA) has allocated 152 grants to port specific projects, either program would need to be expanded and clarified to focus on green energy infrastructure. Congress should also move to enact legislation, such as the Climate Smart Ports Act and similar proposals, which would create a \$500 million-a-year program to provide assistance to ports and port users with upgrades required to achieve zero emissions while ensuring that community labor and environmental concerns are addressed. This includes authorizing an additional \$50 million a year for DERA, specifically for emission reduction at ports.
- **Enact a Monitoring, Reporting, and Verification (MRV) scheme for vessels entering the Exclusive Economic Zone (EEZ) of the United States.** A key component to reducing fossil fuels from shipping is the collection of data on current ship traffic, cargo, fuel consumption, and greenhouse gas emissions from ships. Reporting should be made mandatory for all ships calling on U.S. ports, in a way that is publicly accessible to ensure transparency and better research. This system could be closely modeled on the European Union’s MRV system to avoid duplicating effort by shipowners.
- **Explore enacting a fuel tax on maritime fossil fuels.** A shipping carbon tax could accelerate the sector’s transition to zero-carbon fuels. Not only would such a tax encourage greater fuel savings, it can support research and development as well as investment into the infrastructure necessary for zero emission shipping.
- **Provide robust funding** for development of renewable fuels and grants for port infrastructure upgrades and decarbonization.

Ensuring Success

Transitioning the maritime sector away from its reliance on fossil fuels must be swift, and will require research, innovation, and federal funding to assist with research and development needs in addition to necessary upgrades. Success will also require a whole-of-industry approach that includes early and robust stakeholder engagement and ensures that there are no perverse incentives that could discourage innovation. If shipping is too heavily disrupted by new regulations, it could encourage shifts to less efficient forms of transportation such as rail. As has been seen in previous industry transitions, first movers may face obstacles but will also be rewarded with new economic opportunities. The next Administration must ensure that the adoption of new energy efficiency technologies or zero emissions shipping rewards first movers, does not place individual ports or entities at a competitive disadvantage, and that the best ideas are rapidly shared across the American maritime community.

Milestones

- **First week:** The U.S. delegation to the IMO is directed to pursue actions that aggressively reduce greenhouse gas emissions from the shipping industry.
- **First hundred days:** Congress introduces green ports and infrastructure legislation.
- **First hundred days:** The President incorporates zero-emission shipping into policy guidance for the Ocean Policy Committee’s Ocean Resource Management Subcommittee.

Emerging Issue Spotlight: Climate Impacts of Plastic Production

Plastic pollution and climate impacts create dual threats to the warming planet and ocean ecosystems. The overlap between these threats and their causes creates opportunities for the United States to further solutions that address both of them together. More than 99% of all plastics are derived from ethane, a petrochemical produced from fossil fuels, and the production and disposal of fossil fuel-based plastics results in significant greenhouse gas emissions (12). The production of petrochemicals is projected to increase substantially in the next decade, which will result in additional greenhouse gas emissions under a business as usual scenario. By 2050, the total greenhouse gas emissions from plastic could be greater than 50 gigatons, which is equivalent to 15% of the global carbon budget (13). By that same time, annual inputs of plastic to the aquatic environment are projected to grow more than 10-fold (14).

To address these growing concurrent problems, governments and the private sector need to substantially reduce greenhouse gas emissions from plastics production throughout the plastics lifecycle while also taking steps to prevent plastics from entering—and contaminating—the ocean. Several recent analyses suggest that accomplishing these twin objectives will require 1) transitioning away from fossil fuels as feedstocks and energy sources for primary plastics production; 2) significantly expanding mechanical recycling and waste management over end of life treatments that release greater emissions; and 3) reducing the overall demand for plastics in a way that decreases greenhouse gas emissions (15).

The connections among plastics production, climate change, and ocean and human health are relatively new concerns. But an incoming Administration could take the following steps to play a leadership role.

- **Ensure that federal policies enacted to reduce greenhouse gas emissions do not have the unintended consequence of incentivizing enhanced plastics production and accompanying health effects to communities.** A fundamental restructuring of the energy economy is needed to address global climate change; government policies intended to reduce emissions should be designed to not simply push the private sector toward additional investments in petrochemical manufacturing that will lock them into ongoing extraction and the continued manufacturing—and greenhouse gas emissions and other pollution—of single-use plastics.
- **Incentivize the use of renewable energy in the existing plastics manufacturing sector.** Significant reductions in the emissions from the plastics industry can be achieved by replacing oil, gas, and coal as the energy sources in the distillation, cracking, and other manufacturing processes that underlie plastics production. The Administration should work with Congress to create incentives for companies to use renewable energy sources for primary resin production and conversion.
- **Optimize end-of-life management for plastics to not exacerbate climate change.** It is widely recognized that substantial improvements in mechanical recycling and other end-of-life processes are needed to keep plastics out of the environment. But federal policies that incentivize these end-of-life improvements must do so in a way that also reduces greenhouse gas emissions.
- **Ensure that actions to address climate change and plastics manufacturing are implemented in an equitable and just manner.** Petrochemical manufacturing is well known to have disproportionate health and economic effects on disadvantaged communities. In developing policies to address climate change and plastics pollution, the Administration should take steps to recognize these co-occurring threats and minimize their combined impacts.

Advancing Climate-Smart Marine Protected Areas

Overview

Scientists, coastal residents, and resource managers have long recognized the important role of area-based conservation, particularly marine protected areas (MPAs), for habitat, species, and biodiversity conservation that sustain marine life and the coastal economies that rely upon healthy oceans. Increasingly, research is showing that these protections also offer a range of important climate adaptation and mitigation benefits, meriting MPAs and other area-based conservation tools an important place in the climate policy toolbox.

Ocean ecosystems are fast reaching a tipping point. In order to ensure a healthy and productive ocean that sequesters carbon, and supports wildlife, communities, and ocean industries in the face of the twin biodiversity and climate crises, more of the ocean needs to be protected. A 2019 report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services found that approximately one million plant and animal species are threatened by extinction over the coming decades and that human activities have damaged two thirds of the ocean (16). For example, only 15% of mangroves (a powerful blue carbon sink) and 50% of coral reefs (home to 25% of all marine species) remain. Research suggests that to secure the ocean’s resilience in the face of rapidly changing conditions, and to meet a broad range of environmental and economic goals, at least 30% of the global ocean needs to be protected.

Approximately 26% of the U.S. ocean is currently permanently protected, but more work is needed (17). Existing protected areas in U.S. waters are significantly skewed geographically (with the bulk of protected areas located in the remote Western Pacific Ocean or northwestern Hawaii). Additional evaluation and management of both individual MPAs and the U.S. marine protection network as a whole is needed to ensure it effectively captures and conserves the full range of biological diversity in U.S. marine waters, while maximizing climate benefits. Consideration of public access for recreational activities, accessibility for marginalized people, and proximity to urban centers is also critical to realizing just and equitable benefit distribution of a network of protected areas.

A global campaign is underway to safeguard at least 30% of the world’s ocean by 2030 (30x30) through a network of highly protected marine areas. In response to the global and domestic biodiversity and climate crises, the next Administration should adopt the 30x30 goal as a starting point. Establishment of a network of highly protected marine areas and other effective area-based conservation measures can serve the multiple purposes of conserving biodiversity, providing climate adaptation and mitigation (climate-smart) benefits, and supporting fisheries and diverse coastal communities. A successful process for establishing protected areas in the ocean must respect Indigenous rights, include provisions for Tribal-led marine protection mechanisms, consider public access opportunities (i.e. addressing transportation and other access barriers), and provide meaningful opportunities for public and stakeholder engagement.

Protected Areas as a Climate Strategy

MPAs can provide ecosystem and coastal community adaptation benefits that address impacts of sea-level rise and changing fisheries. Wetlands, mudflats, and reefs can protect coastal communities, infrastructure, and property from storms and the increased flooding and soil erosion that accompany sea-level rise. As fish populations face the additional pressure of climate change, well-designed MPAs can aid the recovery of fish stocks by protecting important fish habitat, increasing the productivity and resilience of fish populations. MPAs can therefore be an important part of supporting climate adaptation of fisheries and for the human communities that depend on them for food, culture, or income.

Protected areas also have mitigation potential if they are designed to prevent the loss—or allow for the restoration, migration, and expansion—of mangroves, seagrasses, and salt marshes (blue carbon). Using MPAs to protect these blue carbon ecosystems supports climate mitigation by ensuring that these ecosystems will continue to sequester carbon well into the future. (See also section on Advancing Blue Carbon Storage.)

For the purpose of these policy recommendations, resource managers should aim to design and manage existing and new protected areas to be “climate-smart.” For guidance on how to design and manage MPAs for climate adaptation and mitigation benefits, see Ocean Conservancy’s brief “‘Climate-Smart’ Marine Protected Areas for Mitigation and Adaptation Policy” (18). At a minimum this includes evaluating areas for their ability to act as a carbon sink, design that allows ecosystems and valuable ocean and fishery resources to adapt to a wide range of climate trajectories, prioritize ecological and spatial connectivity, and integrate dynamic design features that enable managers to anticipate or respond to climate-driven changes in the ocean.

Administrative/Executive Actions

- **Develop and implement a strategy to protect at least 30% of all U.S. lands and ocean areas by 2030**, and recognize the distinction between achieving this goal on land and in the ocean. In response to the global and domestic biodiversity and climate crises, there are increasing calls for the Administration, under the leadership of the President and Congress, to prioritize biodiversity conservation through executive action and coordinated federal agency actions, potentially through a high-level, interagency task force. When developing and implementing a plan to protect 30% of lands and ocean, it is critical to explicitly consider the different starting point, challenges, and opportunities involved in achieving this goal in the ocean. Implementing a plan to protect more U.S. ocean area should include incorporating the ocean-specific recommendations below:
 - Direct the Ocean Resource Management Subcommittee of the Ocean Policy Committee to identify barriers and gaps to advance area-based ocean conservation measures. Develop an implementation plan to coordinate and evaluate stakeholder, state, and public consultation processes to inform a set of principles specific to establishing area-based protections.
 - Consult with existing interagency planning and coordination bodies within regions across the country like the Regional Ocean Partnerships (ROPs) or their functional equivalent. Regional Fishery Management Councils should also be prioritized for consultation.
 - Ensure area-based management designations include meaningful input from Tribes and Indigenous organizations, stakeholders, and states. Innovative designations such as Indigenous protected areas should be encouraged and explored along with community-based monitoring and co-management to enhance durability of ecosystem protections and resilience of coastal communities.
 - Ensure area-based management designations are ecologically representative and networked encompassing the full spectrum of marine biodiversity across the U.S. EEZ. While 26% of the U.S. EEZ is already under some form of protection, the majority of area protected is in the Pacific, and some regions are highly underrepresented.
 - In addition to designing other area-based management designations with climate considerations in mind, the U.S. government must make climate adaptation and mitigation a priority in the management of existing MPAs and allocate sufficient resources to agencies managing ocean and coastal ecosystems threatened by climate change.
 - Assist the international community in achieving its goal of increasing ocean protections at the individual country and global levels, consistent with the global goal of protecting 30% of the world's oceans by 2030, by delivering the necessary technical and development assistance to priority nations.
- **Reinstate Executive Order designations of national monuments, or expansions of national monuments.** The Antiquities Act is an important and unique Executive Branch tool for conservation and protection of special places, including in the marine environment. The use of the Antiquities Act should not circumvent science-based decision making or meaningful stakeholder engagement; however, the authority of the U.S. President to use this tool should also be respected and not undermined by successive Administrations.

Congressional/Legislative Actions

- **Hold hearings on the use of marine protected areas as a tool to help ocean ecosystems and resource dependent communities and sectors adapt to climate change and as a tool for potential climate mitigation**, focusing on the best available science, major gaps in scientific knowledge, and the perspectives of stakeholders and the public.
- **Authorize and fund the National Academy of Sciences** to evaluate: 1) the extent to which existing MPAs and other area-based management designations in the United States are managed for climate change adaptation and ecosystem resilience; and 2) the climate mitigation benefits of marine protected areas. Toward these objectives, the NAS should undertake the following activities:
 - A comprehensive inventory of areas already protected in the U.S. EEZ and U.S. State waters. Such inventory could include the size and location of each area, a description of the level of protection that includes any permitted or prohibited activities, and available biological or geophysical analyses of the area.
 - Analyses, or review of existing analyses, to understand the degree to which protected areas are representative of the ecosystem(s) in which they are found and of all U.S. ocean and coastal ecosystems in the U.S. EEZ; this will reveal gaps

in geographic coverage and help prioritize regions, habitats, and ecosystems for additional protection (as an example, deep sea corals are likely dramatically underrepresented in existing protected areas).

- Review of existing protected areas to determine if they have climate adaptation strategies in place.
 - Review of their effectiveness to achieve the stated goals for conservation or resource management.
 - Recommend a framework for quantifying and maximizing the carbon sequestration potential of protected areas for consideration in U.S. climate mitigation policies.
 - Evaluate existing policies and programs, like the National Marine Sanctuary nomination, designation, and management process, and recommend changes and innovations to ensure future and existing MPAs are climate-smart.
- **Authorize and fund programs through NOAA and the U.S. Agency for International Development (USAID)** to provide technical and development assistance to foreign countries toward the design and establishment of climate-smart MPAs needed to achieve the global goal of protecting 30% of every country’s EEZ and the global ocean by 2030. This assistance can be modeled after NOAA’s programs for helping countries reduce bycatch and develop marine debris prevention and removal strategies, and used to expand the impact of programs like NOAA’s Marine Sanctuary Program.

Ensuring Success

In addition to specifically designing and managing MPAs to be “climate-smart,” several additional factors will be critical for the success of a strategy to significantly increase the amount of U.S. ocean waters that are protected. These include:

- **Ensure Tribes are an integral part of decision-making.** When considering establishment of any marine protected area or other area-based management, it is imperative that the rights, needs and involvement of Indigenous peoples and Tribes are respected in the process of designing MPAs. Any proposed new MPA designations must include a meaningful role for Tribes and Indigenous organizations. Designations such as Indigenous protected areas should be encouraged and mechanisms created as needed. Community-based monitoring and co-management of protected areas should also be prioritized as a means to create coastal jobs and enhance the resilience of coastal communities.
- **Ensure robust stakeholder engagement.** Robust engagement of stakeholders such as the states, fishing community and energy sector is critical for the effective evaluation, design, implementation and management of protected areas. Investing time and resources in stakeholder engagement and public consultation at the outset is well worth it to gain social and political buy-in for the ultimate results.
- **Use MPAs as part of a broader, integrated ocean management approach.** The term “MPA” includes a broad variety of management measures, some excluding all uses, and many providing for multiple uses. They are ideally used in conjunction with other effective area-based conservation measures (OECMs)—which are areas that are effectively conserved but not part of an official protected area system—as part of integrated ocean and coastal management to create integrated spatial development strategies for larger areas.
- **Design and manage for specific goals to ensure success.** MPAs are not panaceas for the challenges facing ocean ecosystems, and not all protected areas are created equal. Each existing or new protected area should be evaluated against explicit goals whether they are improving fisheries productivity, protecting tourism dependent resources, protecting biodiversity, providing adaptation benefits to a coastal community or ecosystem, mitigating climate change, or a combination.
- **Continue research.** Climate mitigation and adaptation benefits of protected ocean and coastal habitats and wildlife have been documented in scientific literature; however, these concepts lag behind in their policy application and are not widely understood among all stakeholders. Additional research is needed to develop the methods and metrics for quantifying these benefits and improving the collective understanding for how to design and maintain protected areas for these goals.

Managing Flooding and Sea Level Rise

Overview

Sea level rise (SLR), frequency of tidal flooding, and intense rainfall flooding are projected to intensify and continue to pose threats to communities across the country. In states affected by Atlantic storms, 90% of deaths were water related, with 76% of all deaths caused by storm surge or flooding. Shrinking coastlines due to higher sea levels increase the likelihood of street flooding during high tide and storm surge events, damaging costly infrastructure, and altering freshwater ecosystems and water reserves. Human impacts on the ocean are reshaping our coasts and endangering natural areas that currently provide cost-effective climate resilience benefits. Proposals by the U.S. Army Corps of Engineers (USACE) aimed at reducing the impacts of flooding and SLR don't account for the cost-effectiveness of nature-based infrastructure or their additional benefits.

Florida in particular is under threat as NOAA has reported Gulf of Mexico and East Coast shorelines have been consistently increasing their number of sunny-day flooding events, and warn these issues will soon become chronic rather than acute or sporadic. In order to protect all communities across the country, a federal strategy with secured funding should be established to support, fund and advise state actions aimed at building resilient infrastructure or implementing adaptation initiatives. Studies and projects looking to armor coastlines should maintain levels of access for all, including valuable economic activities such as fishing and ocean-based tourism. Infrastructure projects that prepare coastlines and river floodplains require substantial funding that can help communities recover from the economic toll resulting from the Covid-19 pandemic. Large investments to prepare for sea level rise and more frequent flooding can create a substantial number of jobs and engage local contractors.

Administrative/Executive Actions

- **Create a Sea Level Rise and Flood Management Task Force.** The Administration should consider appointing a Sea Level Rise and Flood Management Task Force that is made up of scientists, policy experts, and leaders from municipalities, states, Congress, and federal agencies. This Task Force should:
 - Review the best available science and determine one set of federal SLR rates for agencies, state and local governments to use for planning purposes.
 - Develop a federal SLR and flooding management strategy to understand, assess, predict and respond to sea level rise and flooding, including better coordinated interagency collaboration and reduced nationwide disparities in planning and response.
 - Identify opportunities to prioritize, fund, and coordinate resilience and adaptation projects to meet states' needs.
 - Coordinate and ensure alignment among federal, state, and local agencies' responsibilities and areas of operation to increase accountability and transparency (such as NOAA, DOE and USACE).

Without a federal task force providing nationwide leadership and coordination, states will continue to self-advocate for large federally funded projects, which will lead to greater disparities in outcomes and SLR and flooding preparedness. These divergent practices in sea level rise management are highlighted when comparing states like California and Florida, where the former has a statewide coordinated approach that guides municipal planning, while the latter has depended on municipalities to develop a patchwork of strategies. A federal strategy could guide states' plans, organize municipal funding requests and leave enough room locally designed projects.

- **Add flood resilient requirements to DOT-funded projects.** Many cities and towns are raising their roads to help reduce the impact from more frequent flooding. Washington, DC, Baltimore, MD, Miami, FL and Boston, MA, to name a few, have all reported more frequent sunny-day flooding. Including measures such as bio-retention cells in raised roads or floodable parks as part of DOT plans can help reduce the duration and intensity of flooding events.
- **Conserve flood-prone undeveloped coastal areas to reduce impacts of SLR and storm surge events.** Natural coastal ecosystems provide habitat for wildlife, sequester greenhouse gas emissions, help maintain and improve water quality, offer recreation space for communities, require lower federal expenditures to build and maintain, can help reduce the impacts from storm surge events, SLR, wind and water erosion, and retain floodwaters. The John H. Chafee Coastal Barrier Resources System (CBRS), managed by the Fish and Wildlife Service (FWS), protects undeveloped coastal barriers from federal expenditures that incentivize development. The CBRS is in need of updating, Congress should fund the FWS to expand the

areas under protection, to include biologically sensitive and flood prone areas, and extend the inclusion of the system to the Pacific coast.

Congressional/Legislative Actions

- **Pass H.R. 3115/S, 1730, Living Shorelines Act, and provide increased funding for the National Coastal Resilience Fund.** NOAA's scope of work needs more funding to have the intended impact, its grant programs need funds to build local capacity around resilience planning, and it needs to educate and engage local governments on their SLR and flooding management needs and possible nature-based infrastructure solutions. NOAA should be given the responsibility of awarding grant money for living shoreline projects to state and local governments. Living shorelines help protect coastline communities from sea level rise by supporting ecosystem functions and habitats with the use of natural materials and systems, which help reduce the force of waves during storm events, in addition to providing habitat for wildlife, economic opportunities and recreational space for residents. Living shorelines, like many nature-based infrastructure alternatives, have been reported to cost less in maintenance and rebuild after storm events.
- **Fund and require USACE to properly evaluate nature-based solutions.** The benefits and cost-effectiveness of nature-based solutions has not been properly understood nor explored by USACE. A thorough valuation system should determine if nature-based solutions to SLR and flooding are cost-effective to build and maintain, as well as account for the additional benefits rendered to wildlife and community members. For example, a living shoreline or floodable park would provide water quality improvements, habitat creation, carbon sequestration, recreational spaces and tourism activity, in addition to reducing the impacts of SLR or flooding. Small to medium-scale working waterfronts might be better incorporated into redesigned coastlines through nature-based designs offering a dynamic shore that can incorporate a varied use and level access. Additionally, the lack of information on the benefits and limitations of nature-based solutions further complicates the permit process for projects.

Ensuring Success

Comprehensive policies designed to reduce the impacts of sea level rise and flooding events need to balance protecting economic assets, maintaining social cohesion, accounting for economic vulnerabilities, and increasing ecological benefits. Infrastructure projects designed to mitigate the effects of sea level rise or flooding events should incorporate natural components that offer longer project lifespans, reduced post-disaster repairs, have fewer negative impacts to neighboring properties and jurisdictions and provide increased ecological performance. Managing resilience or adaptation projects requires federal guidance and strategy to succeed and maintain overall organization across responsible agencies. In addition, equity and justice considerations are critical to ongoing discussions around enhancements to the National Flood Insurance Program; updates to address socioeconomic inequalities, burdens, and risk factors should be incorporated in order to address the needs of vulnerable communities.

It rests on the next Administration to address and correct the historic disproportionate benefit to whiter and richer communities during disaster relief fund allocation. Without equitable and organized management, individual states will continue to advance at different speeds that will create disparate results and potentially shift national migration patterns due to community-wide retreat as seen in Puerto Rico post-hurricane Maria. The Administration can use sea level rise and flood management resilience or adaptation initiatives to help reduce the economic impact of the Covid-19 pandemic.

Milestones

- First week: President promises to make disaster money eligibility criteria transparent and address historic equity issues.
- First hundred days: President announces the Sea Level Rise and Flood Management Task Force to research and establish a management strategy to organize and fund state and local government-led resilience or adaptation projects.
- First hundred days: Sea Level Rise and Flooding Management strategy is finished and agencies have clear responsibilities as it pertains to resilience or adaptation projects.
- First hundred days: Congress passes living shorelines bill that tasks NOAA with allocating funds for eligible projects.

Developing Climate-Ready Fisheries

Overview

Climate change is already affecting our fisheries and the food security, livelihoods, and opportunities for recreation they provide. Fishermen, who have long provided healthy protein to their families and ours, are finding that target fish populations have moved from their usual fishing grounds, are producing fewer offspring, and are smaller and less resilient. Important fish habitats like corals and kelp forests are also being damaged by warming and acidifying waters, changes in currents, harmful algal blooms and increased nutrient pollution.

The United States, a world leader in science-based fishery management under the Magnuson-Stevens Fishery Conservation and Management Act, must rise to face this systemic challenge to the foundations of fisheries sustainability. Healthy fish populations are critical for resilient ocean ecosystems that support the fishing businesses and traditions we value. While the specific impacts of climate change on our fisheries vary by region and by species, it is clear that climate change is jeopardizing our nationwide success in rebuilding and maintaining sustainable fisheries, and there is a growing need to adapt management of the Nation's fisheries to address these challenges. Fisheries that are climate-ready prioritize sustainability, resilience and equity in the context of rapid changes and increased uncertainty associated with climate change in order to preserve our ocean's long-term ability to provide food and support businesses, recreation and culture.

Preparing and adapting fisheries for climate change yields broad benefits. Climate-ready fisheries will continue to provide jobs and food security that are important to economic resilience and can buffer coastal communities. Climate-ready fisheries, if developed in partnership with Tribes, can also support cultural traditions and support Tribal and subsistence uses of fishery resources. Without action, it will be increasingly difficult to maintain sustainable fishing, where overfishing may further degrade ecosystem resilience and make the system more vulnerable to other environmental threats associated with climate change.

The next Administration must accelerate the transition to climate-ready fisheries by taking steps that adapt management and prepare fishing communities for change. This will include a need to anticipate and detect changes, understand mechanisms of change, and assess risks and priorities. It will require planning and responsive action. Because of the far reach of climate change impacts, climate-ready fisheries will require concerted efforts in science and research, modernized and expanded data collection, uptake of new management and policy tools and practices, and sustained engagement with fishing sectors and communities. Securing sustainable and climate-ready fisheries as part a broader suite of climate solutions is an opportunity to build resilience of both the ecosystem and coastal communities.

Administrative/Executive Actions

- **Provide comprehensive guidance to managers for how to incorporate climate change into management.** The Regional Fishery Management Councils and their Scientific and Statistical Committees will ultimately be developing management that must be responsive to climate change. Doing so will require integrating consideration of climate into existing management processes in ways that reflect principles of sustainability and equity and use the best available science. The agency should release guidance on how to achieve climate-ready fisheries objectives through incorporating climate information into fisheries science, decision-making and management measures. The agency should work directly with stakeholders to develop this guidance, and should work with Tribes both to develop the guidance and incorporate Traditional Knowledge into management.
- **Accelerate the use of proven science and management tools.** A number of tools have been developed and tested that can improve understanding of anticipated changes and plausible outcomes, and identify management options to prepare and adapt fisheries in response. The tools and strategies that have shown value should be used more and implemented in additional fisheries and regions, including scenario planning, risk assessment tools, and management strategy evaluation. The agency can support this acceleration through issuing technical guidance for tool use and promotion.
- **Increase coordination within NOAA on climate and fisheries.** To better understand and forecast impacts of climate change factors on fisheries, a host of information—including biological, oceanographic, and socioeconomic—is needed. NOAA Fisheries should establish and support interdisciplinary and collaborative efforts in each region that are dedicated to examining and addressing the impacts of climate change to fisheries. A primary purpose of these efforts should be to support the development and application of new and existing tools and to support implementation of climate-ready management options. In addition, NOAA Fisheries should enhance collaboration and coordination with other line offices, including the National Ocean Service and Oceanic and Atmospheric Research to improve the efficiency of data collection and sharing. In particular,

socioeconomic data and spatially explicit data on ecosystem services can inform sustainable and equitable fishery management as well as ocean planning efforts.

- **Create guidance to deal with shifting stocks.** Managers currently lack the tools to conduct adaptive management that addresses the conservation and management challenges of shifting stocks and the shifting availabilities of fish populations. Given the cross-jurisdictional nature of stock shifts, this problem necessitates agency-level guidance. Particular consideration should be given to issues around equity and ensuring policies are transparent, inclusive, and do not result in disproportionate benefits or costs to specific stakeholder groups.
- **Protect fish habitat.** Maintaining and restoring the places that fish live, feed, and spawn benefits not only fish populations but also the broader ecosystem. Considering needs for habitat in management can help strengthen ecosystem resilience in a changing climate. The agency can support habitat protections through fishery-specific mechanisms via the Regional Fishery Management Council process and non-fishery specific mechanisms such as National Marine Sanctuaries and other forms of Marine Protected Areas (see section on Advancing Climate-Smart Marine Protected Areas).
- **Continue to implement and update NOAA Fisheries Climate Science Strategy.** The 2015 Climate Science Strategy represented a comprehensive agency-led plan to strengthen production, delivery and use of climate-relevant science in the management of living marine resources and report on progress of implementation. This plan, and subsequent Regional Action Plans, are a natural foundation upon which to accelerate efforts on climate-ready fisheries. The agency should update the strategy to build upon the original effort and to spur implementation of new and remaining national and regional actions to meet priority objectives.
- **Convene national-level meetings.** The Administration could signal the priority of climate-ready approaches to fishery management by elevating discussion of the issue. In the past, the agency has accomplished this through national-level meetings (e.g. the National Saltwater Recreational Fisheries Summit) that convene stakeholders. NOAA Fisheries should convene a series of meetings on climate-ready fisheries to strengthen stakeholder involvement and share management ideas and approaches.

Congressional/Legislative Actions

- **Include climate change in federal fisheries law.** Support legislative changes to the Magnuson-Stevens Fishery Conservation and Management Act that incorporate climate change into fishery management and policy.
- **Prevent the use of climate impacts on fisheries as justification for rollbacks:** Oppose legislation that uses climate change as a rationale to weaken core sustainability requirements in the Magnuson-Stevens Fishery Conservation and Management Act.
- **Increase funding for science and management tools.** Across budget lines, increase funding for NOAA Fisheries that is dedicated to scientific research and management action regarding climate change. In particular, support increases in funding available for existing tools (including risk assessments, scenario planning, and management strategy evaluation); funding for implementation of these tools should be applied across regions.
- **Increase grant funding that can be prioritized to address climate-ready objectives.** Increase funding for grant programs in NOAA Fisheries in ways that prioritize and address climate change impacts on fisheries. For example, the Saltonstall-Kennedy Grant Program funds projects that address the needs of fishing communities, optimize economic benefits by building and maintaining sustainable fisheries, and increase other opportunities to keep working waterfronts viable. Funding from this program could be directed to projects that achieve these aims while addressing the risks of climate change to fishing communities. Along with existing funding mechanisms, new grant programs could be created to direct funding from NOAA Fisheries to the Regional Fishery Management Councils for implementation of climate-ready fishery management. Similarly, the cooperative research program could prioritize grants that address climate issues.
- **Increase funding for staff time to work on climate and fisheries.** Additional funding should be directed to NOAA Fisheries to increase the capacity for coordination within NOAA Fisheries and NOAA more broadly on climate change and fisheries issues. One such example would be increasing staff time (FTEs) at each NOAA Fisheries Science Center that is dedicated to coordination with the relevant Regional Office and headquarters offices on climate and resource management.

Ensuring success

Currently, efforts to prepare and adapt fisheries for climate change have failed to keep pace with the rapid changes occurring in our oceans, presenting real risks to fishermen and coastal communities. From the collapse of Pacific cod in the Gulf of Alaska to the dramatic shifts of stocks up the eastern seaboard, climate change is reshaping our ocean ecosystems and putting our ability to sustainably fish at risk. While groundwork has been laid for success, including an increased focus on ecosystem-based fishery management, growing attention and demand from Regional Fishery Management Councils for more climate impact information and management tools, and an expanding scientific literature connecting climate impacts to the drivers of fish productivity and health, we are lacking the political will to appropriately identify and prioritize climate change as the primary threat to sustainable fisheries. Success for the next Administration will mean leveraging existing efforts and tools while ambitiously planning for and instituting broader structural changes to how fisheries are managed to be climate-ready.

Growing recognition of the issue by fishing communities means many fishermen are ready to adapt and to help accelerate efforts and create more consistent and substantive change nationwide. However, our nation's fishermen are currently reeling from widespread economic impacts from the COVID-19 virus, which will complicate efforts to advance fishery management while so many are trying to rebound. The Administration should ensure an inclusive, transparent process in which Tribes, fishermen and other fishing stakeholders are all given meaningful opportunity to engage as efforts develop. Further, the costs and benefits of actions to ready fisheries for climate change should be made with consideration to equity among stakeholders.

As fisheries are impacted by warming seas and other changes, maintaining sustainability will be more difficult in many cases. We anticipate a push by some to view inevitable management challenges resulting from climate (e.g. a fish stock becomes overfished as a result of environmental conditions) as a rationale to weaken requirements for sustainability. It is imperative that requirements for sustainability are not rolled back.

Milestones

- First hundred days: NOAA announces development of a visionary plan to accelerate efforts to adapt fishery management to the impacts of climate change.

Addressing Ocean Acidification and Coastal Water Quality

Overview

While we have made improvements in U.S. water quality in the nearly fifty years since the passage of the Clean Water Act (CWA) in 1972, climate change is now actively exacerbating the impacts from many of the challenges that remain. Point sources of pollutants have become mostly well regulated, substantially decreasing the amount of man-made toxins entering national waters. However, non-point sources of pollution from diffuse origins remain difficult to regulate even though their impacts are massively compounded by climate change and result in profound impacts to coastal and oceanic water quality.

Atmospheric carbon dioxide from fossil fuel burning dissolves in the surface ocean to drive ocean acidification. Ocean acidification has already jeopardized the West Coast's Pacific oyster aquaculture industry, a multimillion-dollar-a-year harvest that employs thousands in coastal towns and helps sustain Tribes from California to Alaska. Coastal acidification, or alterations of pH and chemical balances in coastal waters, is a product of atmospheric carbon dioxide-driven ocean acidification plus nearshore processes that alter aquatic pH and carbon dioxide levels. Fresh surface water and groundwater naturally have high carbon dioxide levels and low pH, and they often lower coastal ocean pH when the waters mix in the coastal zone. Other materials from non-point sources carried by surface and groundwater include chemicals and persistent organic pollutants, nitrogen and phosphorus from sewage and agriculture, and even high-CO₂, low-pH fresh water. Nitrogen, phosphorus, and other elements that fertilize plant life fuel algal blooms that generate carbon dioxide, thereby worsening acidification, and consume oxygen to cause hypoxia (lethally low oxygen levels) in coastal waters. NOAA-led research in Puget Sound has traced the proportional contributions of different local drivers to coastal acidification; these contributions will vary regionally across the country (19).

The loading of most substances to the coastal zone, regardless of source type, is changing as a direct or indirect result of climate change. For example, regional circulation predisposes the West Coast of the U.S. to upwelling events that accelerate ocean acidification, and these may increase in the future. Also extreme precipitation and flooding in the coastal zone, made more frequent and intense by severe storms (themselves worsened by climate change), carry pulses of pollutants from the built environment into

nearshore waters. Chemical pollutants such as fuel, solvents, and heavy metals travel in both surface and groundwater. Insufficiently treated sewage and storm water carries nitrogen and phosphorus, along with other pollutants, pathogens and organic compounds into coastal surface and groundwater. Sewage and stormwater overflow events can worsen hypoxia and acidification in the coastal zone as well as create hazardous health conditions. All of these changes harm fisheries and other coastal ecosystems that support human communities' economies and identities.

Some harmful algal blooms (HABs) favored by nutrient loading and acidification in the coastal zone create toxins that poison marine and human life. Most HABs are damaging simply because of their abundance, which creates hazards to navigation and further chokes off oxygen supplies to other local species. The U.S. Gulf Coast, Florida, Alaska, and other areas have experienced several long-lasting HAB events in the past several years, and these have closed beaches, halted fishing and shellfishing, and driven away tourism. Ocean acidification may worsen HAB severity and toxicity.

While mitigation of carbon dioxide emissions will help address water quality changes attributable to warming, acidification, oxygen loss, and increased storm severity and frequency, several categories of climate adaptation can be enhanced now to protect coastal communities and the marine resources they depend on. Continued robust support of science and regulatory agencies is necessary to allow: Continuous environmental monitoring of aquatic systems at high enough quality to detect and attribute climate change signals; Understanding of how nonpoint pollution, including carbon dioxide and/or lower-pH freshwater, travels and disperses in the aquatic environment, and how to manage its impact on the environment over time, especially as climate impacts become more severe; and Support for local entities to upgrade storm- and wastewater infrastructure to accommodate current and future anticipated conditions (e.g. more regular or intense flooding, droughts, higher populations, and higher overall sea level).

Administrative/Executive Actions

- **Direct EPA to issue voluntary guidelines for municipalities** to use when developing fertilizer ordinances.

Congressional/Legislative Actions

- **Continue to invest in the NOAA Ocean Acidification (OA) program** and other agencies' programs that participate in the Interagency Working Group on Ocean Acidification.
- **Enact into law House-passed legislation on OA**, including H.R.1921, H.R.1716, H.R.988, and H.R.1237, that deepens research on the issue and places emphasis on decreasing coastal community vulnerability, developing our OA observing system, and understanding the interactive effect of coastal processes on OA and HABs.
- **Increase funding for EPA research** that will clarify how to incorporate acidification and other nonpoint sources that alter acidification (e.g., nutrients that encourage eutrophication) into modern watershed management principles and wastewater management using appropriate TMDLs.
- **Increase federal funding for agencies (including NOAA and USGS) and states** to conduct regular environmental monitoring for climate change-relevant water quality variables and to develop models that will help managers understand the primary drivers altering local water quality.
- **Fund the Clean Water State Revolving Fund** within the EPA at a minimum of \$10 billion annually to ensure communities have the resources to deal with nutrient runoff, stormwater, and other pollution sources in the face of sea level rise. Additionally, these funds should be targeted to disadvantaged and Tribal communities in the form of grants rather than loans.
- **Increase funding and support for the protection and conservation of natural and undeveloped coastal areas.** Undeveloped coastal areas include ecosystems such as wetlands, sand dunes, and coastal forests, all of which help clean salt and fresh water and balance nutrient loads. The section in the report from the House Select Committee on the Climate Crisis on Protecting and Restoring America's Lands, Waters, Ocean, and Wildlife identifies legislation that would help increase funding and support of natural and undeveloped coastal areas.
- **Provide additional funding to help communities build and maintain drinking water and wastewater infrastructure.** Many of the nation's coastal municipalities are facing difficult and expensive challenges in maintaining aging wastewater infrastructure. If cities and regions have full wastewater treatment facilities that provide drinking water for countless residents, they would be better equipped to maintain their facilities if Congress provided more funding. In coastal areas facing issues of saltwater intrusion due to more common tidal flooding and sea level rise, on-site septic systems have become problems; without the necessary ground levels to filter effluent materials from homes, ground sources of freshwater can and do become

contaminated. Congress should provide ample funding sources or credit services to allow local governments to undertake septic to sewer conversions. Several pieces of introduced legislation discussed in the House Select Committee on the Climate Crisis Report's section on Water System Investment do this.

- **Pass legislation that will help restore wetlands for coastal resilience.** Wetlands help filter water flowing from land into the coastal ocean, can help ameliorate coastal acidification and pollution, sequester greenhouse gases, and retain flood waters during storm surge events. Several pieces of introduced legislation discussed in the House Select Committee on the Climate Crisis Report's section Protecting and Restoring Wetland Ecosystems do this. (See also section on blue carbon storage.)
- **Pass legislation that will help address urban flooding.** Runoff waters from urban areas and developed coastlines deliver chemical pollutants, nutrients, and low-pH freshwater to coastal oceans. Urban areas that have issues of land subsidence and poorly managed floodplains struggle to cope with more frequent rainfall flooding and saltwater intrusion from storm surge events and sea level rise, affecting their freshwater surface and ground sources. Several pieces of introduced legislation discussed in the House Select Committee on the Climate Crisis Report's sections on the National Flood Insurance Program and help address this.

Ensuring success

A strong commitment is needed to sustain and expand ongoing water quality monitoring by states and federal science agencies. This permits detection and attribution of changes, and supports management efforts to address drivers of change. Research is also needed to support and expand EPA's ability to address point and nonpoint sources of substances that alter coastal water pH, encourage algal overgrowth, deliver toxins to the coastal zone, and/or promote development of HABs.

Milestones

- First hundred days: Publicly acknowledge the need for grants/ financial programs for states and Tribes to permit improvement/ modernization/ expansion of waste and stormwater management infrastructure.
- First year: Revise EPA's (re)development rules to require inclusion of stormwater management/natural filtration.
- First year: Invest in agencies participating in the IWG-OA and monitoring coastal and ocean water quality variables.

Setting a Global Example for Ocean-Climate Stewardship

On the international stage, rejoining the Paris Agreement and formulating the 2030 emissions reduction target should of course be the next Administration's first steps in climate diplomacy. Yet the Administration will also have several near-term opportunities to set a global example for ocean-climate stewardship (20). First, the Administration should champion the emerging effort to create an ocean-smart U.N. Framework Convention on Climate Change (UNFCCC) and Paris Agreement. At the next U.N. climate summit (COP 26), it should encourage countries to adopt a decision that creates an ongoing arrangement, such as a biennial ocean-climate dialogue, to help ensure that ocean issues and solutions stay top-of-mind in national climate goals and the processes of the UNFCCC.

Second, the Administration should formulate its own ocean-climate commitments that could supplement the next U.S. nationally determined contribution (NDC) under the Paris Agreement (whether they are submitted along with the U.S. emissions target, added subsequently as an update, or announced separately). For example, the Administration could create a specific complementary target that focuses on reducing carbon dioxide emissions. This would raise global awareness of the destructive role of carbon dioxide emissions, which drive both warming and acidification, and the need for rapid mitigation. The Administration could also include sector-specific commitments on achieving zero loss of wetlands, decarbonizing ports, or scaling up well-sited offshore renewable energy.

Third, the United States will have an opportunity to steer ocean-climate leadership groups. Given that the UNFCCC is a large multilateral body that operates by consensus, it is the role of smaller, progressive coalitions to serve as a driving force for climate action. For example, the Pacific Rim Ocean-Climate Action Partnership is a nascent coalition that aims to drive ambitious emissions reductions and advance ocean-based climate solutions. Meanwhile, the Friends of the Ocean and Climate, currently chaired by Fiji and Sweden, is working to integrate ocean issues in the context of the UNFCCC. The United States could also incorporate ocean-

climate action into any new regional agreements that support the goals of the Paris Agreement, such as a North American climate strategy.

In these ways, the next Administration could promote ocean-climate stewardship globally. And by advancing the ocean-based mitigation and adaptation measures in this report, the Administration would be laying the foundation—and presenting its vision—for a blue-green future for the United States that recognizes the important connections between the ocean and climate change.

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